MOBILE BANKING LANDSCAPE

Payments Strategy Service Forum October 2, 2008

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AGENDA

➤ The Mobile Landscape
➤ Why Offer Mobile Banking Services?
➤ Technology Solutions
➤ Risks and Regulations
➤ An Outlook
Mobile Banking Definitions

Mobile Banking:
- Use of mobile device to connect to a financial institution to conduct customer self-service (CCS).
- Includes viewing account balances, transferring funds between accounts, paying bills or receiving account alerts.

Mobile Payments:
- Use of a mobile device to make a purchase or other payment-related transaction.
- Payments initiated in physical or virtual worlds, and can be conducted via SMS, MMS, mobile Internet, downloadable application, and NFC chips.

Mobile Banking Definitions

Mobile Commerce
- Extends e-commerce to mobile devices to buy and sell goods and services.
- Includes use of handheld devices such as cellular phones or personal digital assistants (PDAs).

Mobile Wallet
- A secure location on a mobile device to store information and make payments from multiple credit, debit, membership or loyalty cards, and any other current forms of card-type transactions.
- Wallet can store multiple addresses for delivery purposes.
- Information is typically protected by a PIN, code or token.

THE MOBILE LANDSCAPE
U.S. Mobile Banking Landscape

- All large banks, most regionals, and many mid-tier FIs now offer mobile banking services
- There is little real “hard” usage data
  - Most FIs limit announcements to percent of online users
- Offering browser-based services that mimic home-banking functions is most common, except among largest banks
- Functions offered are chiefly information-based
  - e.g., branch & ATM locators, transaction history, balance inquiries)
- Payments are “phase 2” services
  - Remittances appear to be an area of new opportunity
- Finding a ROI model is difficult
  - FIs offering mobile services appear to be absorbing the expense for strategic reasons
Building Blocks of Mobile Banking & Payment Services

Proximity Mobile Payments

NFC Card Equivalent

Remote Mobile Payments

P2P (Person to Person Payments)

Advanced Features of Mobile Banking

Basic Mobile Banking

Online Banking

Opportunities for revenue generation

✓ US current position
✓ Security and regulation essential to move forward
U.S. Mobile Phone Population Shows Steady Growth

**Mobile Phone Subscribers as a Percentage of Total U.S. Population**

<table>
<thead>
<tr>
<th>Year</th>
<th>2004</th>
<th>2005</th>
<th>2006</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
<th>2011</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>61%</td>
<td>65%</td>
<td>70%</td>
<td>75%</td>
<td>80%</td>
<td>93%</td>
<td>95%</td>
<td>96%</td>
</tr>
</tbody>
</table>

Source: Celent, Sept. 2008
Analysts’ Estimates of U.S. Mobile Banking Users Adoption Agree Only on Growth
Mobile Banking Players

Banking System Participants
- Financial Institutions
- Customers
- Networks
- Clearing/settlement organizations
- Technology vendors
- Third party processors

Technology Players
- Wireless carriers
  - Verizon
  - ATT
  - T-Mobile
  - Sprint
- Handset manufacturers
  - Nokia
  - Apple
  - Motorola
  - Blackberry
  - Samsung
WHY OFFER MOBILE BANKING SERVICES?
Value Propositions for FIs

• Attract a growing number of younger consumers, as well as remittance and underbanked market segments
• Use the mobile phone (etc.) as an authentication device
• Keep up with the Joneses – maintain competitive position relative to larger FIs
• “Create a new user experience” – offering a new value proposition to customers
• Ability to move to fee-generating services
  ➢ Payments
  ➢ Real-time information

“If all we do is replicate Internet banking on this mobile device, it will just be yet another cost to the financial institution.” Tripp Rackley, CEO, Firethorn
Financial Institutions Business Model

- Growth in mobile payments sector
- Relationships with MNO through an integrated approach.
- Rising industry competition
- Online banking is already consolidated, differentiation is key
- Customer retention
- Branding

Opportunities for growth

- View mobile banking as a new channel to create customer value

Concerns
- Managing fraud and payment risk
- Handling compliance and regulation

Objectives

- Customer retention and new segments
- Reduce operational costs.
- Deliver new products and services
- Customer awareness and convenience

Industry Competition

- New product development and services
- Online banking reach limited
- Mobile payments will bring revenue in the long-term

Source: Boston Federal Reserve
# Roll-out by Major Financial Institutions by Year

<table>
<thead>
<tr>
<th>2006</th>
<th>2007</th>
<th>2008</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Wells Fargo</strong></td>
<td><strong>Bancorp South</strong></td>
<td><strong>PSCU Financial Services</strong></td>
</tr>
<tr>
<td>350,000-550,000 users</td>
<td>20,000 users</td>
<td></td>
</tr>
<tr>
<td><strong>Wachovia</strong></td>
<td><strong>Citibank</strong></td>
<td><strong>Washington Mutual</strong></td>
</tr>
<tr>
<td>175,000-225,000 users</td>
<td>1 million+ users</td>
<td></td>
</tr>
<tr>
<td><strong>Bank of America</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>JP Morgan Chase</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15,000-90,000 users</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>SunTrust</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>America First CU</strong></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: RBI, Crone Consulting estimates, June 2008
Mobile Banking Features Offered To Consumers By U.S. FIs

- Check Balances (Savings, DDA): 100%
- View Recent (Savings, DDA)(Tran): 100%
- View Any Other Account: 91%
- Move Funds Between Accounts: 91%
- Check Balances (Credit Card): 87%
- View Recent Credit Card (Tran): 83%
- Pay Bills: 70%
- ATM/Branch Locator: 57%
- Transfer funds to others: 48%
- SMS/Text Alerts: 43%
- View Current Rates: 39%
- Transfer funds between FI: 17%
- Open Account: 17%

Opportunities for Improvement

Mobile Banking Profile – Bank of America Example

**Snapshot**

**Access Platform:** WAP/Browser  
**Launch Date:** March 2008  
**Handset:** All mobile devices internet enabled  
**Carriers:** Not carrier dependent  
**Vendor:** In-house Implementation  
**Functions:** View account balance, review transactions, pay bills, transfer funds

**Mobile Banking “Success”**

- > 4 Mn M.B. customer sessions (May 2008)
- 224,000 activations reaching 840,000 active customers.
- Customer Base:
  - Two- thirds are under 35 years old
  - Four out of five under 45
Corporates Look for Other Services

Today
- Alerts
- Balance and account data
- Payment transaction history

Future – Static Features
- Viewing check images
- Balance reporting

Future -- Interactive Features
- Customer self-service
- Positive pay tools
- Payment initiation with approval functions
- Investments

Source: Celent, NACHA teleseminar, Mobile Banking Way Stations, Sept. 2008
TECHNOLOGY SOLUTIONS
## Mobile Banking Platform Definitions

<table>
<thead>
<tr>
<th><strong>SMS (Short Message Service)</strong></th>
<th>Text message format which allows users of mobile phones to send / receive simple text messages to each other</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Downloadable Application</strong></td>
<td>Application loaded onto mobile phone that enables customers to click through menus quickly</td>
</tr>
<tr>
<td></td>
<td>Best for complex transactions (e.g., payments or fund transfers) requiring security measures</td>
</tr>
<tr>
<td><strong>Wireless Application Protocol (WAP)/Browser</strong></td>
<td>WAP: Secure specification that allows users to access information instantly, particularly Internet content, via handheld wireless devices such as mobile phones and PDAs.</td>
</tr>
<tr>
<td></td>
<td>Browser software enables user to display and interact with text, images, videos, music, etc. on a World Wide Web (www) page of the Internet, such as a bank’s online banking system.</td>
</tr>
</tbody>
</table>

## Selected U.S. FIs – Planned Mobile Platforms (Ranked By Asset Size)

<table>
<thead>
<tr>
<th>Rank</th>
<th>FI</th>
<th>Operating System</th>
<th>Vendor</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Citigroup</td>
<td>SMS/Text</td>
<td>In House</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Downloadable Embedded</td>
<td>mFoundry</td>
</tr>
<tr>
<td>2</td>
<td>Bank of America</td>
<td>WAP/Browser Based</td>
<td>In House</td>
</tr>
<tr>
<td>3</td>
<td>JP Morgan Chase</td>
<td>SMS/Text</td>
<td>In House</td>
</tr>
<tr>
<td>4</td>
<td>Wachovia</td>
<td>WAP/Browser Based</td>
<td>In House</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Downloadable Embedded</td>
<td>Firethorn/Checkfree</td>
</tr>
<tr>
<td>5</td>
<td>Wells Fargo</td>
<td>SMS</td>
<td>In House</td>
</tr>
<tr>
<td></td>
<td></td>
<td>WAP/ Browser Based</td>
<td>In House</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Downloadable Embedded</td>
<td>In House</td>
</tr>
<tr>
<td>6</td>
<td>HSBC</td>
<td>SMS/Text (Business Customers only)</td>
<td>In House</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Downloadable Embedded (UK only, not USA)</td>
<td>Monitise</td>
</tr>
<tr>
<td>7</td>
<td>WAMU</td>
<td>SMS</td>
<td>M-COM</td>
</tr>
<tr>
<td>8</td>
<td>US Bank</td>
<td>WAP/Browser</td>
<td>In House</td>
</tr>
<tr>
<td>9</td>
<td>Sun Trust</td>
<td>Downloadable/Embedded</td>
<td>Firethorn/Checkfree</td>
</tr>
<tr>
<td>10</td>
<td>Capital One</td>
<td>WAP/Browser Based</td>
<td>In House</td>
</tr>
</tbody>
</table>

Source: Javelin Strategy & Research. Mobile Banking Vendor Analysis, August 2008
## Selected Vendor Platforms

<table>
<thead>
<tr>
<th>Vendor Platforms</th>
<th>ClairMail</th>
<th>Clickatell</th>
<th>Firethorn</th>
<th>Harland</th>
<th>Henry</th>
<th>M-COM</th>
<th>mFoundry</th>
<th>Monitise Americas</th>
<th>MShift</th>
<th>Sybase</th>
<th>Tyfone</th>
<th>Yodlee</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>SMS</strong></td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X**</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td><strong>WAP</strong></td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X**</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td><strong>Downloadable Application</strong></td>
<td>X*</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X**</td>
<td></td>
<td></td>
<td></td>
<td>X**</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td>3</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>2</td>
<td>3</td>
<td>1</td>
<td>2</td>
<td>2</td>
<td>3</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td><strong>LARGE FI</strong></td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>MID-SIZE FI</strong></td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td><strong>SMALL FI</strong></td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>2</td>
<td>2</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>1</td>
</tr>
</tbody>
</table>

*ClairMail's application provided by mFoundry. Sybase's application provided by C-SAM.

**Tyfone's service provided by memory card that can be inserted in a mobile device.

New Platform for Mobile Payments

NFC – Near Field Communication

- A short-range proximity technology that uses radio frequency to enable communication between two devices.
- NFC chips are embedded in mobile phones to enable this contactless ‘tap and go’ payment technology.

Why use NFC?

- Purchasing speed and convenience
- Increases consumer interactivity
- Reduces need for cash
- Merchant marketability
- Consumer traveling convenience
NFC Contactless Payment Pilots

- **MasterCard – 7-Eleven** – Fast food, convenience store purchases
  - Dallas, TX – Six month trial began in November 2006
  - 500 participants, Nokia 3220 phones with NFC capability

- **MasterCard - NYC MTA** Mobile Trial public transportation
  - Citi MasterCard, Cingular Wireless account and NFC-enabled Nokia mobile phones.

- **BART & Jack in the Box** – Transportation, fast food, digital content
  - Four-month trial began in February 2008
  - 230 BART commuters received NFC-enabled Samsung phones.

- **VISA - Atlanta Phillips Arena** – concession purchases & media download
  - Six month trial began in December 2005
  - 150 Atlanta sports team season ticket holders with a Chase-Visa and Cingular Wireless account issued NFC-enabled Nokia phones.
Consumers and Vendors Have Differing Concerns

**Consumer Concerns**
- My personal... 69%
- My account... 62%

**Vendor Concerns**
- Security Fears 77%
- Lack of executive support 62%
- Unfavorable economic climate 46%
- Lack of consumer interest 38%
- Limitations of mobile technology 15%
- Too costly 15%
- Technological Problems 8%
- Other 38%

RISKS AND REGULATIONS
Risks and Barriers to Mobile Banking

- Carrier/vendor technologies incompatible, lack standards
- Business models not yet standard
- Complexity using device
  - Entering passwords, commands difficult
  - Applications can be tricky on handset
- Customer ownership unresolved
  - Bank or carrier?
  - Responsibility for customer service, fraud prevention, billing
  - Revenue sharing
- Regulation emerging – liability issues unresolved
- Security
  - Authentication and Fraud, especially cross-channel
  - Lost/stolen phones
  - Secure access via wireless network
- Customer demand – is it there? Will it be?
Will Regulatory Issues Impede Growth in Mobile Banking?

- Numerous regulatory agencies touch payments and/or wireless transactions
  - e.g., Federal Reserve, FTC, FCC, SEC, NACHA, FDIC, OTC, OCC, NCUA
- No legal framework specific to mobile banking today
- Financial services’ and telecoms’ regulations differ significantly
  - Telecoms have limited liability
- Cost of regulatory compliance may be too high
  - e.g., KYC, BSA/AML, state MSB licenses
- Mismatch between potential regulatory requirements and mobile payment standards
  - Participants might take “wait and see” approach
Possible Oversight / Regulatory Requirements

- Mobile banking services should be ubiquitous – fair access for all consumer segments
- Interoperability among networks and handsets
- Protect against unauthorized transfer of funds at any point in the process
- Establish grievance procedures
- Ensure customer data privacy
- Identify recourse for technical failures
- Customer Notification - Provide adequate and timely disclosure of risks, responsibilities and liabilities of mobile transactions to customers
- Ensure security requirements met for authentication
OUTLOOK
Outlook

- More FIs will offer mobile banking -- with continuing evolution and enhancement of services offered
  - Businesses will adopt mobile banking services more readily
  - Payments (especially for bill pay) and NFC will be levers for value-added, priced services
  - International remittances will foster mobile payment transfer offerings … at least by selected (larger) FIs
  - Cell phone will act as “authentication device”
- Vendors will continue to consolidate
  - Alliances of top FIs and carriers, vendors, or other third parties will proliferate
- U.S. market will follow other markets in the near future
- The market will be driven by standards and technology – carriers remain a wildcard
## Do All Roads Lead to NFC / Proximity Payments?

### NFC Timeline

<table>
<thead>
<tr>
<th>2008</th>
<th>2009-2010</th>
<th>2010</th>
<th>2010-2011</th>
<th>(ongoing)</th>
<th>2011</th>
</tr>
</thead>
<tbody>
<tr>
<td>Info-focused Mobile Banking</td>
<td>Bill Pay</td>
<td>Remittances</td>
<td>Intra, Inter-Bank /P2P</td>
<td>m-Commerce</td>
<td>M Promotions + Plastic Cards</td>
</tr>
</tbody>
</table>

### Balance look-up
- Mobile version of on-line bill pay

### Transaction history
- Send or receive remittances via mobile-based accounts

### Self A2A transfers
- Send funds P2P via mobile interfaces

### Remote payments
- Remote payments for purchase of digital content & physical goods

### m-Commerce
- Mobile coupons & promotions with payment via plastic card at POS

### Proximity payments
- Proximity payments to buy physical goods.

### Technology
- Contactless readers, NFC chip in handset
- SMS/text, mobile browser, client application

### U.S. 2007
- U.S. receive solutions. Western Union to launch send in 2008 with Affinity Mobile
- U.S. in market: Paypal, Obopay, low adoption
- U.S. 3-4 years. Mostly digital content. Low adoption for physical goods
- U.S. solutions target Gen Y in 2007. Little tie in with card programs
- U.S. pilots only. No clear leaders driving NFC in industry

### U.S. 2008 - 2010
- U.S. few banks 2007, more 2008
- U.S. in market: Paypal, Obopay, low adoption
- U.S. solutions target Gen Y in 2007. Little tie in with card programs

### Source
- Oliver Wyman Group 2008