

# Primer on Mobile Financial Services

BITS and FSTC Mobile Financial Services  
Forum

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# Agenda

- Key Terms
- Mobile Banking & Payments Landscape
- Regulatory Framework
- Security
- Role of Central Bank

# Key Terms

- **Mobile Banking**
  - Use mobile device to connect to a financial institution to view account balances and transactions, transfer funds between accounts, pay bills, receive account alerts, deposit checks, etc.
- **Mobile Payments**
  - Use mobile device for purchase or other payment-related transaction at point of sale (proximity) or via internet (remote)
  - May be conducted via SMS, MMS, mobile Internet, downloadable application, contactless or barcode technology
  - Process and settle over traditional banking networks (credit, debit, ACH), mobile carrier or other third party network

# Delivery Platforms for Mobile Banking & Payments

OPTIONS	SMS/Short message service	Wireless Application Protocol (WAP)	Downloadable Smartphone Application
Description	Send/receive low risk text messages & alerts	Browser access via mobile phone to internet content	User-friendly apps customized to mobile smart phone screen
Advantages	<ul style="list-style-type: none"> <li>• ~90% of U.S. phones</li> <li>• FI/carrier agnostic</li> </ul>	<ul style="list-style-type: none"> <li>• FI/carrier agnostic</li> <li>• Range of services</li> <li>• ~ 60% of U.S. phones</li> <li>• No download required</li> </ul>	<ul style="list-style-type: none"> <li>• Blackberry, iPhone, Android</li> <li>• FI/carrier agnostic</li> <li>• Faster navigation</li> <li>• More secure</li> </ul>
Challenges	<ul style="list-style-type: none"> <li>• 160 character message</li> <li>• Less secure</li> <li>• Not encrypted</li> </ul>	<ul style="list-style-type: none"> <li>• For online banking customers</li> <li>• Small screen</li> <li>• Slower data transmission</li> <li>• Expensive data plan</li> </ul>	<ul style="list-style-type: none"> <li>• ~ 30% of U.S. phones</li> <li>• Extensive data plan</li> <li>• Easy set-up</li> <li>• Not as ubiquitous</li> <li>• Involves FI, carrier, vendor</li> </ul>

# Mobile Banking and Payments Landscape

# Mobile Banking in Developing Countries

- Few payment alternatives to cash – no bank accounts or credit cards
- Lack of banking and physical infrastructure to reach people located remotely
- Large unbanked populations with limited landlines BUT high mobile phone penetration
  - e.g. Philippines, India, Kenya
- Mobile Network Operators (MNOs) have created systems using SMS for mobile P2P money transfers and remittances with extensive networks of local agents (e.g. M-Pesa in Kenya)
- Mobile payments replace ‘risky’ cash

# Mobile Payments in Developed Countries

- Technologically advanced countries
  - e.g. Japan, Singapore, S. Korea
- Highly concentrated banking markets, cash-intensive
  - Debit card not a major payment method
  - Mobile payments typically replace cash
- Mobile Payments initiated by mobile carriers (MNOs) partnering with banks, government, transit authorities
- Mobile phones enabled with contactless chips to pay for transit/retail purchases
- Governments more willing to intervene to ensure success of mobile payments

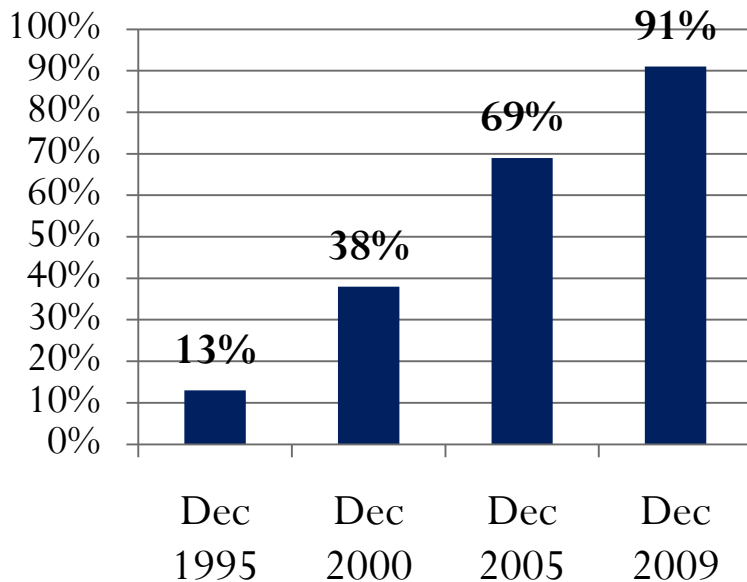
# U.S. Mobile Banking Landscape

- All large banks, most regional and many mid-tier FIs offer mobile banking services
- More large banks offer downloadable applications, SMS and WAP/browser-based mobile access (Triple Play)
- Smaller banks and credit unions may implement their core processors' mobile packages
- Banks usually start with basic, information-based services
  - Branch & ATM locators, transaction history, balance inquiries
- Payment or transaction services are usually Phase 2
- Most banks do not charge for mobile banking

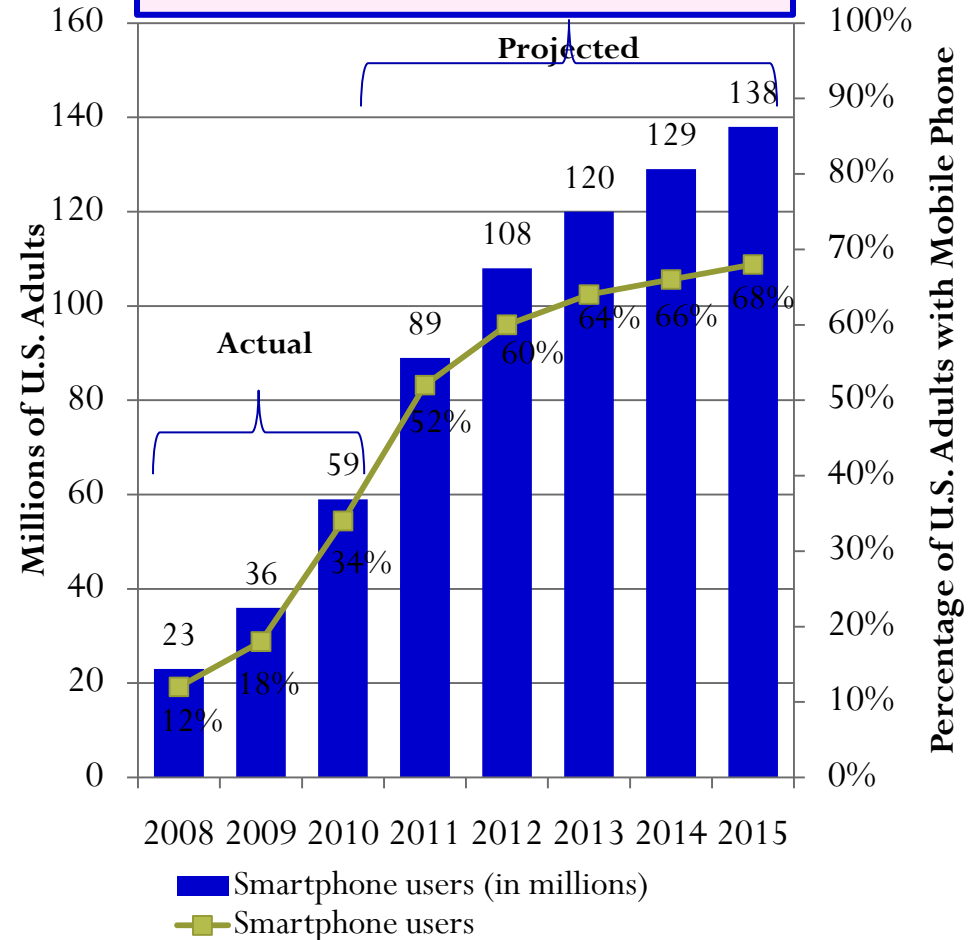


# U.S. Mobile Phone Penetration Drives Mobile Banking and Payments

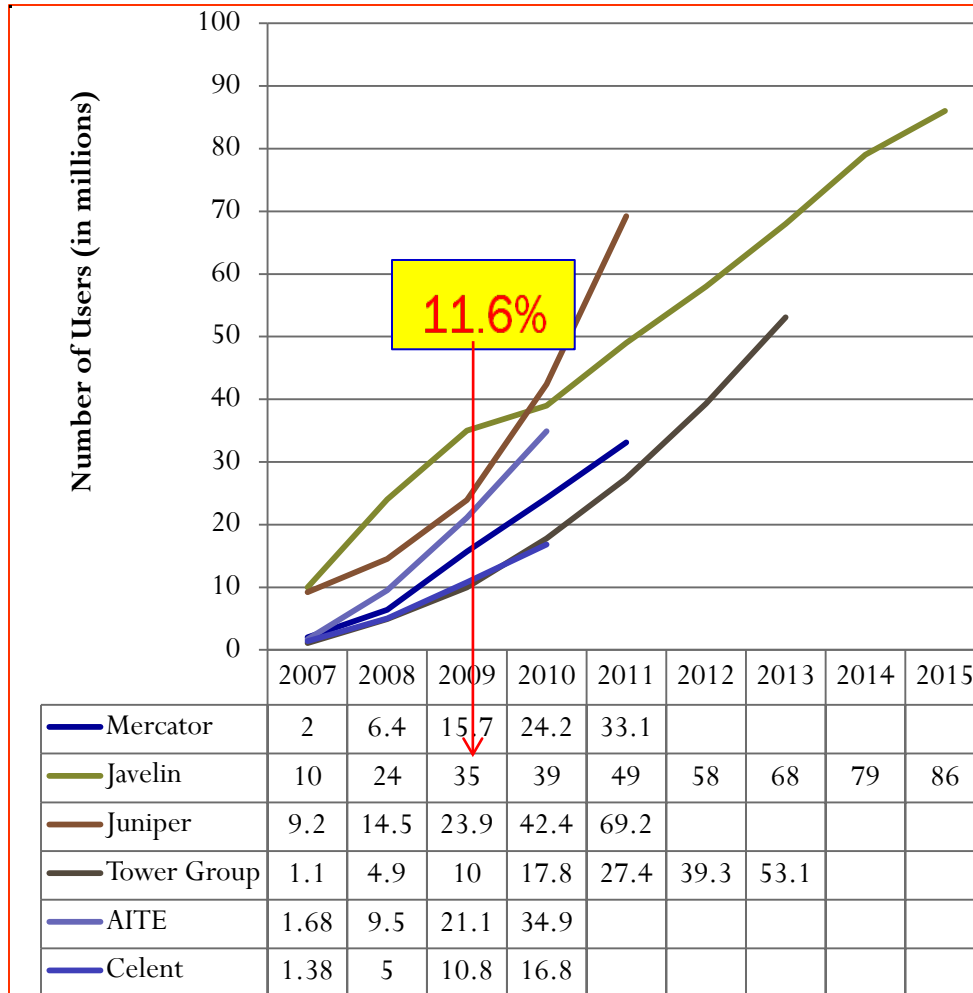
Mobile Phone Subscribers - Percentage of Total U.S. Population



Smart Phone Ownership - Five Year Forecast



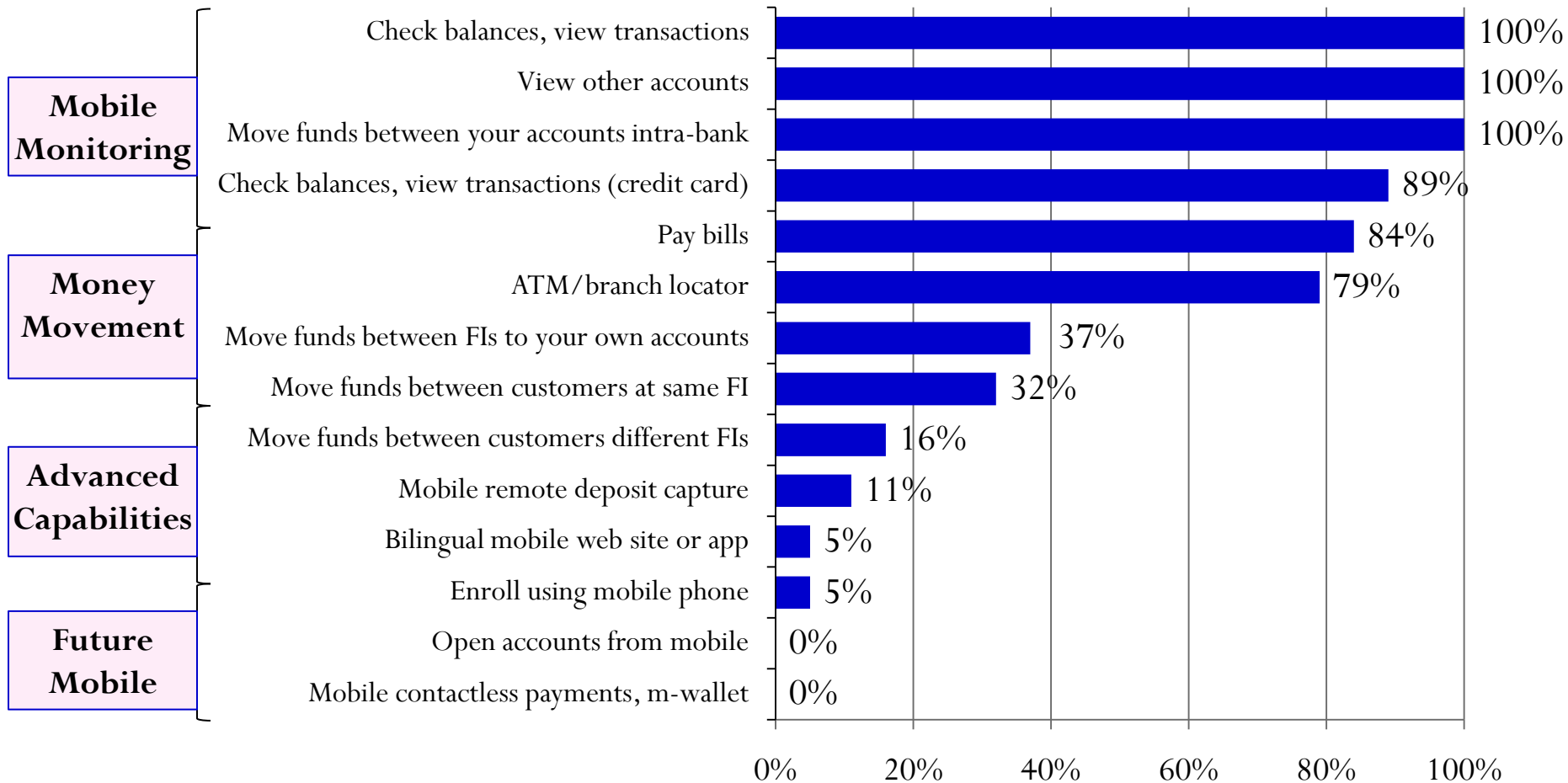
# U.S. Mobile Banking Adoption Industry Forecast vs Fed Survey Results



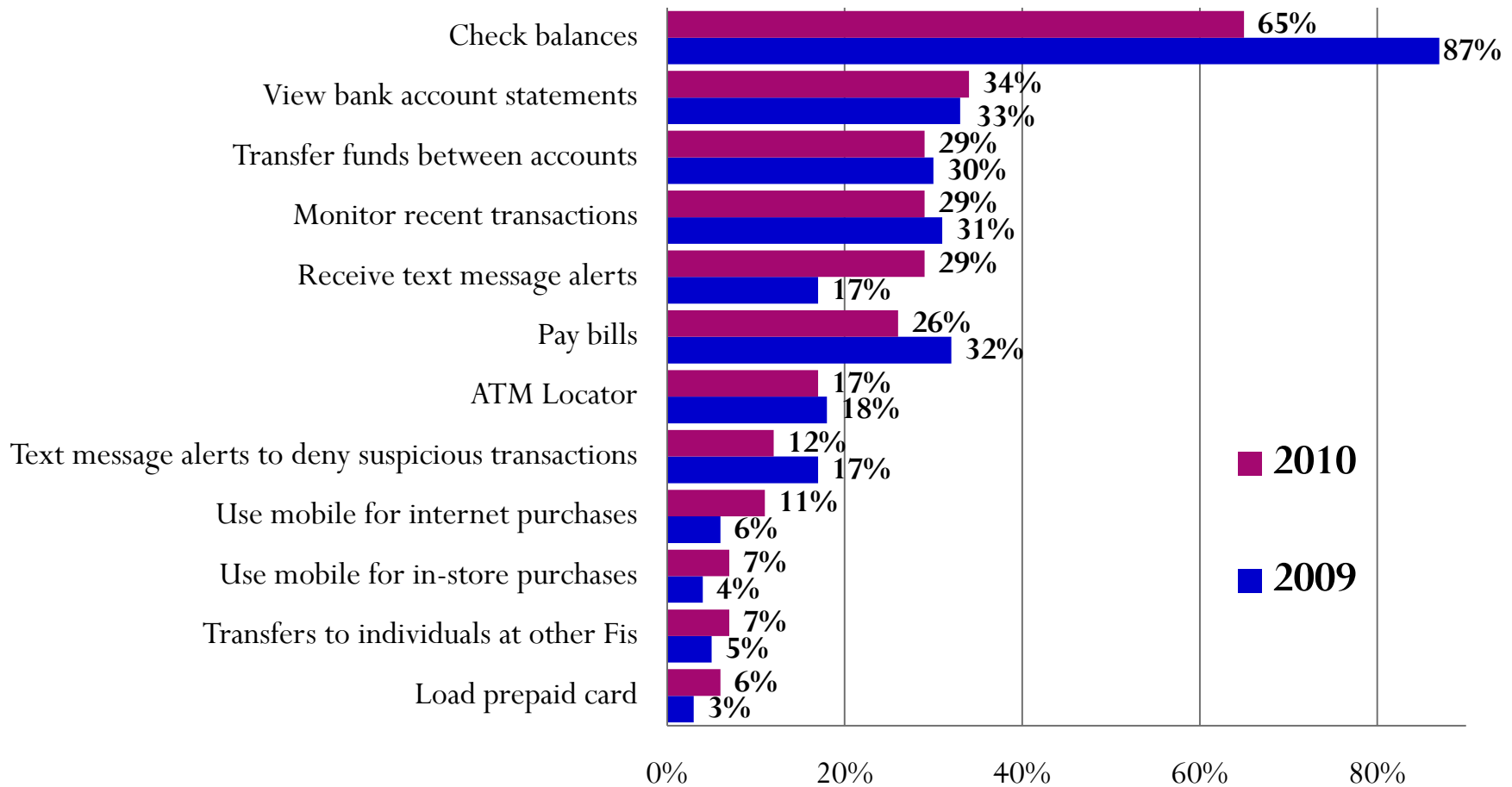
## Survey of Consumer Payment Choice

<u>% of consumers</u>	<u>2008</u>	<u>2009</u>
Bank account adopters	93.8	93.0
Mobile banking adopters	8.2	10.2%
• Used Mobile banking in last 12 months	n.a.	8.9
Mobile phone adopters	n.a.	89.5
• Mobile payment adopters:	n.a.	3.0
▪ Using SMS		2.0
▪ Using contactless		1.1

# Mobile Banking Features Offered by Largest U.S. FIs



# Mobile Banking Features Used by Consumers



# MOBILE REMOTE DEPOSIT CAPTURE

- Use mobile phone camera to capture front and back images of check and send images to FI for deposit.
- Ideal for small service businesses that process low check volumes from remote locations
  - Insurance agencies, home repair
- Reduces bank paper check process costs & reliance on branch
- USAA first to offer m-RDC
  - *Deposit@Mobile* for iPhone & Android
- Chase *Quick Deposit*, July 2010
- BoA in test with iPhone, planned 2011



- Limits on daily deposit amounts per customer can help control fraud
- KYC & customer due diligence is also important

# Mobile P2P Payments

- Mobile P2P allows bank customers to send funds to recipient accounts at another bank or to a PayPal account using a mobile phone
  - Senders register to activate mobile phone and send via email address or mobile phone number of recipient
  - Transactions usually settle through ACH
- Very few banks offer mobile P2P
  - A few are partnering with 3<sup>rd</sup> parties to offer online and mobile P2P (e.g. CashEdge, Fiserv, PayPal or Obopay)
- Benefits
  - Replaces cash and checks for informal, low dollar payments between people you know

# Expedited Bill Pay

## Mobile Banking Revenue Opportunity

- Guarantees same day posting of bill payment if submitted before payee's cutoff time
- Fee-based so new source of revenue for bank
- Customer pays on time and avoids paying higher late fee from biller
- 41% of consumers have initiated an expedited bill
- Process may involve alert reminders to customer to pay

# Mobile Banking Applications for Businesses

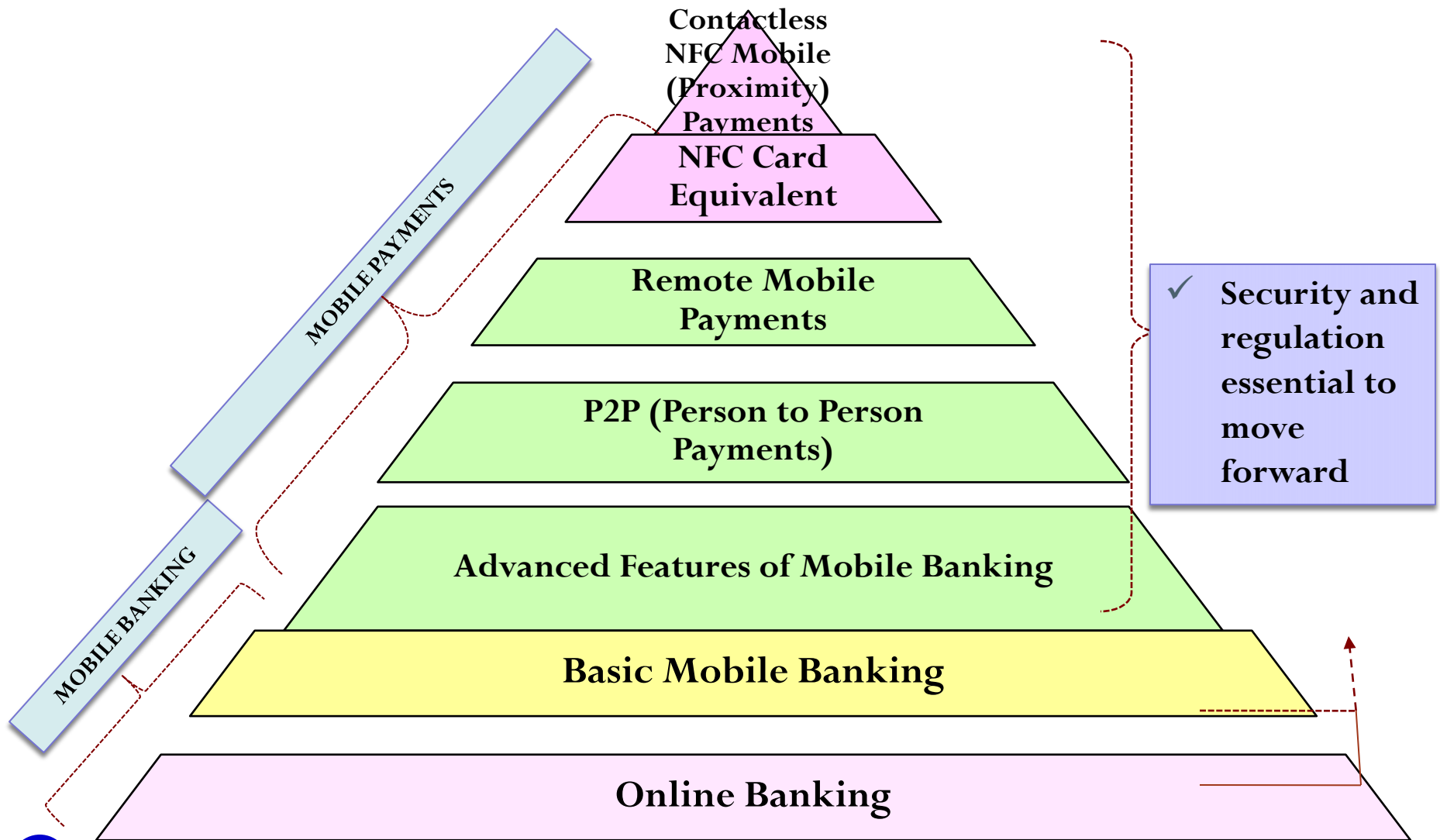
- Banks originally focused on consumer mobile banking
- Corporate/small business markets offer new bank opportunities
- Businesses want ability to monitor transactions, transfer funds, receive account alerts, with assurance that system is secure
- Examples
  - Treasury/Cash management
    - Wells Fargo CEO Mobile
    - Wall Street Systems *Treasury on the Move*
  - Financial trading
    - e-Trade *Mobile Pro*
  - Small Business credit card acceptance
  - Business T&E
- 40% of executives surveyed in 2010 would consider mobile banking for their businesses





# Mobile Payments in the U.S.

# Evolution from Mobile Banking to Mobile Payments



# Mobile Payment Terms

## Mobile Commerce

- Use of mobile device to buy and sell goods and services over the internet

## Mobile Marketing

- Marketing, messages, coupons, and other content delivered via wireless (mobile media)

## Mobile Wallet

- Secure location on mobile device to store information & make payments from multiple credit, debit, prepaid, loyalty or other card type transactions

# Contactless Mobile Payment Technology

- RFID (Radio Frequency Identification)
  - Tag used to identify and transmit data short distances in one direction via radio waves
- NFC (Near Field Communication)
  - Wireless proximity technology that uses radio frequency to enable two-way communication between devices over a short distance
  - NFC chips embedded in mobile phones to enable contactless 'tap and go' payment
- Benefits of contactless payments
  - Use mobile phone for proximity payments at retail POS or transit
  - Purchasing speed and convenience
  - Increases consumer interactivity
  - Reduces need for cash
  - Merchant marketability



# NFC Bridge Technologies acclimate consumers to mobile phone payments

- NFC stickers
  - First Data GO-Tag attached to mobile phone or other device
    - Customer must register and load funds to an open loop Prepaid account
  - Bling Nation
    - Banks provide contactless sticker to customer, linked to checking account
    - Merchants install special contactless terminals (Blinger)
    - Closed system –settles over Bling network, sends transactions to ACH
- Micro SD cards
  - Memory cards that fit in slots in most phones (70%)
  - Can store payment account details, coupons, loyalty points
  - Several pilots pending with vendor (Device Fidelity) and VISA: BoA, Wells Fargo, US Bank
- Barcodes
  - Pay for purchases using 2D bar code linked to Starbucks prepaid account

# Types of Mobile Payments

## REMOTE

## PROXIMITY

### Platform



- SMS
- WAP
- Downloadable application

- NFC Contactless chip
- NFC stickers, microSD cards
- 2-D Barcode

### Process



- Pay by sending text or via web browser
- May require registration with 3<sup>rd</sup> party mobile payment service

- NFC chip embedded in handset
- Credit/debit account info stored on chip
- Wave phone at POS wireless reader to pay

### Services



- Remittances, P2P
- Charitable donations
- Ticketing (airline, movie, event, parking)
- Rewards, coupons, digital content

- Retail purchases
- Public transit, taxis, parking
- Vending
- Rewards, coupons

# Mobile NFC Payments and Pilots

- NFC pilots have been occurring worldwide for several years
  - Testing retail and transportation payments
- Most pilots are overseas, a few in U.S.
- Overseas NFC pilots
  - Involve card issuer, card association, MNO, handset manufacturer, merchant(s)
  - MasterCard and VISA active participants
  - Pilots limit number of participants (closed environment)
  - Mobile phones free to participants
  - Very few have led to production

# U.S. Mobile NFC Payment Pilots Completed

- QSR & Convenience Stores
  - 2006: MasterCard and 7-Eleven - 500 participants, Dallas
  - 2009: U.S. Bank, Nokia, MasterCard, McDonalds, Jack in the Box, and 7-Eleven, Spokane, WA
- Transit & QSR
  - 2007: NYC MTA, Citibank MasterCard, Cingular Wireless & Nokia
  - 2008: BART, First Data, Sprint, and Samsung – Oakland, CA
    - 230 participants purchase BART fares and Jack in the Box
- Sports Arena Concessions
  - 2006: Atlanta Phillips Arena, Chase VISA, Cingular Wireless, & Nokia
    - 150 season ticket holders purchase & download media from smart posters



# New U.S. Mobile NFC Transit Pilot

- NYC Metropolitan Transportation Authority (MTA)
  - Pay with contactless debit or credit cards or contactless-enabled mobile phones instead of MetroCard
    - Available on 28 MTA subway stops, PATH rail system and some buses
    - Money deducted from account linked to card or mobile phone
  - Two MTA pilots
    - MasterCard PayPass
      - Contactless debit or credit card or sticker attached to back of phone
      - 6 month trial – June - November, 2010
    - Visa payWave & BoA with microSD-enabled smart phones
      - MTA and over 10,000 cabs with contactless readers
  - Goal – full replacement of the MTA MetroCard by 2014

# Mobile NFC Payments Pilot Nice, France

- Nice launched ‘pre-commercial’ pilot in May 2010
  - Goal to test how businesses and consumers react to availability of a real-world NFC service
- Involves multiple competitive stakeholders
  - 4 mobile operators; 3 banks and the regional public transit operator
  - Government-backed
  - About 3,000 customers participating
- Can use NFC phones to pay for buses and trams, some retail purchases and tap smart posters
- If successful, plan to expand roll-out to other cities

# Barriers to Adoption of Contactless Mobile Payments

- Little consumer demand
  - Existing payment system meets most consumer payment needs
  - No clear value proposition for customers to pay with mobile phone
- High merchant costs
  - Merchants reluctant to buy contactless readers with uncertain consumer demand
- No commercially available NFC phones in U.S.
  - Handset manufacturers reluctant to invest in NFC phones with uncertain consumer demand

# Barriers to Adoption of Contactless Mobile Payments

- (Too) many parties involved
  - Banks, mobile carriers, mobile vendors, card associations, payment processors, handset/chip manufacturers, trade groups, regulators, merchants & consumers
- Mobile carriers and banks haven't resolved customer ownership and viable revenue model
- Lack of clear regulatory oversight authority
- No standards for mobile phone use and interoperability
- Security and privacy issues
  - Authentication and fraud
  - Lost/stolen phones
  - Secure access via wireless network

# Regulatory Landscape for Mobile Payments

- No legal framework specific to mobile banking or payments
- Many regulatory/rule-making agencies touch payments and/or wireless transactions with little overlap
  - Fed, NACHA, FDIC, OTC, OCC, NCUA, SEC, FTC, FCC
- Underlying payment methods from mobile-initiated transaction covered by existing bank regulations & rules for credit, debit & prepaid cards, ACH transactions
- Carriers unfamiliar with payments/banking requirements
  - e.g. KYC, BSA/AML, Money Service Business, risk compliance, consumer protection
- Mobile channel creating gaps where coverage & liability unclear
- Need guidance on current coverage and gaps

# Mobile vs Online Banking Security

TYPE of BANKING	Possible RISKS	BENEFITS
<p><b>Mobile Banking</b></p> <p>Bank access via mobile phone with over-the-air or mobile Internet connection</p>	<ul style="list-style-type: none"> <li>▪ Lost/Stolen Phone</li> <li>▪ Malware/spyware</li> <li>▪ Phishing</li> </ul>	<ul style="list-style-type: none"> <li>▪ Most Frequent Account Access</li> <li>▪ 24/7 Anytime/Anywhere Access</li> <li>▪ Can interact directly w/CSR</li> <li>▪ Diverse Operating Systems</li> <li>▪ Lower risk of malware</li> <li>▪ Geo-location</li> <li>▪ Remote Deactivation</li> <li>▪ e-mail and mobile alerts</li> </ul>
<p><b>Online Banking</b></p> <p>Bank access via desktop or laptop with an Internet connection</p>	<ul style="list-style-type: none"> <li>▪ Phishing</li> <li>▪ Malware</li> <li>▪ Cracking</li> <li>▪ Lost /Stolen Laptop</li> <li>▪ Man in the Middle</li> <li>▪ Spamming</li> <li>▪ Sniffing</li> <li>▪ Online Scams</li> </ul>	<ul style="list-style-type: none"> <li>▪ Most Frequent Account Access</li> <li>▪ Turn Off Paper Statements</li> <li>▪ Can Interact Directly w/CSR</li> <li>▪ 24/7 Access</li> <li>▪ e-mail Alerts</li> <li>▪ Can manage account settings</li> </ul>

# Mobile Banking Preventative Measures

## • Banks

- Secure (encrypt) communication channels: SMS, browser based, downloadable apps
- Assign security levels & user authentication based on payment type, transaction value, number of daily transactions, etc.
- Set transaction limits
- Know your vendor: ensure mobile apps have built-in safeguards to limit security breaches in case device lost or stolen
- Apply due diligence for new customers by authenticating account number and user name
- Educate consumers on security policies and tools

# Mobile Banking Preventative Measures

- Consumers
  - Receive mobile alerts on potentially fraudulent transactions
  - Set strong passwords, install anti-virus software on smart phones
  - Know the developer before downloading applications
    - How well have they tested the app?
    - Is it certified?
  - Do not store sensitive data on mobile phone



# Mobile Security - EMV Chip+PIN?

- EMV is a global standard for micro chips to replace magnetic stripe on credit and debit cards (and mobile phones)
- Can store and transmit dynamic data to provide more secure authentication and reduce fraud
  - Chip inserted into terminal authenticates card to terminal
  - Cardholder validates identity by entering PIN
- Chip+PIN combined with mobile phone can provide increased fraud protection
  - Password required to access applications on mobile phone
  - Account credentials and PIN are stored on EMV chip in phone and remain encrypted to the terminal while obtaining authorization
- Most developed countries have adopted or are adopting EMV
- U.S. payment industry just starting to discuss possibility of EMV

# Current Fed Activities in Mobile Payments

- Working with industry mobile workgroups
  - NACHA
    - Looking at new SEC Code for mobile payments via ACH
  - ISO/X9 Standards
    - Creating Mobile Payments/Banking Standard
- Meeting with key stakeholders in mobile ecosystem
  - Create neutral setting for stakeholders to exchange ideas without concerns about collusion
  - Facilitate coordination of industry-wide standards to ensure continued safety, soundness and efficiency of U.S. payments system
  - Help to establish regulatory guidelines for security and privacy and clarify oversight responsibilities
- Analyzing need for quantitative survey and market research to estimate potential value of mobile payments in U.S.

**QUESTIONS?**