2016

Mobile Banking and Payment Survey of New England Financial Institutions

Marianne Crowe and Elisa Tavilla
Payment Strategies
Federal Reserve Bank of Boston

Breffni McGuire
BMCG Consulting

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Marianne Crowe is a Vice President and Elisa Tavilla is an Industry Consultant in the Payment Strategies Group at the Federal Reserve Bank of Boston. Breffni McGuire is Principal at BMCG Consulting. The authors thank Carey Mott and Niall Anglim for their assistance in preparing the survey and this report.

The views expressed in this paper are those of the authors and not necessarily those of the Federal Reserve Bank of Boston or the Federal Reserve System.

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I. INTRODUCTION

The mobile landscape has changed dramatically in the past several years. Eight years ago when this survey was conceived, only 37 financial institutions (FIs) offered mobile banking services. Today, mobile banking services are nearly ubiquitous at New England[1] (NE) banks and credit unions.

This study offers insights into current mobile banking practices and mobile payment plans of banks and credit unions in NE. These FIs offer similar mobile banking services, but some are expanding the array of functions and features offered via mobile devices as their experiences with mobile financial services (MFS) and mobile technologies mature. The *2016 Federal Reserve Mobile Banking and Payments Survey of New England Financial Institutions* (NE FI mobile survey) sought to address the following questions:

- What mobile banking and payment products and services do NE FIs offer today, and what additional mobile services do they plan to offer?
- How have these offerings and supporting platforms changed since the previous NE FI mobile survey was conducted in August 2014?
- How do mobile banking services offered by banks differ from those of credit unions in the NE region, and is the breadth of services offered dependent on asset size as well as institution type?
- How have NE FI mobile payment strategies changed?
- How have these factors affected mobile payment implementations and adoption by bank and credit union customers?

The 2016 research was designed to provide a comparison to data collected in 2014 as well as to explore some questions in more detail. A notable difference in this year's survey is its strengthened focus on mobile payments. Some of the key areas covered in the survey include:

- Number of banks and credit unions offering mobile banking and payment services
- Types of mobile banking services offered or planned
- Plans and activities related to mobile payment/wallet services
- Business drivers, benefits, and challenges associated with mobile services
- Adoption of mobile banking and payment services

More specifically, the survey asked for information related to 13 consumer and seven business-focused mobile banking services and about a dozen questions related to mobile payment/wallet plans. Additionally, the Federal Reserve Bank of Boston (FRBB) sought information on specific mobile features, markets served, and customer enrollment and adoption.

This report presents aggregate information from 201 FIs (132 banks and 69 credit unions), with a response rate of 35 percent, based on the 572 FIs in NE that received the survey. This survey received 22 more respondents than the 179 institutions that participated in the 2014 NE FI mobile survey. Interestingly, there were only 57 repeat responses. On a combined basis, 318 FIs completed either the

[1] New England includes Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, and Vermont.

2014 or 2016 survey or both – bringing the total surveyed population during the two-year period (Q3 2014 to Q3 2016) to 55.5 percent[2] of institutions in the NE region.

II. SURVEY BACKGROUND and METHODOLOGY

The FRBB first conducted a mobile banking survey of NE FIs in conjunction with the New England ACH Association (NEACH) in 2008. At that time both organizations were interested in assessing the state of mobile banking, and later payment services, offered by banks and credit unions in the NE region.

An interim mini-survey questionnaire followed in early 2010 and focused on mobile services, customer adoption, and market segments. The FRBB and NEACH completed major surveys again in 2012 and in 2014. The 2014 survey covered many of the same topics as the 2012 survey, but added new questions based on the changing mobile landscape and the emerging importance of mobile payments.[3]

A key finding from 2014 was that mobile banking had become a service that almost all banks, and most credit unions, had to have as part of their consumer product suite. While mobile banking adoption by consumers and businesses in the market was still growing, the consumer base was large enough to warrant FIs offering the service. That finding was reinforced in this 2016 survey: 89 percent of respondents offer mobile banking, including seven percent that began offering it within the past year. Just three percent (three banks and three credit unions) have no plans to offer these services. Bank implementations are more than 14 percent higher than those of credit unions.

The FRBB's goal for the 2016 survey was generally the same as those of previous surveys – to understand the products, practices, and approaches implemented by NE FIs in offering mobile banking and payment services and to determine whether new challenges or barriers exist. Given the ubiquity and relative maturity of mobile banking services, this new survey also sought greater information about the evolving mobile payment services.[4]

Survey Methodology

The survey was distributed to banks and credit unions in NE and ran from September 19 through October 28, 2016.[5] The FRBB promoted the survey via email and contacted some banks and credit unions directly to drive participation. Additionally, NEACH promoted the survey to its members on behalf of the FRBB.

Almost all responses were collected through an online survey tool – just 15 surveys were returned via email and entered manually into the survey tool.

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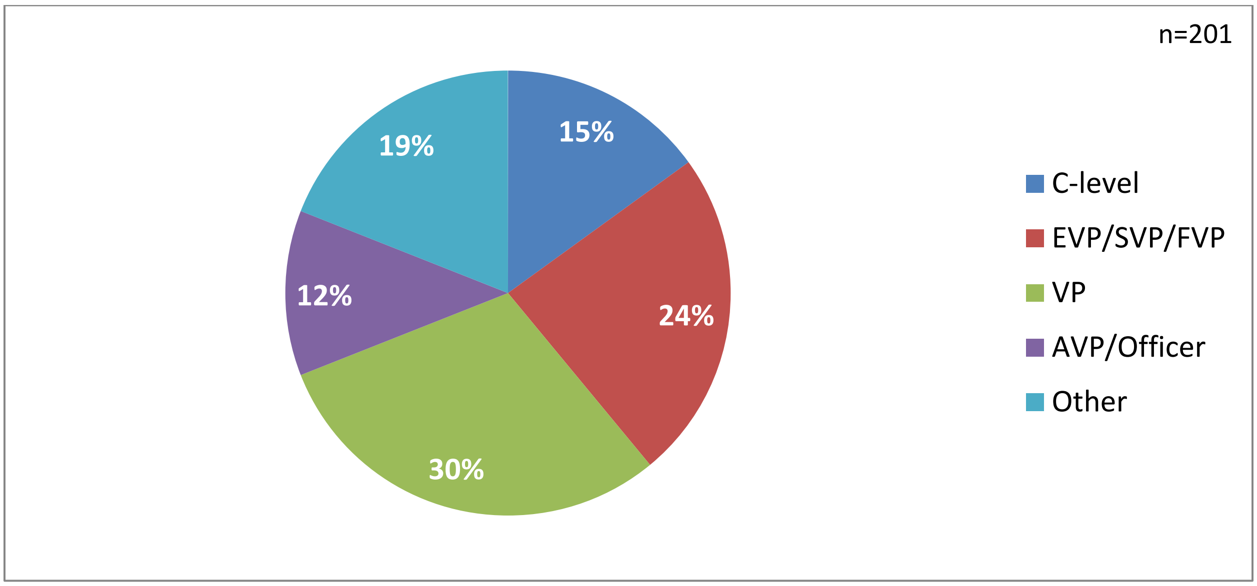
[2] This percentage is calculated on the 572 FIs receiving the survey in 2016.
[3] The survey was conducted just before the Apple Pay announcement and the launch of Android Pay and Samsung Pay.
[4] See Appendix B for links to all FRBB mobile banking and payment surveys.
[5] In 2014, four other Federal Reserve Banks surveyed their financial institutions. See https://www.bostonfed.org/publications/payment-strategies/mobile-banking-and-mobile-payment-practices-of-us-financial-institutions-results-from-2014-survey-of-fis-in-five-federal-reserve-districts.aspx. In 2016, six other FRBs participated. The 2016 consolidated report will be published in Q2 2017.

Note that not all respondents answered all questions. The median number of responses to the general and consumer-focused mobile banking questions was 129 banks and 66 credit unions. The numbers decreased to 109 and 33, respectively, for most of the business customer questions. Some respondents do not have business relationships and were directed to skip these questions, while other respondents do not offer mobile services to their business customers. The comparable number of banks and credit unions for the mobile payments questions were typically 107 and 51.

Figure 1 shows the titles of respondents at participating FIs. Fifteen percent of all respondents were CEO or C-level executives, typically from credit unions where more C-level executives tend to be directly involved with mobile banking services than their counterparties at banks: 32 percent of credit union respondents compared to seven percent of bank participants. Another 54 percent of respondents were EVPs, SVPs, FVPs and VPs. Here the situation is reversed with just three percent of this group representing credit union executives.

Figure 1: FI Respondent Titles (*percent of total bank and credit union respondents*)



Q4. Contact title.

Demographics of Survey Respondents

Table 1 compares the numbers and percentages of bank and credit union respondents by state to the actual totals for each state in the NE region. Respondents included institutions in all six New England states as well as three banks in New York[6] (Figure 2). Bank representation is generally comparable to total banks in each state. Respondents from New Hampshire represent banks in the state almost exactly (7.75 compared to 7.51 percent), and those from Vermont are less than one percent higher than overall state numbers. Respondents from both Maine and Rhode Island are within two percentage points: Maine respondents are two percent higher and Rhode Island responses are two percent lower than state totals. The largest variations come from Connecticut and Massachusetts: respondents are seven percent lower and six percent higher, respectively.

Credit union respondents are generally aligned to state totals – the outliers being Maine and Massachusetts. Rhode Island (less than one percent) and Vermont (two percent) lower are closely aligned, while respondents in New Hampshire are three percent higher and in Connecticut 3.5 percent lower, compared to state totals. Respondents from Massachusetts are lower by eight percent, while those from Maine exceeded state figures by 8.5 percent.

Table 1: New England FI Respondent Representation by State

State	Banks			Credit Unions		
	Number of respondents	State total[7]	Percentage	Number of respondents	State total[8]	Percentage
CT	14	46	30%	16	105	15%
MA	79	140	56%	25	172	15%
ME	17	27	63%	16	58	28%
NH	10	19	53%	7	17	41%
RI	2	9	22%	3	20	15%
VT	7	12	58%	2	21	10%
TOTAL	**129**	**253**		**69**	**393**	

6 The three New York head-quartered banks included were surveyed through NEACH's promotion of the survey to its members on behalf of the FRBB.
7 Quarterly Bank Call Reports (FFIEC), September 2016.
8 NCUA, September 2016.

Figure 2: New England FI Respondents by State

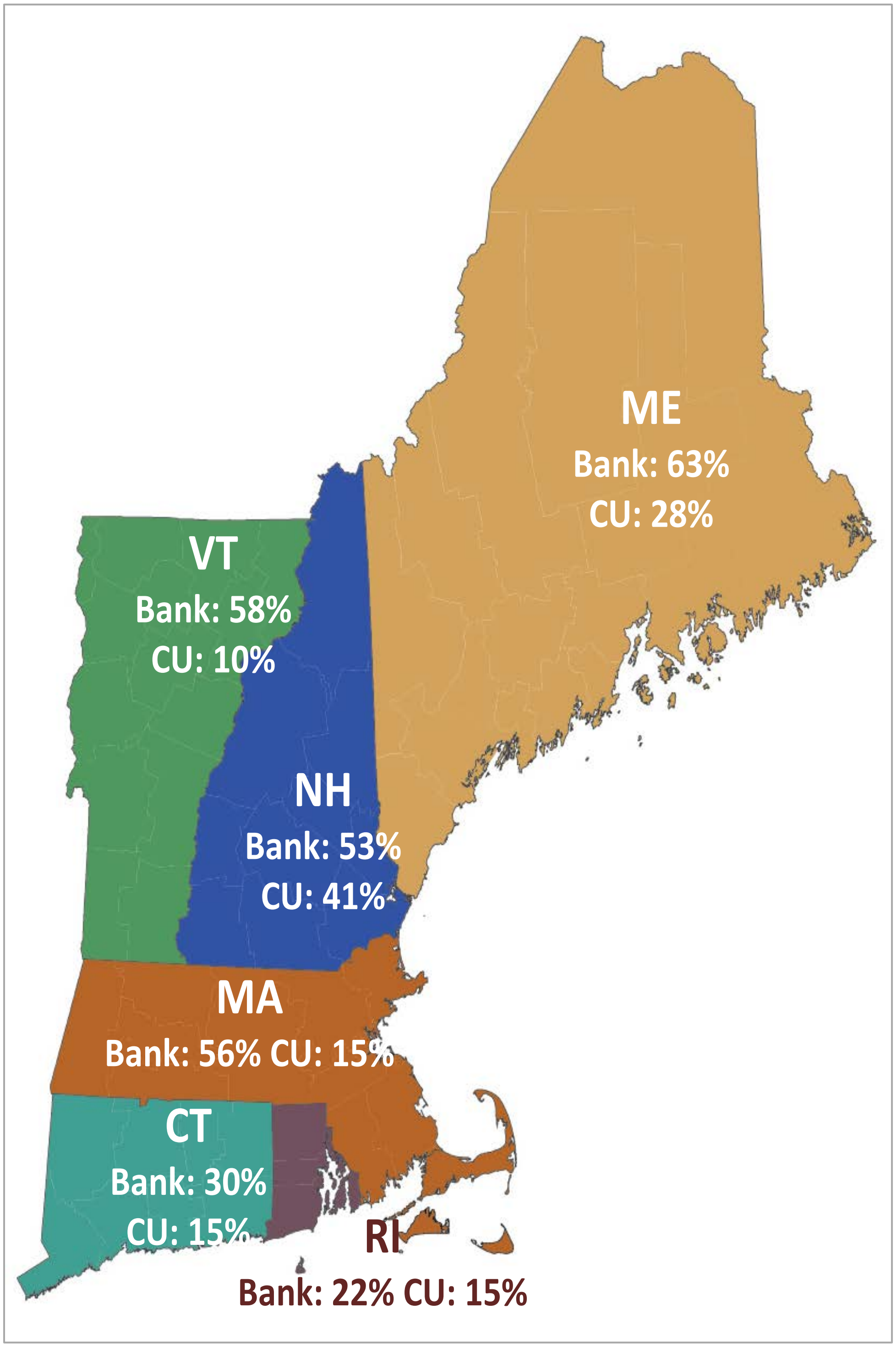
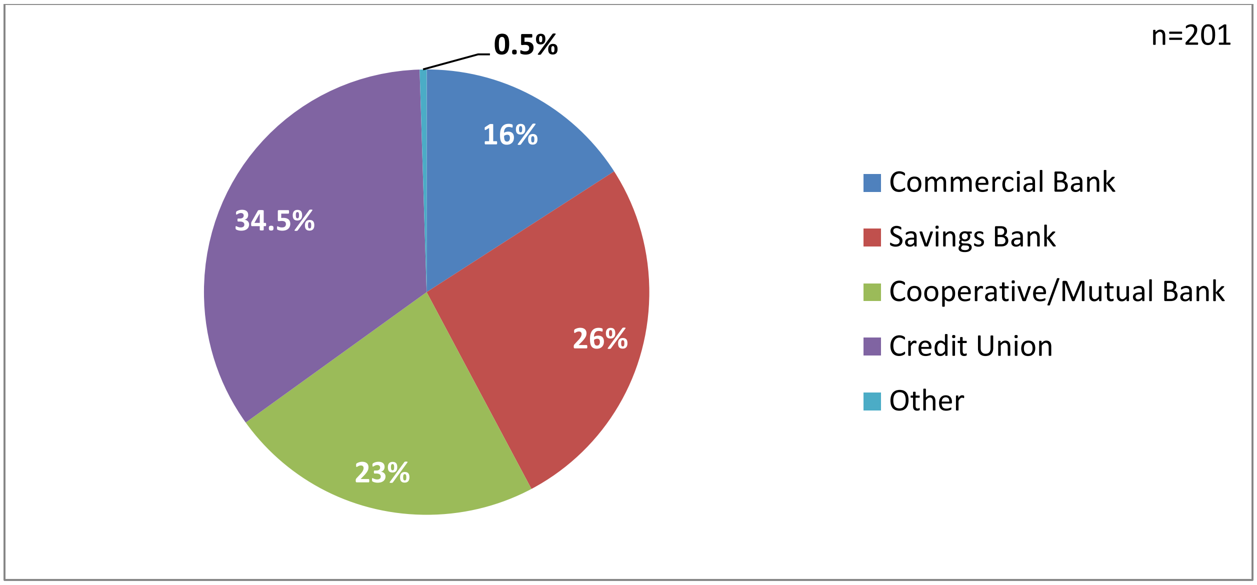


Figure 3 highlights the percentage of each type of FI participating in the survey. Credit unions represented 34.5 percent of the respondents, followed by savings banks (26 percent), cooperative banks[9] (23 percent), and commercial banks (16 percent). There was one 'other' banking firm.

Figure 3: FI Respondents by Institution Type (*percent of respondents*)



Q10. Please indicate your financial institution type.

[9] Cooperative banks are a type of mutual bank specific to Massachusetts.

There were 22 more responses in 2016 than in 2014, which slightly shifted the percentages especially for credit unions and savings banks, which boasted the highest return rates. However, the loss of one single credit union resulted in a five percent dip from 2014 to 2016. In real terms, the number of savings banks rose by 14 institutions, which increased savings bank participation from 22 to 26 percent, just ahead of cooperative bank results. The following comparison (Table 2) illustrates, that savings institutions aside, there is a high level of consistency in the number of institutions by type.

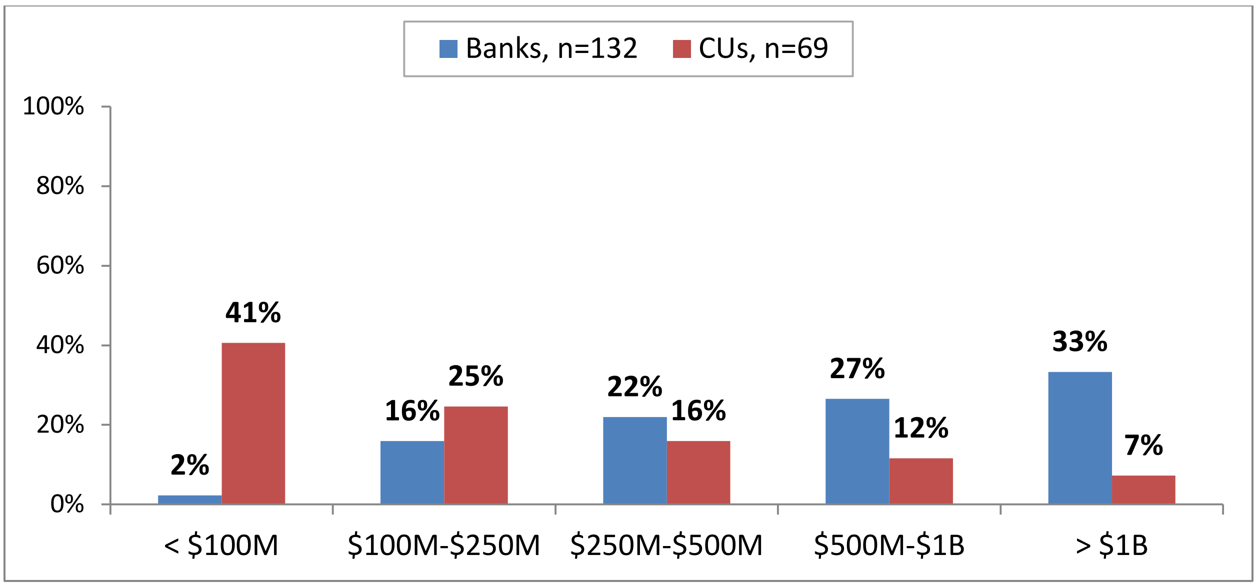
Table 2: Comparison of 2014 and 2016 FI Respondents by Institution Type

Institution Type	2016 Number	2014 Number	2016 Percentage	2014 Percentage
Commercial bank	32	27	16%	15%
Cooperative (mutual) bank	46	43	23%	24%
Credit Union	69	70	34.5%	39%
Savings Bank	53	39	26%	22%
Other	1	0	0.5%	0%
TOTAL	**201**	**179**		

NE FIs are predominantly community banks and credit unions. About 28 percent of banks[10] in the region had assets over $1 billion; credit unions had comparably fewer assets. NE FIs have been consolidating for more than a decade, a trend that has been accelerating in recent years. The number of NE FIs declined seven percent from December 2013 to September 2016. Banks fell five percent and credit unions dropped eight percent. Many of these consolidations took place within NE such that average assets have risen somewhat at the top of the market.

For example, unlike the 2014 study population, where 31 percent of respondents had more than $500 million in assets (Tiers 4 and 5 below), in 2016, 46 percent of respondents (44 banks and five credit unions) were above the $500 million asset mark. Because more large banks completed the survey, the percentage of banks rose by asset tier. Conversely, 41 percent of all credit union respondents were in Tier 1. The number of credit unions by tier decreased with asset size (Figure 4).[11]

Figure 4: FI Respondents by Asset Size (*percent of respondents*)



Q9. What is your FI's asset size?

[10] There are 253 institutions, of which 72, or 28.4 percent, have assets greater than $1 billion, Quarterly Bank Call Reports (FFIEC), September 2016.
[11] Very small FIs (under $100 million in assets) are under-represented in the survey: 87.5 percent of these banks and 90 percent of these credit unions, which represent 21 banks and 242 credit unions, respectively, did not participate in the survey.

Overall, the breakdown of banks and credit union respondents by asset tier is:

Tier 1: Less than $100 million in assets:
1 commercial bank; 1 cooperative bank; 1 savings bank; and 28 credit unions

Tier 2: $100 and $250 million in assets:
5 commercial banks; 7 cooperative banks; 9 savings banks; and 17 credit unions

Tier 3: $250 and $500 million in assets: 8 commercial banks;
12 cooperative banks; 9 savings banks; and 11 credit union

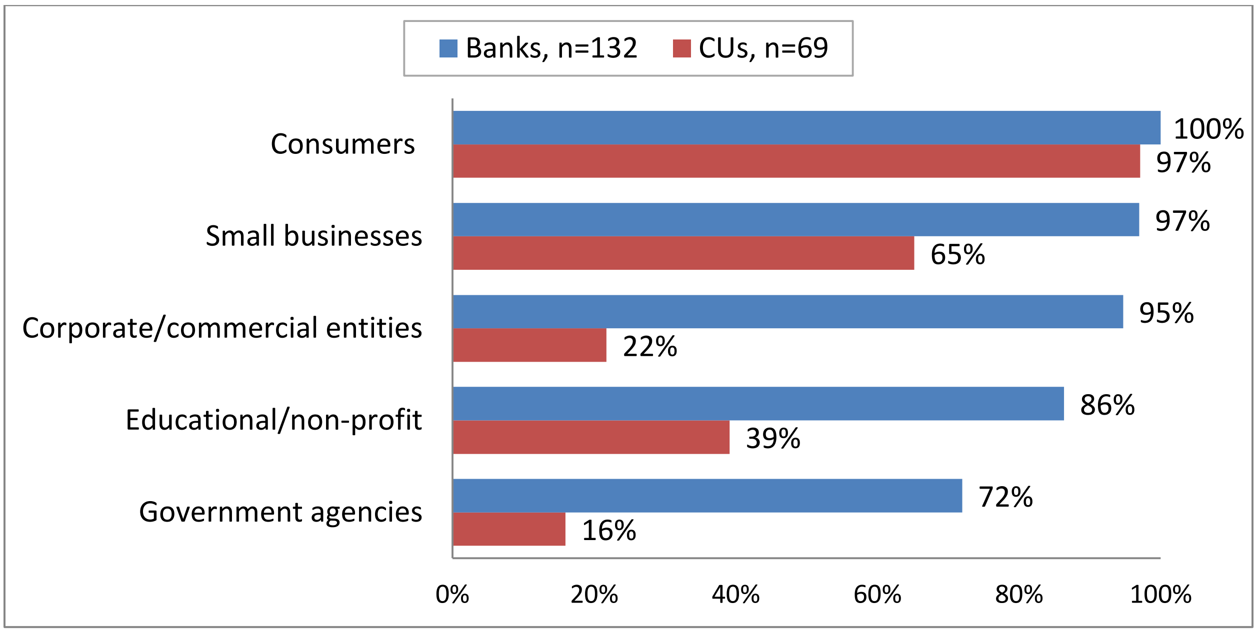
Tier 4: $500 million to $1 billion in assets:
5 commercial banks; 11 cooperative banks; 19 savings banks; and 8 credit union

Tier 5: More than $1 billion in assets:
13 commercial banks; 15 cooperative banks; 15 savings banks; 1 other banking firm; and 5 credit unions

NE FIs were asked about market segments for which they provided banking services. All respondents, except two credit unions, provide banking services to consumers. Eighty-six (86) percent of FI respondents have small business customers; just over 70 percent serve educational entities or non-profits; and 70 percent have corporate/commercial customers. Additionally, more than half (53 percent) serve government agencies. Figure 5 shows the breakdown by banks and credit unions.

Banks typically have a more diverse customer base than do credit unions, a situation reflected in their mobile banking offerings. Banks provide mobile banking services to small businesses (97 percent), corporate/commercial entities (95 percent), educational clients and non-profits (86 percent), and government agencies (72 percent). Other than consumers, the only market served by more than half of the credit unions is small businesses (65 percent).

Figure 5: Markets Served by New England FIs (*percent of respondents*)



Q11. Please indicate to whom you provide (banking) services.

III. MOBILE PAYMENTS LANDSCAPE

The U.S. payments system is experiencing significant market developments in a number of areas. Mobile and digital technologies are gaining momentum, and consumer expectations for payments and financial services are evolving as they engage in new ways to use payment technologies across multiple channels. The need for improved security to protect traditional and new payment methods is front and center and an ongoing challenge. U.S. payment stakeholders implemented EMV chip technology to reduce credit and debit card counterfeit fraud at point of sale (POS). Since the October 2015 liability shift, most FIs have issued new chip cards to their customers, more merchants have enabled their terminals to accept chip cards, and consumers are adapting to the change with a better understanding of the security focus behind it. One consequence is that fraudsters are shifting their efforts to the card not present (CNP) channel. As a result, the introduction of new payment methods, channels and market participants not only creates new opportunities, but also new challenges, opening the door to increased risks and fraud threats.

For many FIs in the U.S., mobile banking has become an established and important customer service channel, as well as a critical component of their distribution strategies. Use of the mobile device for financial services is having a strong influence on the direction of payments. Changing preferences and behaviors are shifting consumer demand to ease of use, convenience, and immediacy of payments; and in response, mobile solutions are converging payment channels to connect purchases and payments across POS, online, and in-app. Nonbank players are competing with FIs to offer new mobile and digital payment solutions built on a variety of technology platforms, including near field communication[12] (NFC), host card emulation[13] (HCE), and cloud to provide options to consumers and merchants.

Industry data illustrating consumer interest in and adoption of mobile banking and payments help to frame the results of FI respondents to this 2016 NE FI mobile survey. According to one report adoption is beginning to show traction as more consumers use new mobile wallet models such as the NFC-based "Pay" wallets (Apple Pay, Android Pay and Samsung Pay), although lack of broad merchant acceptance is still a barrier.[14]

To incent consumer use, mobile payment providers[15] are adding value-added services such as rewards and loyalty programs to their mobile solutions. Security concerns are being addressed with stronger, multi-layered security tools that include biometrics (fingerprint) for authentication and tokenization of payment account credentials. Finally, initiatives to develop faster (i.e., near or real-time) payment solutions should also accelerate mobile payment adoption.

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[12] Near field communication (NFC) is a standards-based wireless communication technology that allows data to be exchanged between devices that are a few centimeters apart.

[13] Host card emulation (HCE) enables a mobile wallet app to communicate through the NFC controller to a contactless NFC-enabled POS terminal/reader to pass payment card credentials or token, eliminating the need for a physical secure element managed by a mobile network operator. For more information, see Susan Pandy and Marianne Crowe, "Understanding the Role of Host Card Emulation," *Federal Reserve Bank of Boston*, May 10, 2016. https://www.bostonfed.org/publications/payment-strategies/understanding-the-role-of-host-card-emulation-in-mobile-wallets.aspx.

[14] According to First Annapolis, 74 percent of respondents made a payment with a mobile device in 2016, up 58 percent from 2015 survey. "Study of Mobile Banking & Payments, Third Edition," *First Annapolis Consulting*, August 2016. http://www.firstannapolis.com/wp-content/uploads/2016/08/First-Annapolis-Study-of-Mobile-Banking-Payments-3rd-Ed_Aug-2016.pdf.

[15] Mobile payment providers include FIs, card networks, mobile network operators, merchants, mobile solution providers, etc.

Consumers, particularly millennials, are using the mobile channel more frequently for banking and payments than in previous years. One industry survey found that 60 percent of millennials increased their use of mobile banking from 2015 to 2016, and 57 percent increased their use of a digital wallet.[16] Even though a larger portion of mobile bankers are younger, usage is consistently high across all age groups. Security also plays an important role in a consumer's decision to adopt mobile payments.

Although mobile wallet transactions currently represent less than five percent of all transactions, larger FIs are seeing strong growth in mobile wallet purchase and spent volume across all consumer age groups, including millennials and Gen X customers.[17] The convergence of POS, mobile, and digital channels is helping to build this momentum.

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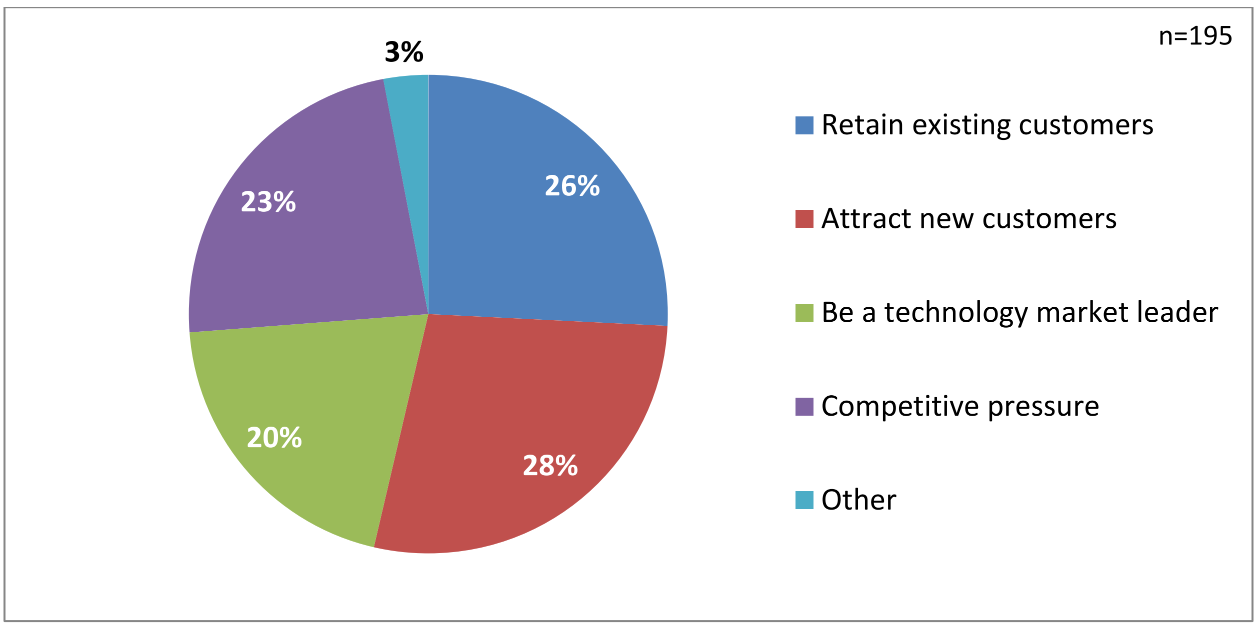
[16] "Expectations & Experiences: Consumer Payments," *Fiserv*, Aug ust2016. https://www.fiserv.com/expectations-experiences-consumer-payments-research-paper.aspx.The report is based on survey data collected in November 2015.
[17] "Bank of America Consumer Spending Snapshot," September 2016. http://newsroom.bankofamerica.com/files/press_kit/additional/July_2016_Bank_of_America_Consumer_Spending_Snapshot.pdf

IV. MOBILE BANKING RESULTS

Mobile Banking Infrastructure

Mobile banking has evolved from being considered a new channel to being portrayed as a key banking service. Generally, industry experts view mobile's importance as a means of providing a new spectrum of services to consumers, and to a lesser extent, small businesses and larger commercial companies. Smaller FIs do not yet share this vision of mobile as the gateway into their institution, but they are quick to perceive the benefits. More than half (53 percent) of the study population view mobile services as a way to gain or retain customers – and 20 percent think their mobile banking services will result in their being perceived as a market leader with technology (Figure 6). Credit unions rate 'customer retention' higher than do banks (by 11 percentage points); banks are more interested in 'attracting new customers' (three percent higher) and being 'technology leaders' (five percent higher). Nearly one-quarter (23 percent) of all FI respondents are offering mobile primarily as a response to competitive pressure. Additionally, two FIs consider customer retention and acquisition as equally important factors for offering mobile banking, and one bank reports providing security and convenience to customers as its top reason. "Increase revenue"' was a response option which none of the respondents selected, so it does not appear in the legend.

Figure 6: Primary Business Reason for Offering Mobile Banking (*percent of respondents*)



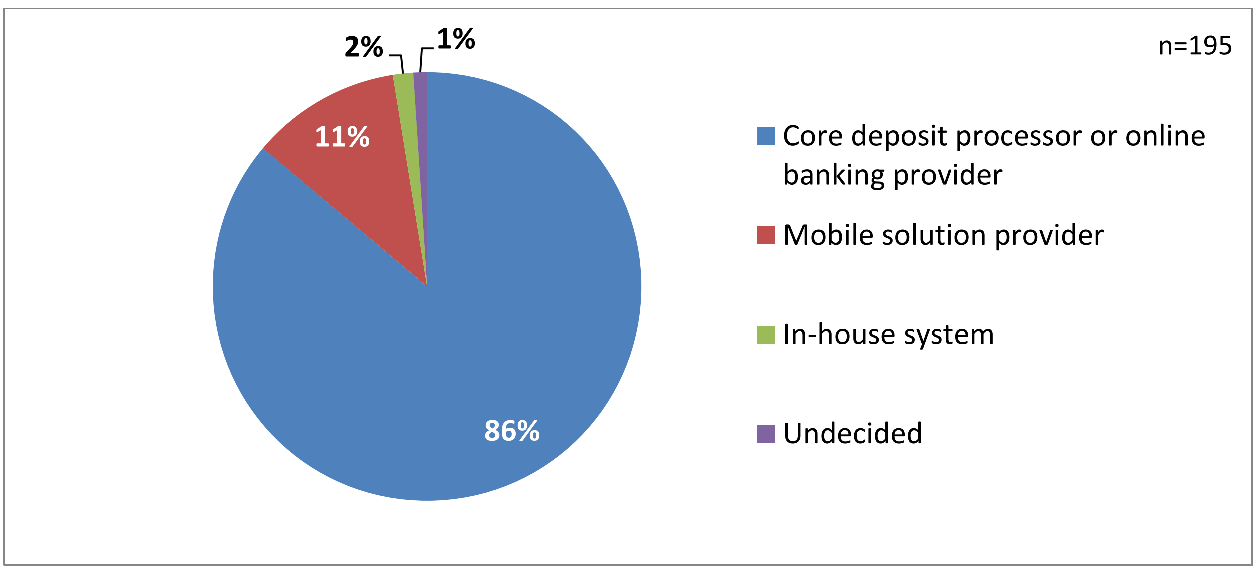
Q13. What is your PRIMARY business reason for offering or planning to offer mobile banking? (Check only ONE)

According to Pew Research, 72 percent of U.S. mobile phone users now have smartphones – up from 58 percent in 2013 – and ownership rises to 92 percent for millennials (aged 18-34).[18] Additionally, the Federal Reserve Board (FR Board) *Consumer and Mobile Financial Services 2016 Survey* found that 82 percent of mobile banking users have installed mobile banking apps on their phones.[19] This has motivated more banks and credit unions to offer mobile banking services through apps that appeal to younger, tech-savvy demographics.

Like FIs across the U.S., most NE banks and credit unions support Apple iOS and Google Android as the primary mobile operating systems (OS): 99 percent support Android and 98 percent support iOS. These percentages are consistent with the 2014 survey results. Support for Blackberry continues to decline, decreasing from 22 percent in 2014 to eight percent in 2016. Support for Microsoft declined by about nine percentage points to 22 percent in 2016. A higher percentage of credit unions than banks support Microsoft, similar to 2014, although that lead is 10 percentage points, down two points from 2014. Currently, 29 percent (19) of credit union respondents compared to 19 percent (24) of bank respondents support Microsoft.

Most respondents stick with the tried and true when it comes to mobile banking services. Eighty-six (86) percent rely on their core deposit system or online banking providers for their mobile banking services (Figure 7). Eleven (11) percent use mobile solution providers and one respondent has an in-house system.

Figure 7: Providers of Mobile Banking Services *(percent of respondents)*



Q16. Who provides or will provide your mobile banking services?

[18] Jacob Poushter, "Smartphone Ownership and Internet Usage Continues to Climb in Emerging Economies," *Pew Research*, February 22, 2016. http://www.pewglobal.org/2016/02/22/smartphone-ownership-and-internet-usage-continues-to-climb-in-emerging-economies/.

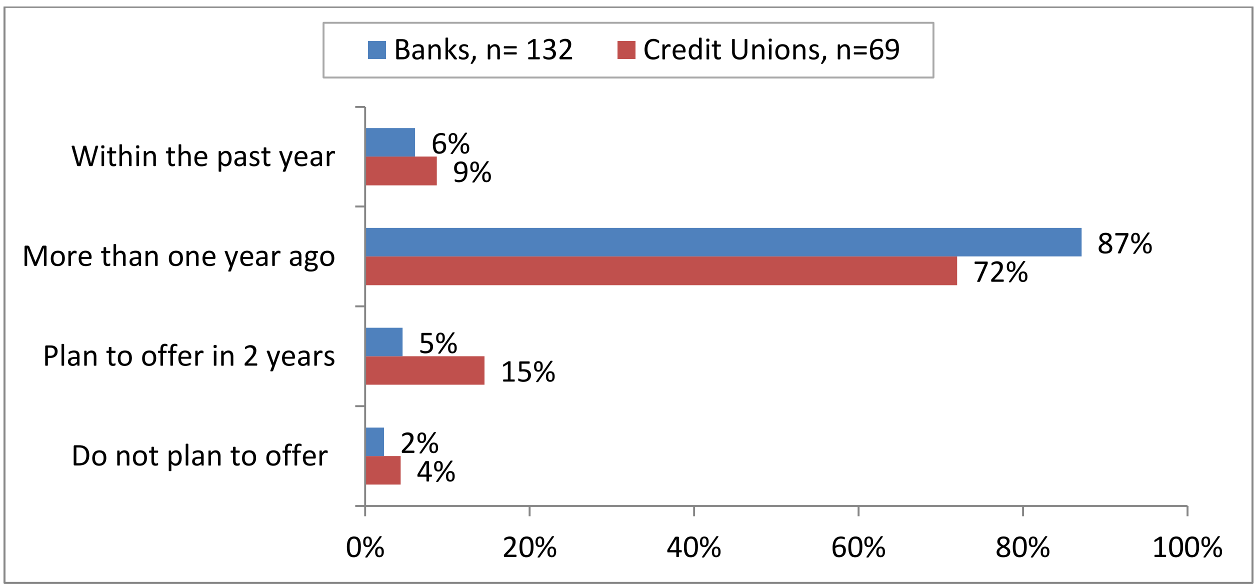
[19] "Consumers and Mobile Financial Services 2016," *Board of Governors of the Federal Reserve System,* March 2016. https://www.federalreserve.gov/econresdata/consumers-and-mobile-financial-services-report-201603.pdf. The report presents findings from a nationally representative survey fielded in November 2015 on consumer use of mobile technology to access financial services and make financial decisions. The survey will be referred to as the *2016 FR Board consumer mobile survey* throughout the rest of this report.

Consumer Mobile Banking Services

FIs in NE have continued to increase their mobile banking offerings in the past two years. The percentage of banks that offered mobile banking increased from 85 percent in 2014 to 93 percent in 2016 (Figure 8). Similarly, the share of credit unions offering mobile banking grew from 76 percent in 2014 to 82 percent in 2016. Another five percent of banks and 15 percent of credit unions plan to offer mobile banking by 2018.

The availability of historical data makes it possible to determine how many FIs that planned to offer mobile banking in 2014 actually implemented it by 2016. Of the eight FIs that participated in both the 2014 and 2016 surveys, in 2014 four FIs reported 'no plans to offer mobile banking' and four were 'planning to offer mobile banking in the next two years.' By 2016, seven FIs reported that they have been 'offering mobile banking for more than a year.' Only one FI from the 2014 group that had 'plans to offer mobile banking in the next two years' is still in the planning stage in 2016. Just six respondents – three banks (two percent of total banks) and three credit unions (4 percent of total credit unions) – reported 'no plans to offer mobile banking' in the 2016 survey. This is a decrease from 11 FIs (three banks and eight credit unions) in 2014. The reasons for not offering mobile banking have changed as well, shifting from 'lack of customer demand,' the key reason in 2014, to 'security concerns' and 'lack of a business case' in 2016. Collecting this data helps to validate the forecasts of future growth.

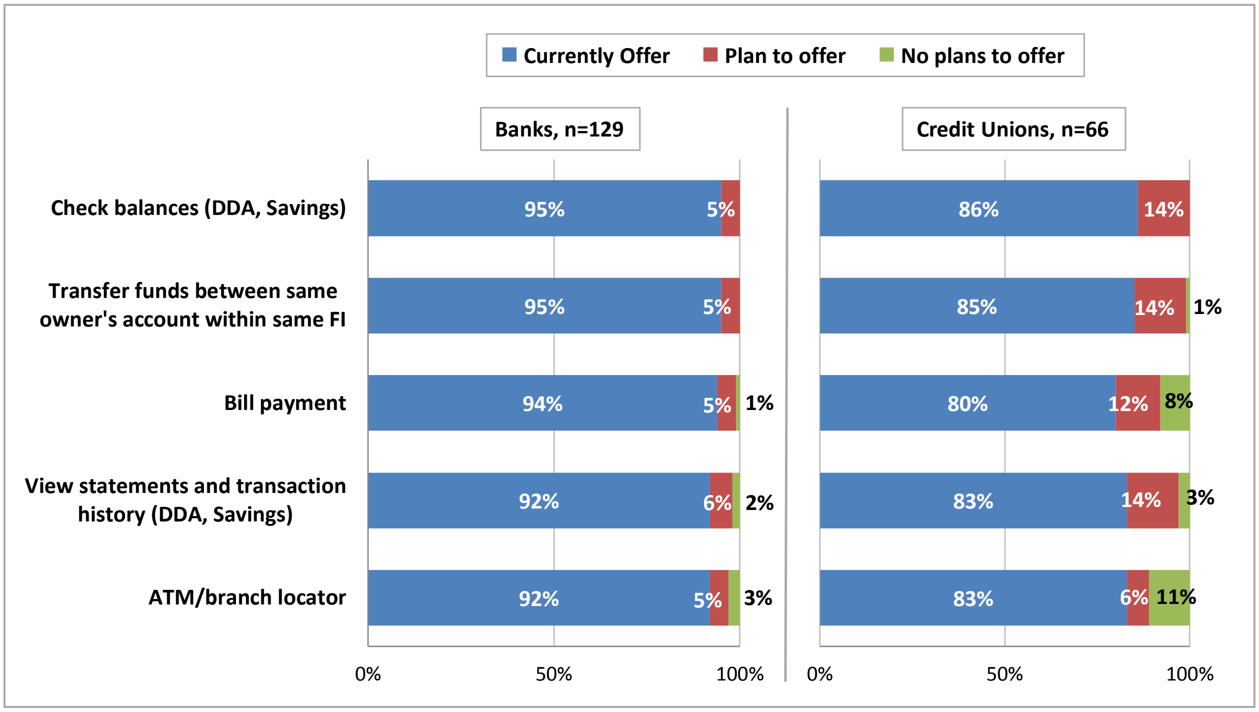
Figure 8: FIs Offering Mobile Banking Services (percent *of respondents*)



Q12. When did you start offering mobile banking to CONSUMERS? (Check only ONE)

Historically, most FIs offered mobile banking services that mirrored their online banking services, and the 2016 data show that this is still the case in New England. Over 90 percent of banks and more than 80 percent of credit unions currently offer mobile banking services that are available through their online banking platform. These services include account monitoring capabilities (e.g., checking balance, viewing statements) and money movement features (e.g., transfers between accounts and bill pay) as shown in Figure 9. Nearly all FIs plan to offer these standard mobile banking services by 2018.

Figure 9: Standard Mobile Banking Services Offered by FIs (*percent of respondents*)



Q17. Which of the following mobile banking features do you currently offer or plan to offer within the next 2 years? (Check ALL that apply)

As consumers' banking channel preferences increasingly shift towards digital, FIs continue to offer more advanced mobile features to meet customer expectations and financial needs. The data in Figure 10 show FIs that ***currently offer*** these mobile banking features. For example, there was a substantial increase in the number of FIs that offered mobile money movement features between 2014 and 2016. Most notably, the percentage of banks offering mobile remote deposit capture (mRDC) increased from 54 percent in 2014 to 89 percent in 2016. Similarly, while 52 percent of credit unions offered mRDC in 2014, that percentage increased to 76 percent in 2016.

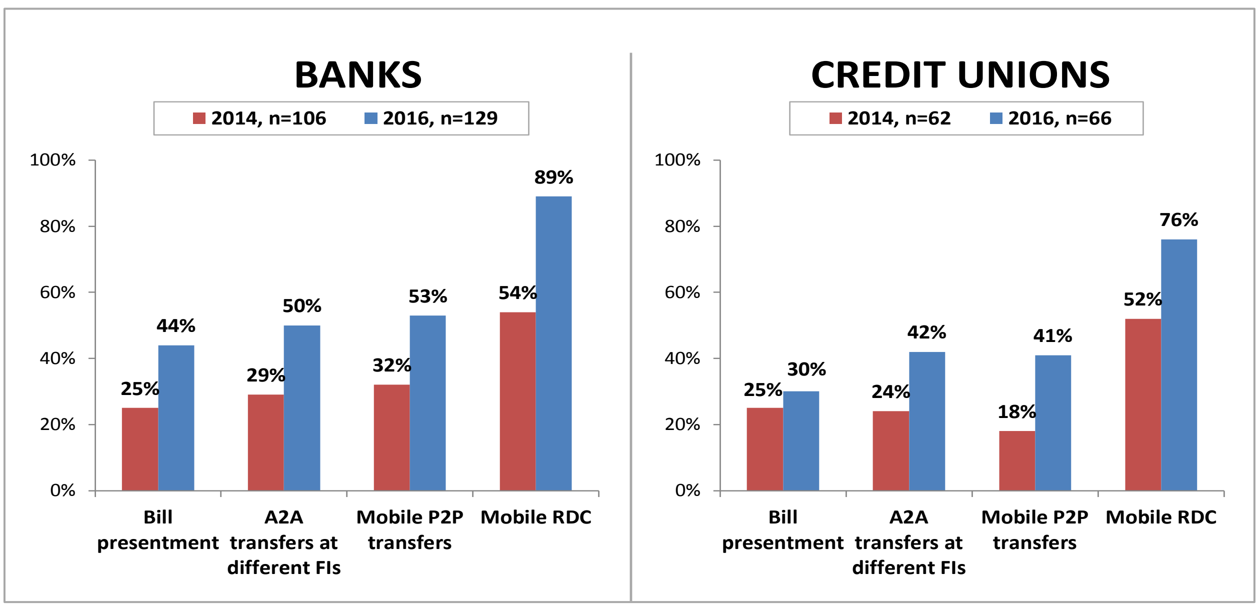
According to Javelin's *2016 Mobile Banking Financial Institution Scorecard* study, 97 percent of the top 30 U.S. FIs offer mRDC and are responding to customer demand with enhancements to the standard features that include display of mobile deposit limits and deposit funds availability; review of check images; mobile deposit automatic image taking; and customized limits.[20]

Since 2014, both FIs and nonbanks have shown increased interest in offering mobile person to person (P2P) services. More than half (53 percent) of bank and 41 percent of credit union respondents reported offering mobile P2P money transfers in 2016, an increase from 32 percent and 18 percent, respectively, in 2014. Javelin reports that 47 percent of the top 30 FIs offer mobile P2P today – putting NE results in line with larger institutions – although competition for NE FIs may come more from nonbank provider Venmo (owned by PayPal) or P2P services offered by deposit processors, such as Fiserv and FIS.

Many FI respondents now offer account to account (A2A) services to their retail customers. The percentage of banks offering the ability for customers to transfer funds between their own accounts at different FIs via mobile increased from 29 percent in 2014 to 50 percent in 2016, and the percentage of credit unions offering the service grew from 24 percent to 42 percent in 2016. Another 31 percent of banks and 28 percent of credit unions plan to offer A2A transfer services within the next two years.

Finally, support for mobile bill presentment has also risen among NE FIs. Forty-four (44) percent of banks currently offer the service, an increase from 25 percent in 2014. The percentage of credit unions offering bill presentment was lower, rising a modest five percentage points to 30 percent in 2016.

Figure 10: Mobile Money Movement Functions CURRENTLY Offered by FIs (*percent of respondents*)



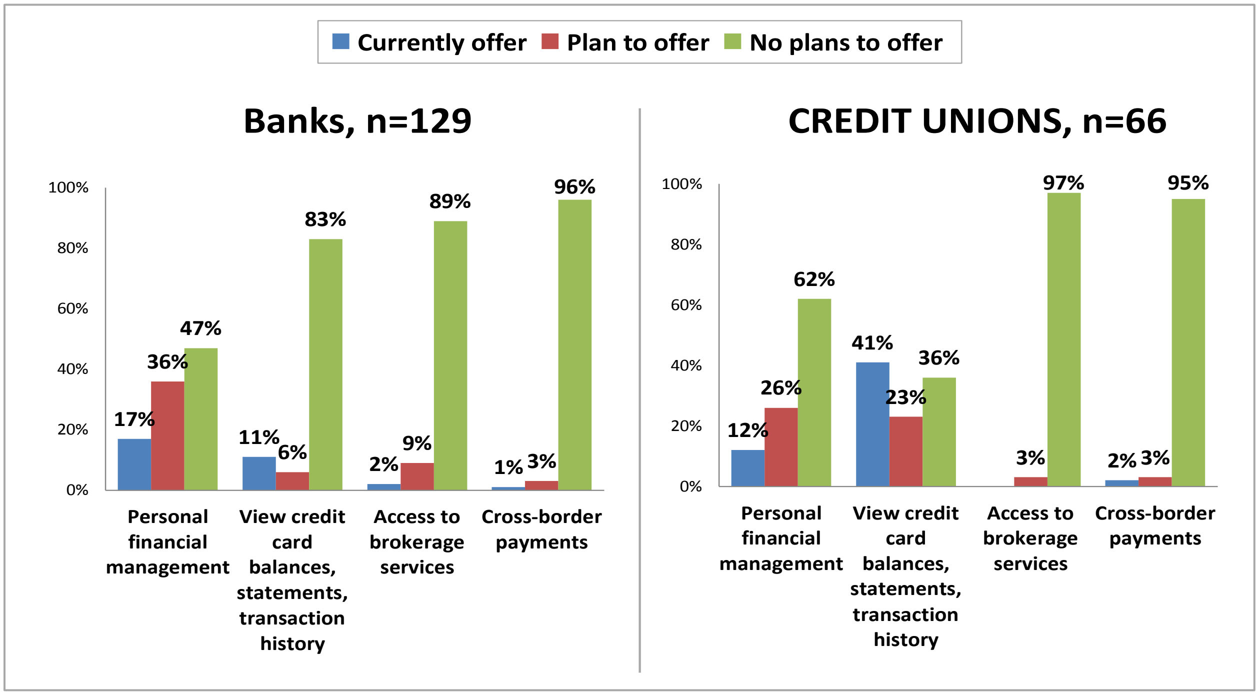
Q17. Which of the following mobile banking features do you currently offer or plan to offer within the next 2 years? (Check ALL that apply).

[20] Daniel Van Dyke and Emmet Higdon, "2016 Mobile Banking Financial Institution Scorecard: Mobile Becomes the Remote Control for Banking," *Javelin Research & Strategy*, May 2016. https://www.javelinstrategy.com/coverage-area/2016-mobile-banking-financial-institution-scorecard.

Few FI respondents support more advanced mobile banking services, such as personal financial management (PFM) tools, the ability to view credit card account information, access to brokerage services, and cross-border payments (Figure 11). Only 17 percent of banks and 12 percent of credit unions currently offer mobile PFM services, although 36 percent of banks and 26 percent of credit unions plan to offer it within the next two years. NE respondents trail large FIs in this regard. A mobile banking FI survey found 37 percent of the top 30 U.S. FIs have already integrated mobile PFM into their apps.[21] Additionally, larger banks are considering mobile spending and budgeting tools to help customers track and control their money.

Most FIs in NE do not plan to offer mobile access to brokerage services or cross-border payments. Only one bank offers brokerage services, and only six other FIs (four banks and two credit unions) plan to offer such services in the foreseeable future. Three banks and one credit union currently offer cross-border payments, and another 11 banks and two credit unions plan to offer the service by 2018.

Figure 11: More Advanced Mobile Banking Services Offered by FIs *(percent of respondents)*



Q17. Which of the following mobile banking features do you currently offer or plan to offer within the next 2 years? (Check ALL that apply)

A growing number of NE FIs offer mobile enrollment and account opening capabilities (Figure 12). The percentage of banks and credit unions enabling customers to enroll in mobile banking from their mobile phone increased from 74 percent and 72 percent, respectively, in 2014, to 81 percent and 79 percent, respectively, in 2016. The percentage of banks that allow customers to open accounts via their mobile phones rose from 30 percent in 2014 to 43 percent in 2016. Credit union gains were more modest, rising

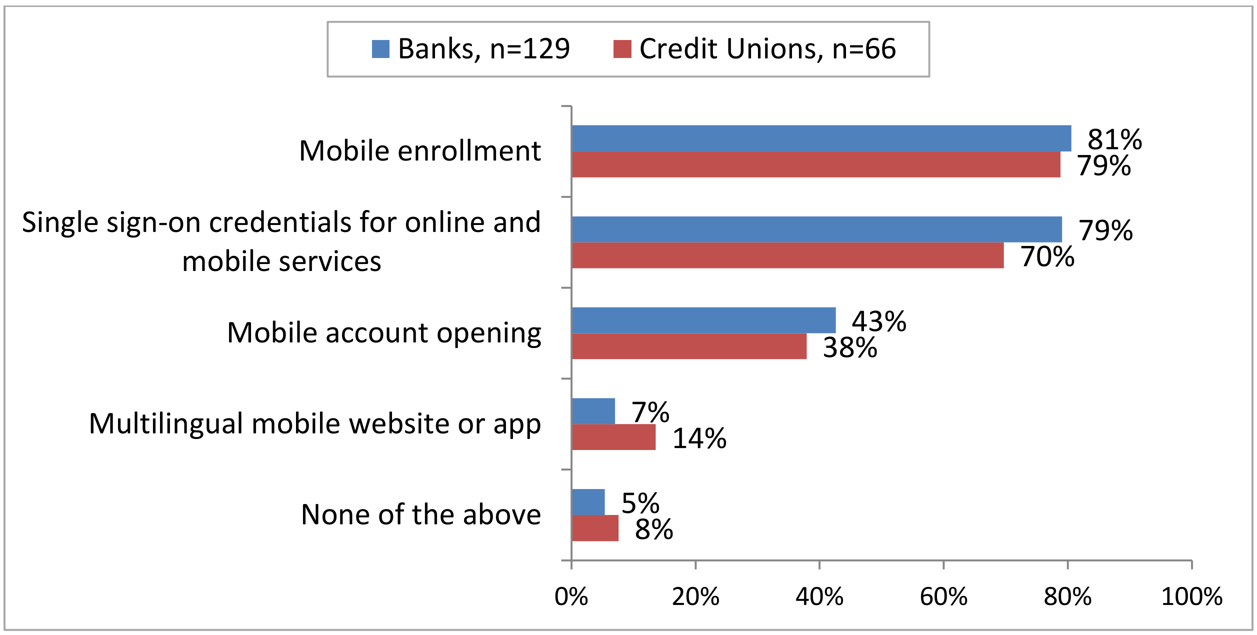
[21] Van Dyke and Higdon, *"2016 Mobile Banking Financial Institution Scorecard."*

six points from 32 percent to 38 percent during the two-year period. Interestingly, NE FIs are ahead of the 33 percent of the top 30 U.S. FIs that support this feature.[22]

Banks offering single sign-on credentials for online and mobile banking inched up from 76 percent in 2014 to 79 percent in 2016. Surprisingly, the percentage of credit unions offering single sign-on dropped nine points during the period, from 79 percent in 2014 to 70 percent in 2016. This is most likely due to the difference in respondents than to a real drop in credit unions offering these capabilities.

Support for multilingual mobile websites and banking apps remains very low as only seven percent of banks and 14 percent of credit unions offer them. Location appears to be the primary determinant for FIs to offer multilingual capabilities in New England. FIs offering multilingual capabilities are located primarily in urban centers in just three states: Connecticut, where three banks and two credit unions provide these services; Massachusetts (six banks and five credit unions); and New Hampshire (two credit unions). Not surprisingly, these FIs are in areas with larger non-English speaking populations.[23]

Figure 12: **Mobile Account Features Offered by FIs** *(percent of respondents)*



Q18. Do you offer or plan to offer the following mobile features? (Check ALL that apply)

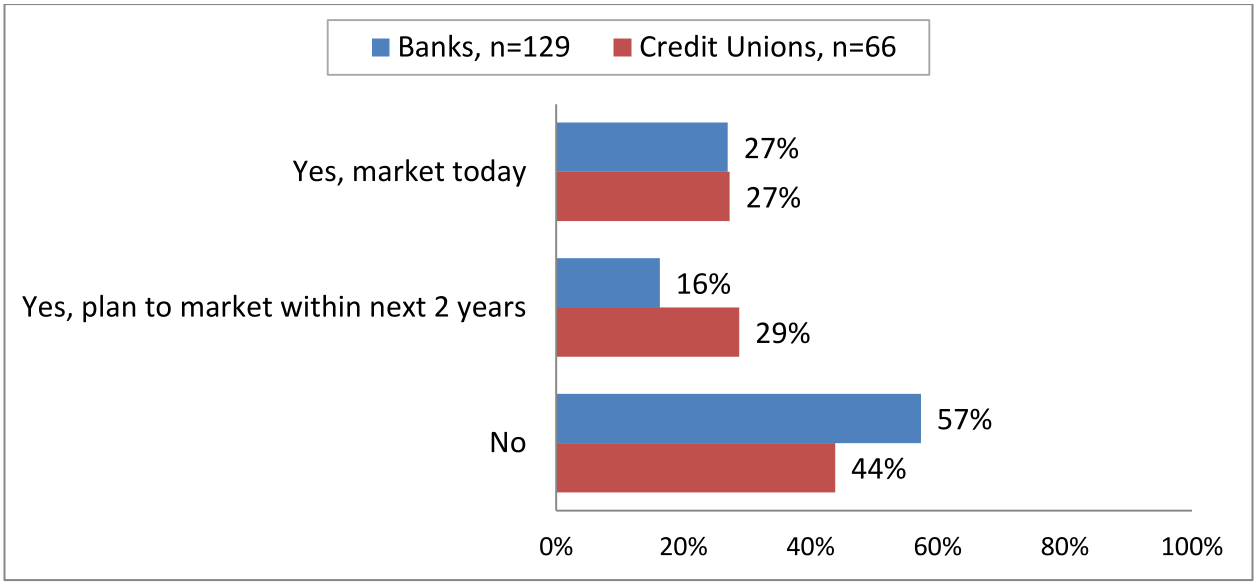
Mobile financial services can help address the financial needs of underserved consumers and change the way they interact with FIs. According to the *2015 FDIC National Survey of Unbanked and Underbanked Households*, seven percent (9 million) of U.S. households were unbanked and 20 percent (24.5 million)

[22] Van Dyke and Higdon, *"2016 Mobile Banking Financial Institution Scorecard."*
[23] Some of the FIs are in or near larger cities that are potentially more diverse, such as Worcester, Fall River, Fitchburg, MA; Nashua, NH; and East Hartford, Danbury, CT.

were underbanked. However, more than 90 percent of underbanked adults own mobile phones and 76 percent own smartphones.[24]

The 2016 survey found that FI respondents are marketing mobile services to underbanked consumers in New England. In 2014, only 12 percent of banks and 14 percent of credit unions reported that they offered or planned to offer mobile banking products targeted to the underbanked. By 2016 those percentages had doubled to 27 percent of both banks and credit unions – and another 16 percent of banks and 29 percent of credit unions plan to market to underbanked consumers within the next two years (Figure 13).

Figure 13: Marketing Mobile Banking Services to the Underbanked (*percent of respondents*)



Q19. Do you market or plan to market any mobile banking products to the underbanked?

Most NE FIs continue to offer mobile banking services to retail customers free of charge. In 2016, only 16 FI respondents indicated that they currently charge or plan to charge their retail customers. Charging for mobile P2P services tops the list (selected by 15 of 16 respondents); and a few (six of 16) selected A2A transfers. Interestingly, 15 of these FIs offer some mobile banking services today, and eight offer mobile P2P, but it is unclear how many are currently charging for any of these services.

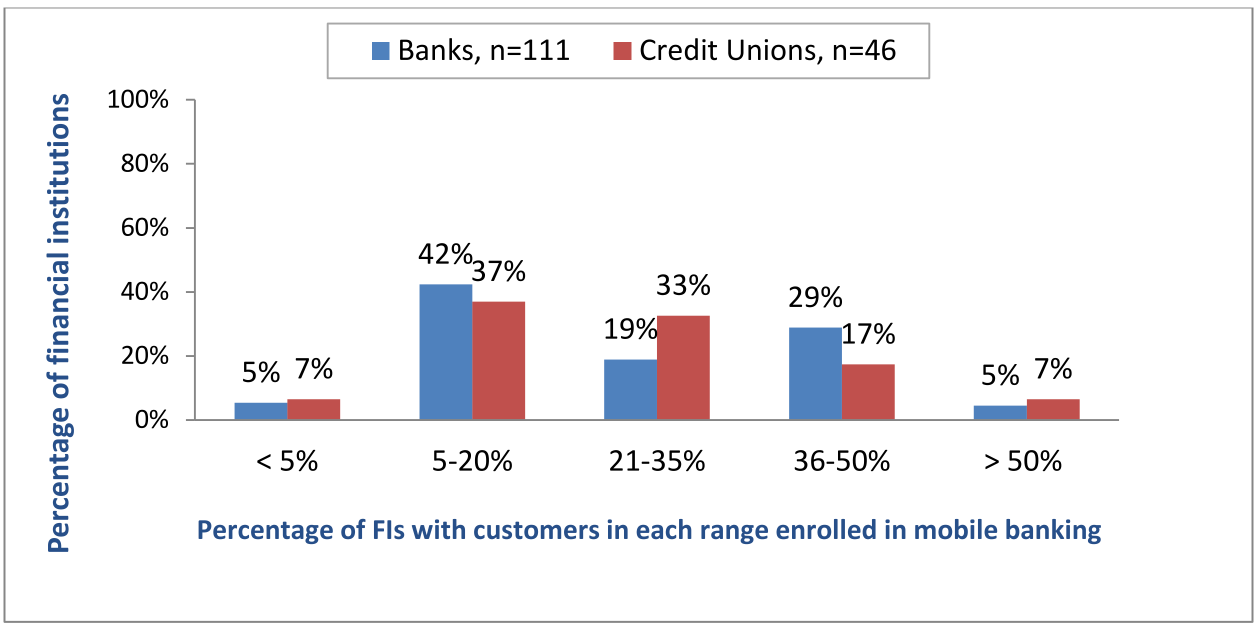
[24] Underbanked refers to a household with a checking or savings account that also obtains financial products and services outside of the banking system. "2015 National Survey of Unbanked and Underbanked Households," *FDIC*, October 20, 2016. https://www.fdic.gov/householdsurvey/.

Consumer Adoption of Mobile Banking Services

Consumer adoption of mobile banking services is growing steadily as more people rely on their mobile phones[25] for a broad range of activities including access to financial services. According to the *2016 FR Board consumer mobile survey*, mobile banking usage has increased annually for all age groups since the survey began in 2011, although younger consumers have consistently used mobile banking more than older consumers. Mobile banking is used by 67 percent for those in the 18-to-29 age range and 58 percent of those in the 30-to-44 age range. By comparison, only 18 percent of individuals aged 60 or older reported having used mobile banking. Additionally, the *2016 FR Board consumer mobile survey* found that mobile app use is rising as well: 82 percent of mobile banking users have their FI's mobile app on their phones. How consumers use mobile banking is also shifting from primarily accessing information (viewing balances, statements, and ATM locations) to performing more complex financial transactions. According to industry findings, 96 percent of consumers check balances and transactions, 51 percent deposit checks, and 47 percent pay bills using their FI's mobile app.[26]

Both enrollment and usage rates for mobile banking have remained relatively low. Figure 14 shows the percentage of FIs (Y-axis) with customers who enrolled in mobile banking within each range (X-axis). The FIs include 111 banks and 46 credit unions that offer and track mobile banking enrollment data. For the first time, however, in 2016 more than half of respondents reported that over 20 percent of their customers were enrolled in mobile banking. Additionally, although not shown in Figure 14, 12 banks (10 percent) and 11 credit unions (17 percent) do not track mobile banking customer enrollment.

Figure 14: Range of Retail Customers Enrolled in FI Mobile Banking (*percent of respondents*)



Q20. What percentage of your RETAIL customers has used your mobile banking services?

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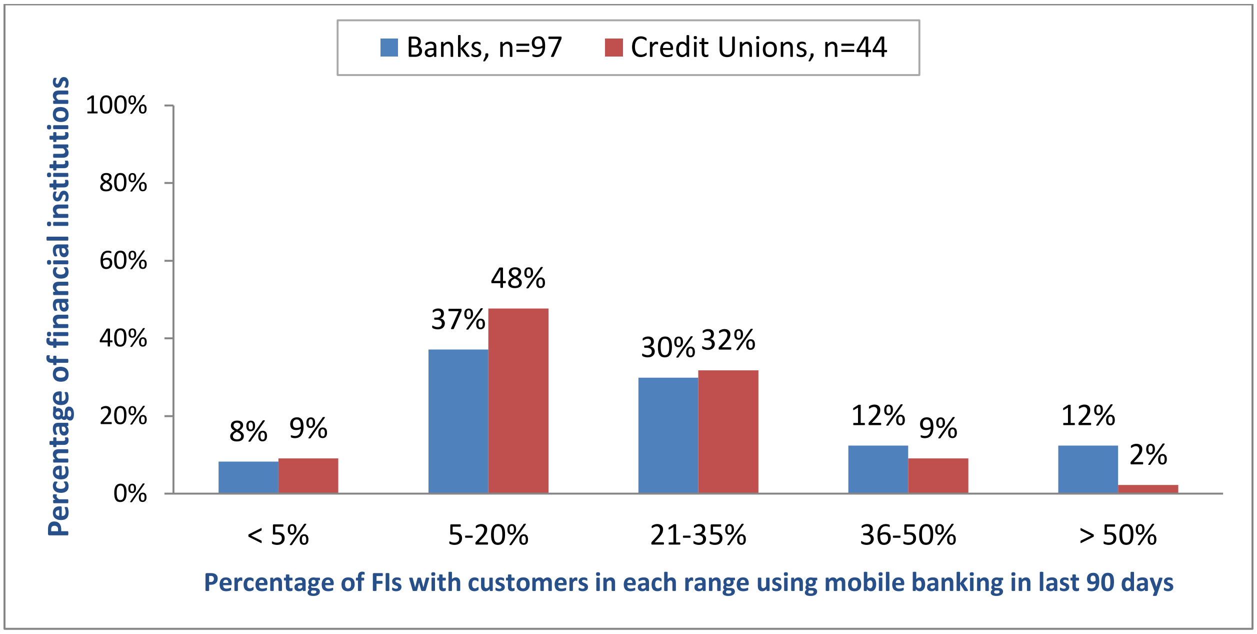
25 In this report mobile phone refers to a smartphone which can access the Internet and can run a variety of mobile apps.
26 First Annapolis Consulting, "Study of Mobile Banking & Payments."

Figure 15 shows the percentage of FIs (Y-axis) with customers who used mobile banking within each range in the last 90 days (X-axis). The FIs include 97 banks and 44 credit unions that offer and track active mobile banking usage. More than half of the bank respondents also reported active users had tipped past the 20 percent (active usage) point. The plurality of credit unions (57 percent), however, still reported that fewer than 20 percent of their retail customers were active mobile banking users. Moreover, 26 banks (21 percent) and 13 credit unions (17 percent) do not track mobile banking usage at all.

Figure 15: Range of Retail Customers using FI Mobile Banking (*percent of respondents*)



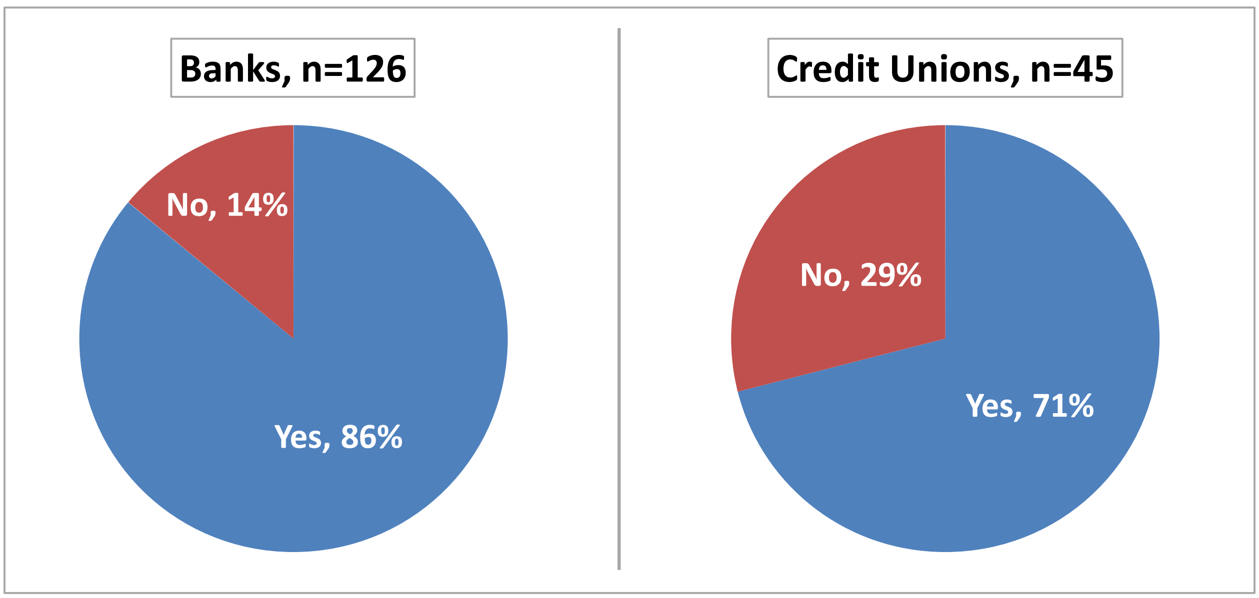
Q20. What percentage of your RETAIL customers has used your mobile banking services?

Business Mobile Banking Services

This section includes responses only from the 171 FIs (126 banks and 45 credit unions) that have corporate, commercial or small business customers *and* offer mobile banking services. Eighty-two (82) percent of these FIs (108 banks and 32 credit unions) indicated that they offer mobile banking services to their business customers. There is a clear difference between banks and credit unions: 86 percent of banks offer mobile banking services to their business customers compared to 71 percent of credit unions doing so (Figure 16).

Asset size is a key determinant as to whether an FI offers mobile banking services to its business customers. Most respondents with assets under $100 million (14 percent of banks and 29 percent of credit unions) do not offer mobile banking to businesses and responded 'no' in Figure 16. However, among FIs with assets between $100M and $250 million, the numbers of those offering and not offering are almost equal. The number of FIs offering mobile banking services to businesses increases with each asset tier[27] among respondents with assets over $250M. Not surprisingly, the 'do not offer' group comprised more credit unions than banks due to asset size.

Figure 16: FIs Offering Mobile Banking Services to Businesses *(percent of respondents)*



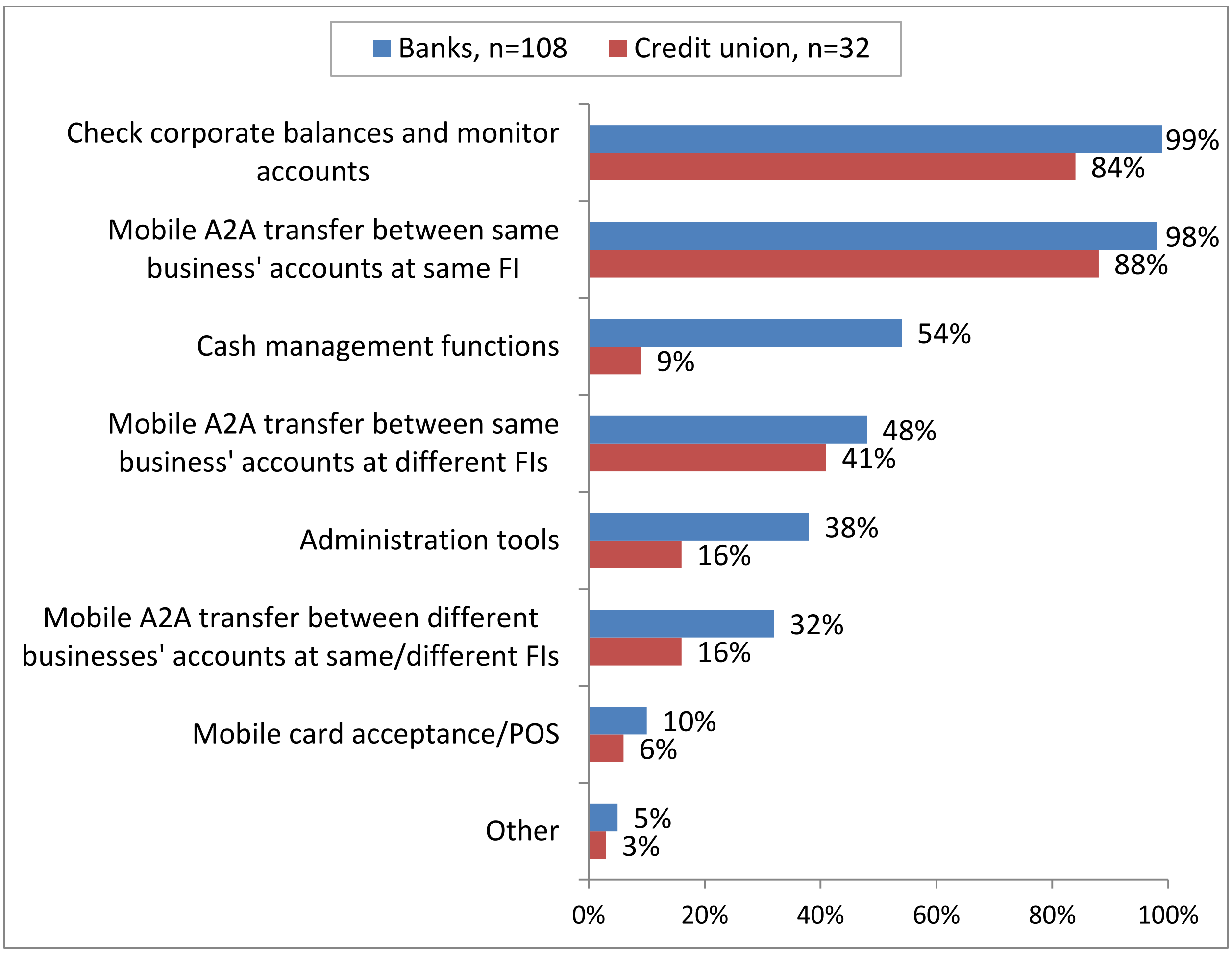
Q28. Do you offer or plan to offer mobile banking services to your BUSINESS customers?

[27] Refer to page 10 for breakdown of asset tiers.

The two mobile banking services most commonly offered today or likely to be offered in the next two years to business customers are the ability to: (1) check corporate balances and monitor accounts; and (2) move funds between accounts (A2A transfer) within the same institution – each selected by 95 percent of respondents. (See Figure 17 for bank to credit union comparisons.)

More banks than credit unions provide these services: 99 percent of banks and 84 percent of credit unions offer or plan to offer 'balance checking and account monitoring,' while 98 and 88 percent of banks and credit unions, respectively, offer or plan to offer mobile A2A services within the same FI. The next most offered service was A2A transfer from a business customer's account with one FI to that same customer's account at another institution, selected by 47 percent of total respondents: 48 percent of banks and 41 percent of credit unions. Most credit unions do not offer cash management services. Although offered by 41 percent of total respondents, this service is supported by just nine percent of credit unions compared to 54 percent of banks.

Figure 17: Mobile Banking Services Offered to Businesses *(percent of respondents)*

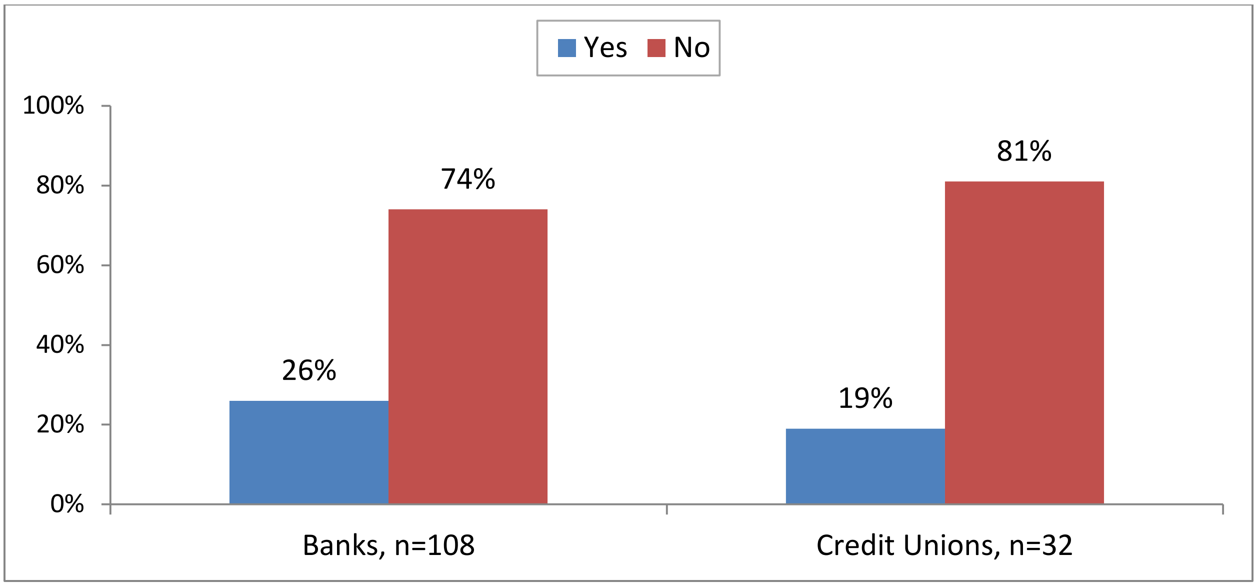


Q29. What mobile banking services do you offer or plan to offer within the next 2 years to your BUSINESS customers? (Check ALL that apply)

Most banks and credit unions do not plan to charge business customers explicitly for mobile banking services, although a higher number of banks (28) charge or plan to charge for some services compared to six credit unions (Figure 18).

Asset size was a factor. The decision to charge rose by asset tier: 25 of the 34 respondents charging or planning to charge were in the highest two asset tiers. Twelve (12) respondents were FIs in the $500 million to $1 billion in assets range, and 13 had more than $1 billion in assets.

Figure 18: Business Mobile Banking Fees *(percent of respondents)*



Q30. Do you charge or plan to charge your BUSINESS customers a fee for any mobile banking services?

There are a variety of ways that these banks and credit unions can earn revenue for the mobile banking services that they offer. The method most preferred by FIs (59 percent) is to charge businesses a flat monthly fee for services. This practice is far more prevalent among banks than credit unions (64 percent to 33 percent respectively). FIs typically charge or plan to charge for mRDC: 43 percent of banks and 50 percent of credit unions. However, as only 24 FIs responded to this question, the data should be taken as indicative of the low response rate.

Business adoption of FIs' mobile banking services is a perennial issue, dependent on external factors, such as an institution's readiness and ability to provide the mobile services that business entities want, and internal business challenges, including how to manage and secure employee use of mobile phones for business purposes, compliance and regulation, as well as other priorities that consume resources and dollars.

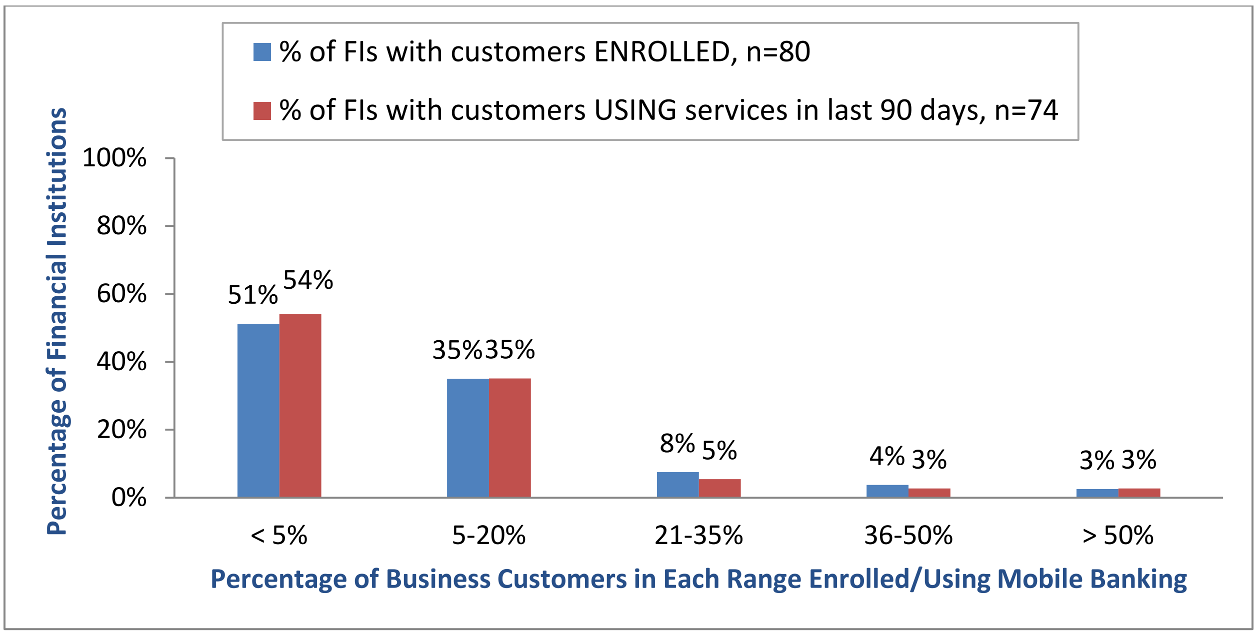
About one third of respondents do not track mobile enrollment (26 percent) or usage data (31 percent) for their business customers. Non-trackers are tend to be smaller institutions under $500 million in assets; these FIs comprise 16 FIs that do not capture either enrollment or usage data and two that track enrollment but not usage. Among Tiers 4 and 5 (greater than $500 million in assets), 12 FIs do not capture any of this data and four track enrollment only.

It is not clear why some FIs do not monitor this data. Possible reasons include lack of a clear strategy for offering mobile banking to businesses or a lack of understanding of the benefits of maintaining such metrics. Some FIs may not have sufficient resources to capture these statistics.

Figure 19 illustrates that among the FIs that track adoption, most respondents still have business enrollment and usage rates of five percent or less, but adoption and usage percentages have improved since the 2014 findings. For example, in 2014, the percent of banks with under five percent enrollment and active usage were both above 90 percent, while credit unions with fewer than five percent of business customers enrolled and using mobile banking were 70 percent and 76 percent, respectively.

There has been a corresponding uptick in 2016 in the percent of FIs with adoption rates past the five percent mark. More than 11 percent of respondents have over 20 percent of their business customers enrolled and using their mobile banking platform.

Figure 19: Business Customer Enrollment and Usage of Mobile Banking (*percent of respondents*)

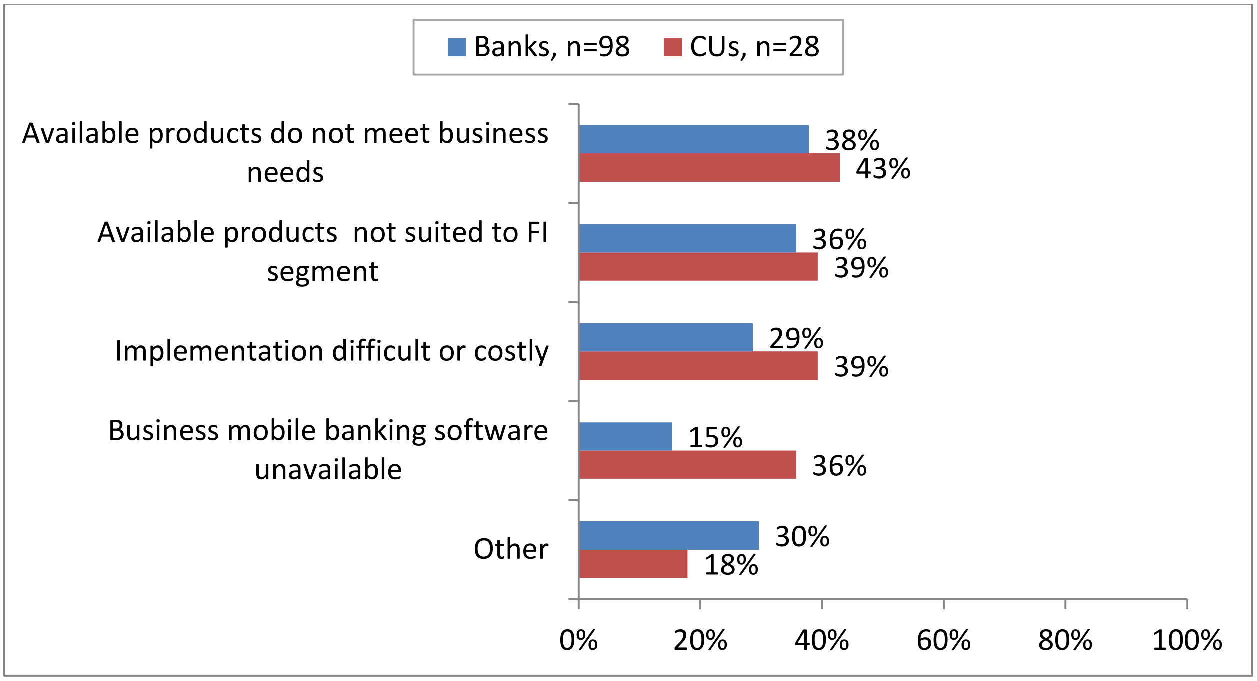


Q32. What percentage of your BUSINESS customers has used your mobile banking services?

The perceived challenges in offering mobile banking to businesses must be included in the reasons why institutions are slower to implement these services. Although the number of bank respondents far exceeded the number of credit unions, the latter on a percentage basis viewed challenges to be greater than banks did (Figure 20), with at least 36 percent of respondent credit unions selecting all factors as challenges.

Although many respondents selected more than one challenge, 55 FIs selected ‘available products do not meet business needs’ as the single major barrier, which may be the primary reason why few FIs offer mobile banking to business customers. Several institutions that selected ‘other’ believed that online (or other) channels met the needs of commercial customers. Marketing, security, lack of business-focused services, and customer training were also cited. Nine respondents asserted that they had not experienced any challenges.

Figure 20: Challenges in Offering Mobile Banking Services to Businesses (*percent of respondents*)



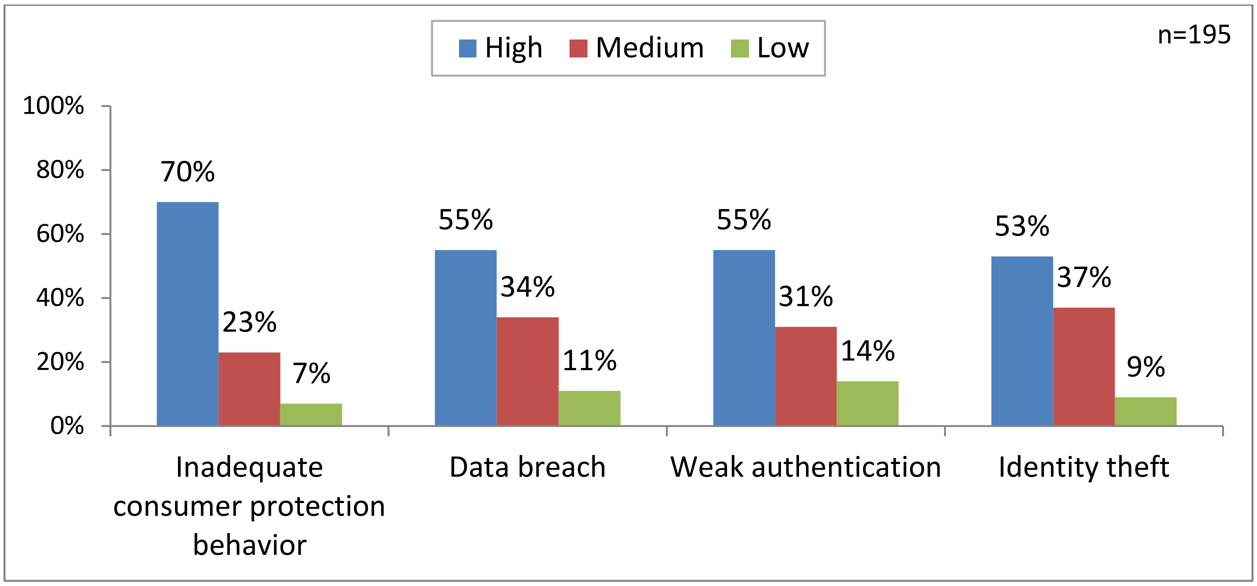
Q33. What challenges do you see in offering mobile banking services to your BUSINESS customers? (Check ALL that apply)

Mobile Banking Security

Security continues to be a key concern for FIs deciding whether to offer mobile banking services. Most FIs (70 percent) rated 'inadequate consumer protection behavior' as the highest concern in offering mobile banking. Compounding this issue is that FIs have the least control over consumer behavior compared to other factors. However, FIs can do more to improve and influence consumer protection behaviors through education, marketing, and promoting tools that are easy for customers to implement on their mobile phones, such as creating stronger passwords.

More than half of FI respondents rated data breach (55 percent), weak authentication (55 percent), and identity theft (53 percent) high as well. Fewer than 15 percent of FIs rated any of the security concerns as 'low.'

Figure 21: Mobile Banking Security Concerns (*percent of respondents*)



Q25. Please RATE the IMPORTANCE of your FI's security concerns associated with offering mobile banking services for consumers.

NE FIs use multi-layered methods to enhance mobile banking security. Similar to 2014 survey results, the 2016 data clarified that 'time-out due to inactivity' and 'multifactor authentication' (MFA) are still the two most commonly used security methods by FIs in this region. In April 2016, the Federal Financial Institutions Examination Council (FFIEC) released security guidance, which included MFA, for FIs to follow to ensure that their mobile banking and payment services are secure.[28]

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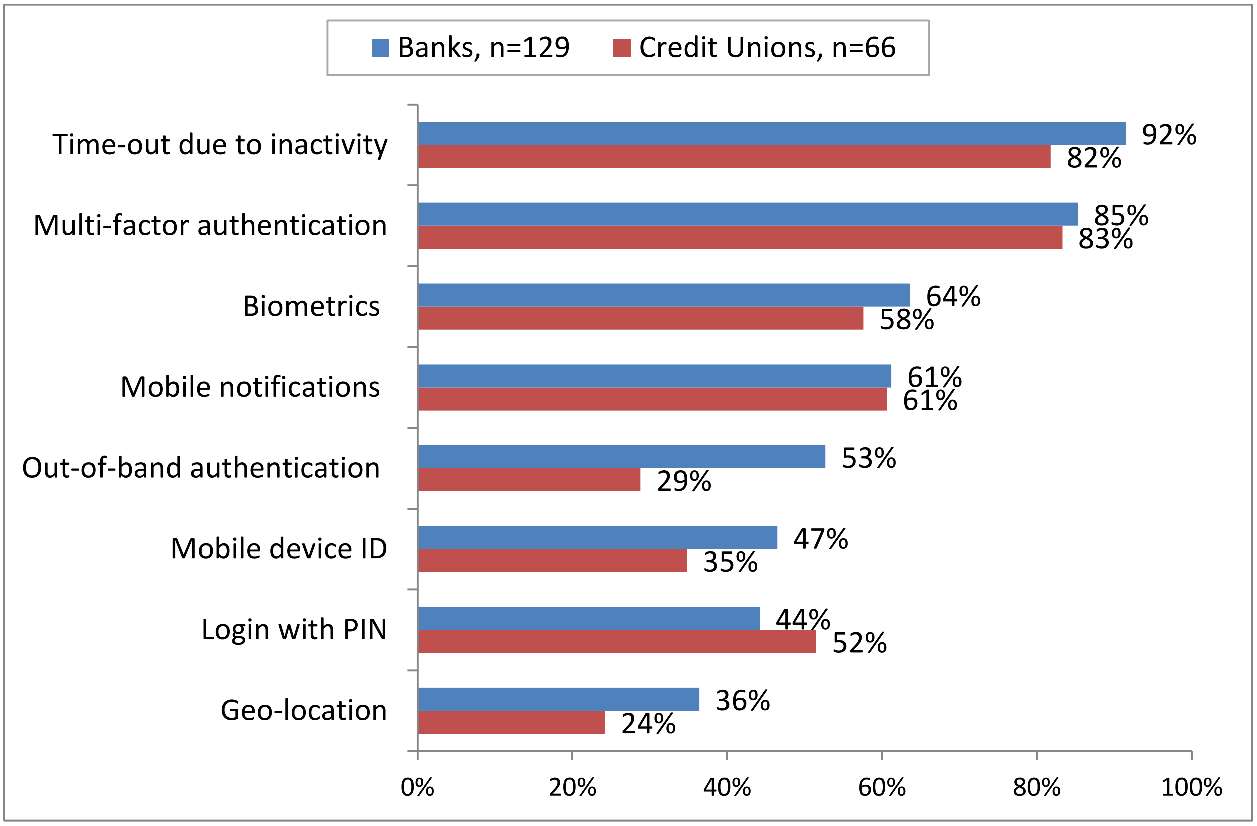
[28] "FFIEC IT Examination Handbook Appendix E: Mobile Financial Services," *FFIEC*, April 2016. https://www.ffiec.gov/press/PDF/FFIEC_booklet_Appendix_E_Mobile_Financial_Services.PDF. New guidance addresses mobile technologies, and risk identification, measurement, mitigation, monitoring, and reporting. It recommends that FIs implement MFA to mitigate the risk of fraudulent transactions and other malicious activities. It also stresses the need to ensure customers take responsibility for mobile security through customer awareness training.

The percentage of FIs using or considering biometrics increased dramatically from seven percent of banks and four percent of credit unions in 2014 to 64 percent of banks and 58 percent of credit unions in 2016 (Figure 22). Newer mobile phone models that support biometric capabilities for fingerprint authentication have enabled this security feature. In comparison, nearly half of the top 30 U.S. FIs support login through fingerprint recognition.[29] Consumers have been vocal in their demand for the feature, which provides for faster logins and has the added benefit of visually appearing more secure.

Ninety-two (92) percent of banks implemented the ‘timeout due to inactivity’ feature in 2016 compared to 80 percent in 2014; and 82 percent of credit unions offered inactivity timeouts in 2016 compared to 72 percent in 2014. Similarly, use of ‘mobile notifications’ increased from 52 to 61 percent of banks and 47 to 61 percent of credit unions between 2014 and 2016. However, the percent of FI respondents that reported using ‘mobile device ID’ decreased from 2014 to 2016: 47 percent compared to 56 percent of banks and 35 percent compared to 51 percent of credit unions. The biggest difference between banks and credit unions, however, is the use of ‘out-of-band authentication.’ Fifty-three (53) percent of bank respondents use or plan to use it compared to 29 percent of credit unions.

Figure 22: Mobile Security Methods Used by FIs (*percent of respondents*)



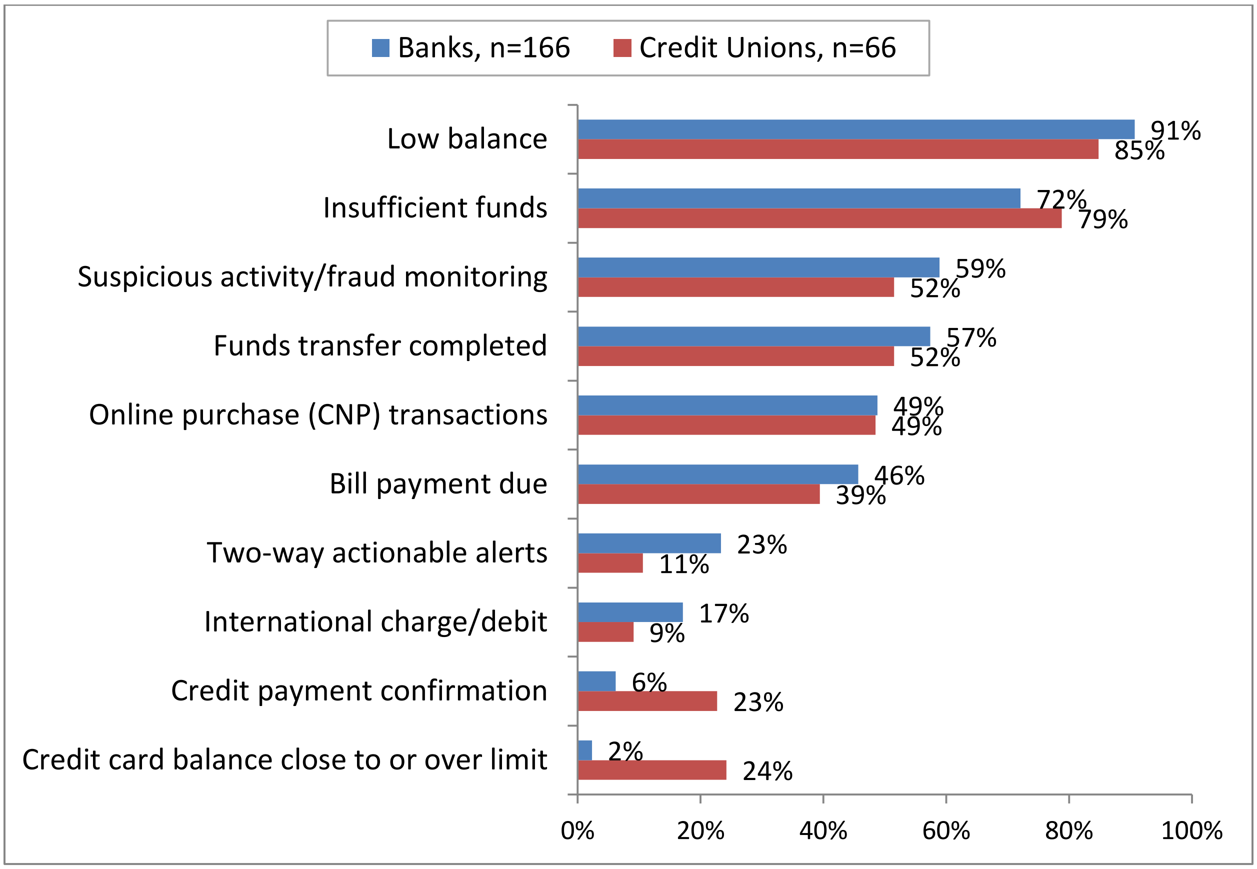
Q27. Which of the following does your FI use or plan to use to enhance mobile security? (Check ALL that apply)

[29] Van Dyke and Higdon, “2016 Mobile Banking Financial Institution Scorecard.”

Now that many consumers have near-constant access and interaction with their mobile phones, FIs can use mobile alerts to provide "just-in-time information" to influence consumer financial behavior and help them make better financial decisions. Figure 25 shows different types of alerts that FIs provide to help customers manage their funds and monitor fraud. The two most commonly supported alerts are, as they were in 2014, 'low balance' (offered by 91 percent of banks and 85 percent of credit unions) and 'insufficient funds' (offered by 72 percent of banks and 79 percent of credit unions). This data aligns to findings from the *2016 FR consumer mobile survey* – 'low balance' alerts are the most common type of alerts received by consumers.[30]

More than half of NE FIs offer alerts for 'suspicious activity/fraud monitoring' as well as alerts to confirm completed funds transfers. The number of FIs providing alerts for card not present (CNP) purchases made with the FI's credit or debit card increased significantly from 18 percent of banks and 16 percent of credit unions in 2014 to 49 percent of both banks and credit unions in 2016. This is in line with rising industry concern about the shift in fraud from card-present to CNP transactions as a result of the U.S. EMV chip card migration at POS.

Figure 23: Mobile Alerts Offered by FIs (*percent of respondents*)

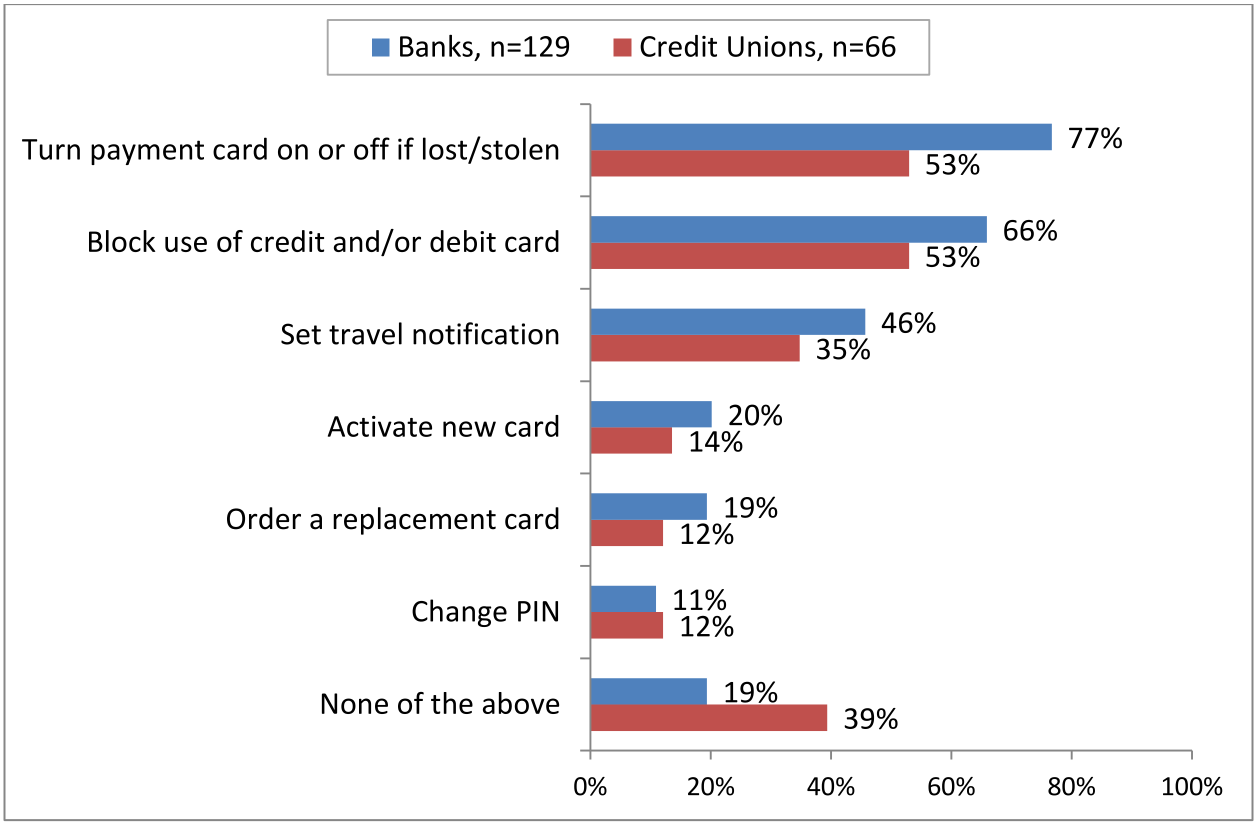


Q24. What types of mobile alerts does your FI offer or plan to offer? (Check ALL that apply)

[30] The *2016 FR Board consumer mobile survey* found that customers who received 'low balance' alerts reported taking action in response – transferring funds (43 percent); depositing money into the low balance account (36 percent); or reducing spending (32 percent).

In a new 2016 NE FI mobile survey question, respondents were asked what mobile features they offered to secure card transactions (Figure 24). The two most broadly supported features are the ability to turn a lost or stolen payment card on or off and to block use of a credit/debit card. Some FIs also allow customers to set travel notifications and activate a new card through the banking app instead of calling the bank, going online, or using an ATM. Features that allow mobile customers more control of what they can do within the app may accelerate the emergence of "mobile only" consumers, which industry research has shown to be nearly nonexistent today.[31]

Figure 24: Mobile Card Controls Offered by FIs (*percent of respondents*)



Q26. Which of the following card control features does your FI's mobile banking app support or plan to support? (Check ALL that apply)

[31] Van Dyke and Higdon, "2016 Mobile Banking Financial Institution Scorecard."

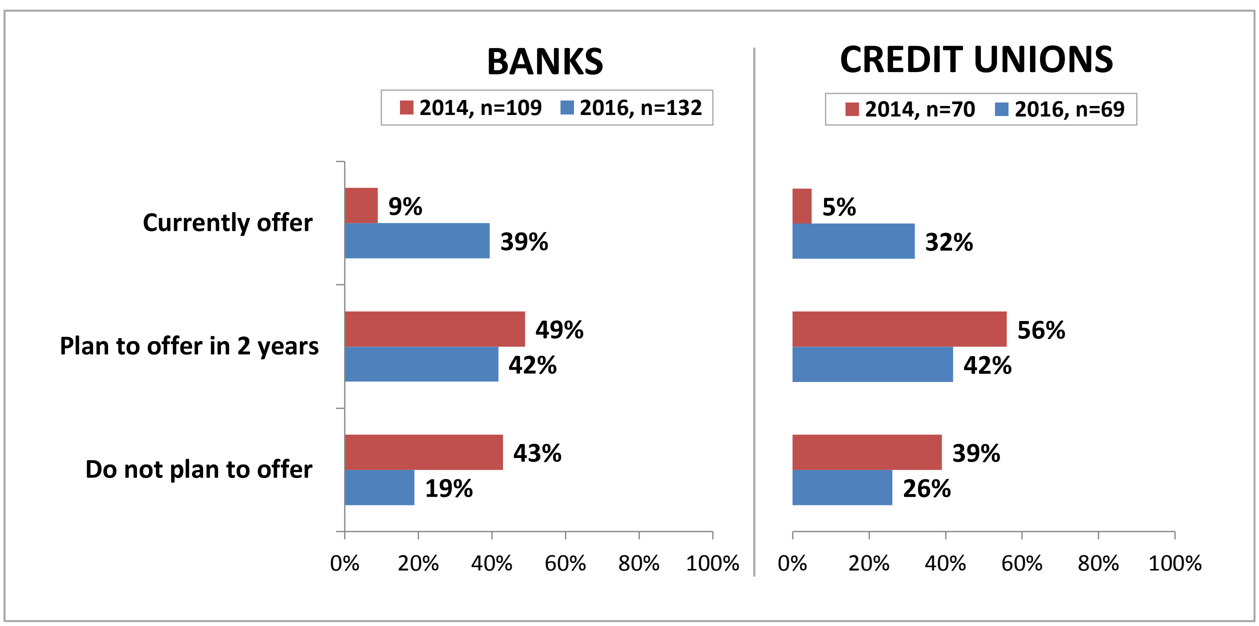
V. MOBILE PAYMENT RESULTS

There have been significant developments in the mobile payments industry since the previous NE FI mobile banking survey conducted by the FRBB in 3Q 2014. Most noteworthy during this time was the introduction of Apple Pay in October 2014, followed by the launch of Android Pay, Samsung Pay, and a number of other mobile wallets in 2015. Consumers can now choose from a variety of mobile wallet models. The 2016 survey data evidences that increased mobile wallet activity in the payments industry has led to growing interest among FIs, merchants, card networks, and technology providers to engage in this market. More NE FIs are implementing mobile payment services. Over one-third (39 percent of banks and 32 percent of credit unions) offer mobile payments in 2016, compared to only a small fraction (9 percent of banks and 5 percent of credit unions) in 2014 (Figure 25). Another 42 percent of both banks and credit unions, respectively, plan to offer mobile payment services in the next two years. Additionally, compared to 2014, fewer FIs in 2016 reported that they 'do not plan to offer' mobile payments.

The availability of historical data from previous FRBB mobile surveys makes it possible to determine whether FIs that planned to offer mobile payment services in 2014 had in fact implemented them by 2016. Of the 57 FIs that participated in both the 2014 and 2016 surveys:

- 9 percent offered mobile payment services in 2014 and continued to offer them in 2016
- 18 percent planned to offer mobile payments in 2014 and offer them in 2016
- 25 percent planned to offer mobile payments in 2014 and are still in planning stage in 2016
- 14 percent did not plan to offer mobile payments in 2014 but changed to offer them in 2016
- 11 percent did not plan to offer mobile payments in 2014 but reported plans to offer them by 2018
- *23 percent did not offer mobile payments in 2014 and **still have no plans** to offer them by 2018*

Figure 25: FI Plans to Offer Mobile Payment Services – 2016 vs 2014 (*percent of respondents*)



Q35. Do you offer or plan to offer mobile payment/wallet services to customers?

Table 3 shows how FIs rated the factors that influenced their decision to offer mobile payments. The highest ratings were 'competing with other FIs' and 'mobile payments gaining momentum,' selected by more than two-thirds of respondents. The third high-rated factor was 'compete with nonbanks,' selected by 57 percent of NE FIs.

FIs have realized that mobile payments are a reality – merchants are accepting mobile payment solutions at their venues, and consumers are using mobile wallets to make purchases at POS, in-app, and online. At this point, banks and credit unions are focused on competing with other FIs, recognizing that although mobile payments may not be a direct revenue driver, they may increase of the volume of underlying credit and debit card transactions in lieu of cash.

Many FI respondents do not yet perceive the benefit of value-added services, such as loyalty programs and rewards, and are evenly split across high, medium, and low importance for use of incentive programs. Interestingly, while security concerns are top of mind for FIs in general, they are starting to recognize that a mobile device can be more secure than other payment methods.

Table 3: Drivers for Offering Mobile Payment Services (*percent of respondents*)

Factors that influenced FI's decision to offer mobile payments *n=158*	**Ratings by Importance**		
	High	**Medium**	**Low**
Compete with other FIs	74%	25%	1%
Mobile payments are gaining momentum	67%	31%	2%
Compete with nonbanks	57%	32%	11%
Customer demand	40%	43%	17%
Mobile device is more secure than card or other payment methods	37%	48%	15%
Increase customer engagement with loyalty, rewards, and other incentives	31%	32%	37%
Generate revenue and/or reduce costs	18%	39%	43%

Q36. Please RATE the IMPORTANCE of factors that influenced your FI's decision or plans to offer mobile payments.

Mobile Wallets

In 2016 respondents were asked to 'indicate the mobile wallet service(s) that you are familiar with.' Awareness of the "Pay" wallets received the greatest response, not surprising given that 44 percent of U.S. mobile phone users have iPhones and 53 percent have Android phones.[32] Extensive media coverage of "Pay" wallet launches generated much attention, and the involvement of FIs in the "Pay" wallet implementation also contributed to the high awareness level. Of NE FIs, 99 percent were aware of Apple Pay; 87 percent of Android Pay; and 81 percent of Samsung Pay, shown as a visual representation in Figure 26.

It is not surprising that FIs are aware that PayPal offers a mobile wallet, since the e-commerce payments provider has been an FI competitor in the online space for more than a decade. FIs in the NE region have some familiarity with the digital wallets offered by the card brands to make online purchases as they start to gain momentum in the market. Almost half of respondents (48 percent) know about Visa Checkout, and 37 percent have heard of Masterpass.

Figure 26: FI Mobile Wallet Recognition (*n=158*)

Q37. Please indicate the mobile wallet service(s) that you are familiar with. (Check ALL that apply)

[32] "comScore Reports February 2016 U.S. Smartphone Subscriber Market Share," *comScore*, April 6, 2016. https://www.comscore.com/Insights/Rankings/comScore-Reports-February-2016-US-Smartphone-Subscriber-Market-Share

The two most common strategies NE FIs selected for offering mobile payments were ‘partnering with third party payment processors’ and ‘partnering with NFC wallet providers.’ Two-thirds of FIs (67 percent of banks and 63 percent of credit unions) selected third party processors; and 59 percent of banks and 63 percent of credit unions selected NFC wallet providers. Very few FIs (five percent of banks and eight percent of credit unions) build or plan to build their own mobile payment solutions.

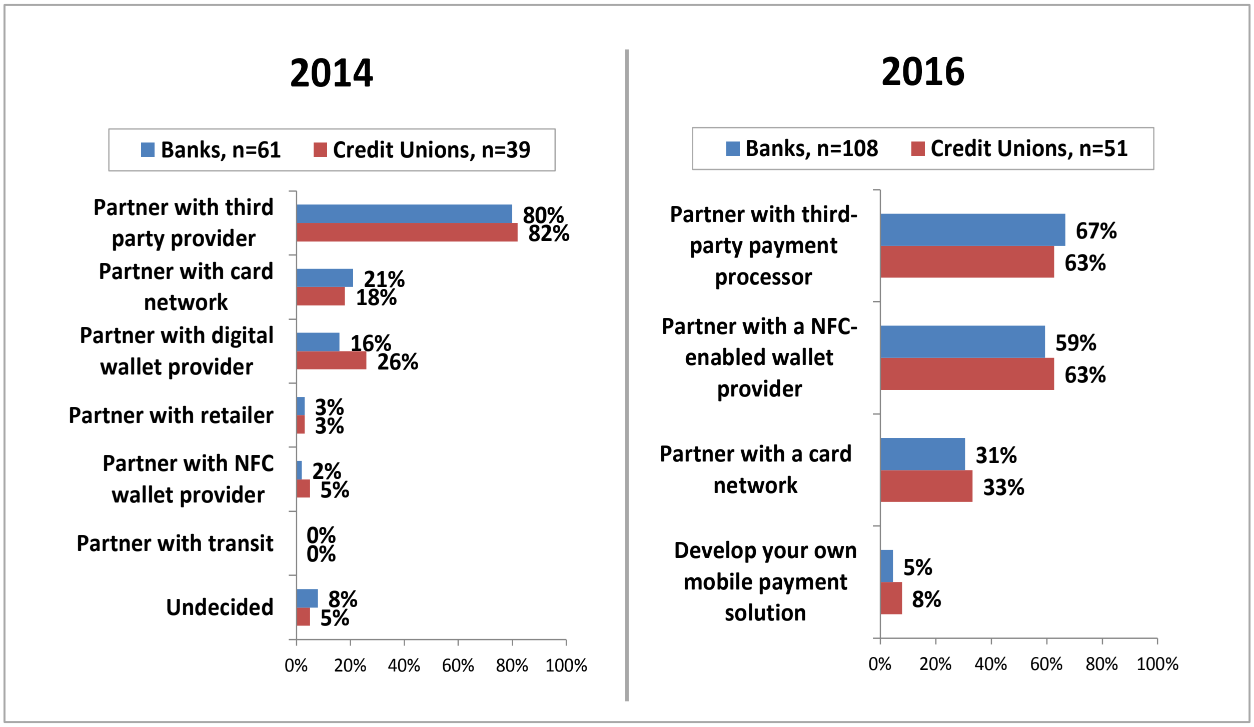
Some smaller FIs may work in conjunction with their payment processors to implement the “Pay” wallets and/or other mobile wallet solutions. FIs may also partner with card networks to offer digital payment solutions like Visa Checkout, Masterpass, or AmEx Express Checkout. Most FIs understand the value and synergies of partnering with payment processors or wallet providers to implement mobile payment solutions. Such partnerships enable FIs to combine their knowledge of customers, regulation, compliance, and risk management with the technical and marketing expertise of third party providers and processors.

Given the many changes in the payment industry, it is somewhat difficult to make direct comparisons between 2014 and 2016 related to FI strategies for offering mobile payments. However, there are some similarities in the results. In both years, most FIs indicated they would partner with a third party provider or payment processor. Over half of banks (59 percent) and credit unions (63 percent) also selected ‘partnering with an NFC-enabled wallet provider’ in 2016, an option chosen by only two percent of banks and five percent of credit unions in 2014.

Some discrepancies can be explained by differences in the options available in response to the question, and by the limited types of mobile/digital wallets that were in the market when the 2014 survey was fielded. For example, in the 2016 survey, ‘partnering with a card network’ also included the card network branded digital checkout wallets (e.g., Visa Checkout and Masterpass), whereas they were two separate options in 2014. In another example, the 2014 survey wallet option for NFC included wallets available at the time (e.g., Softcard and Google Wallet); the “Pay” wallets were not yet announced.

Finally, since FIs could select multiple options, some may have selected ‘partner with a third party processor’ along with an ‘NFC wallet provider’ or other choice for the same mobile wallet implementation. The 2016 survey also eliminated ‘partner with retailer’ and ‘partner with transit’ as answer choices since almost none chose them in 2014; however this could change as new wallets, such as Chase Pay and Walmart Pay, are rolled out.

Figure 27: FI Strategies for Offering Mobile Payments (*percent of respondents*)



Q38. How do you offer or plan to offer mobile payment/wallet services? (Check ALL that apply)

FIs were next asked about their plans to offer specific wallets, as shown in Figure 28. More than one-third (36 percent) of FI respondents have implemented at least one of the NFC mobile wallets, and some have implemented two or three. Another 41 percent of FIs plan to implement NFC wallets in the next two years. Half of respondents offer Apple Pay today, and the remainder plan to do so within the next two years. Android Pay is a close second: 81 percent of banks and 88 percent of credit unions plan to offer it by the end of 2018; and Samsung Pay is close behind.[33] Fewer FIs offer digital checkout wallets because they have only been recently implemented for mobile commerce payments. We expect to see a higher percentage of FIs that offer these mobile wallet services in the next two years.

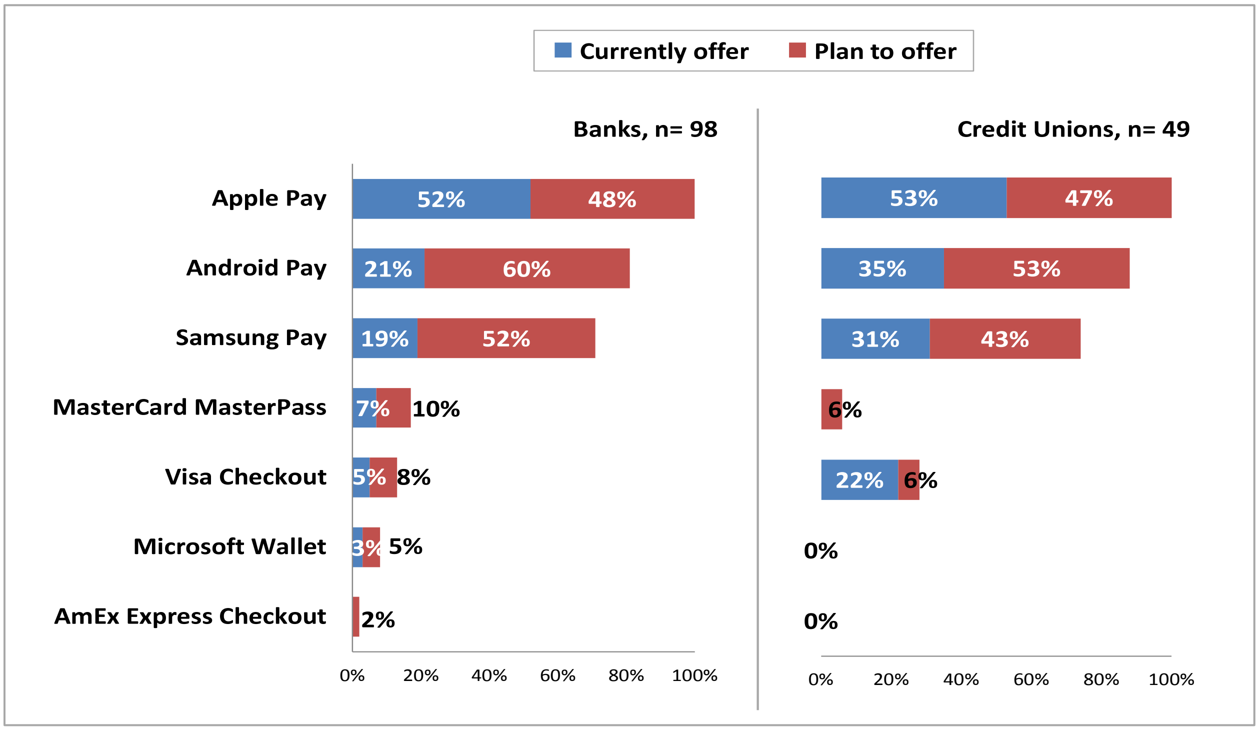
Visa Checkout and Masterpass are card network-agnostic, but AmEx Express Checkout supports only AmEx cards. FI response rates for offering the AmEx solution are much lower because cards are issued directly by AmEx and a few banks. None of the banks or credit unions currently offers AmEx Express Checkout and only two banks plan to offer it. No credit union offers or plans to offer Microsoft Wallet.

FIs understand the need to offer multiple wallet options because customers have different mobile phone preferences and may use different wallets depending on the purchase, merchant, or channel (e.g., POS, online, in-app). Additionally, merchants do not accept all wallets. FIs have some control over the availability of the wallets listed in Figure 28 through their participation with the mobile wallet providers,

[33] Apple Pay works with iPhone 6/6 Plus and newer models. Android Pay and Samsung Pay work on selected mobile phone models that use the Android mobile operating system.

but they cannot control acceptance of merchant wallets (e.g., Walmart, Kohl's, or CVS Pays) that compete with the NFC "Pay" or digital wallets.

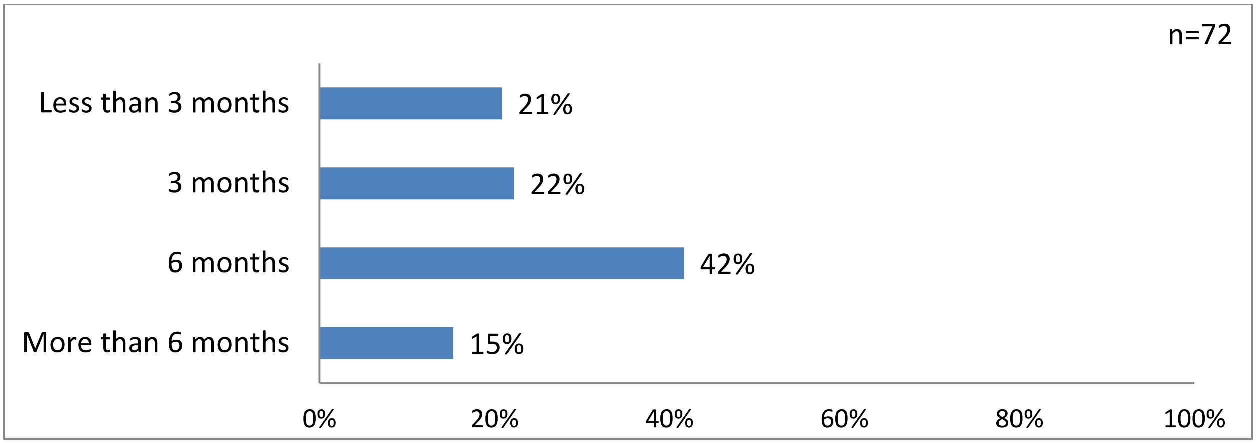
Figure 28: Mobile Wallets Offered by FIs (*percent of respondents*)



Q39. Which of the following MOBILE WALLET service(s) do you offer or plan to offer? (Check ALL that apply)

Implementation of an NFC wallet for most FIs took six months or less after completion of the certification process (Figure 29). FIs that have not yet implemented NFC mobile wallet services were asked to check 'N/A.'

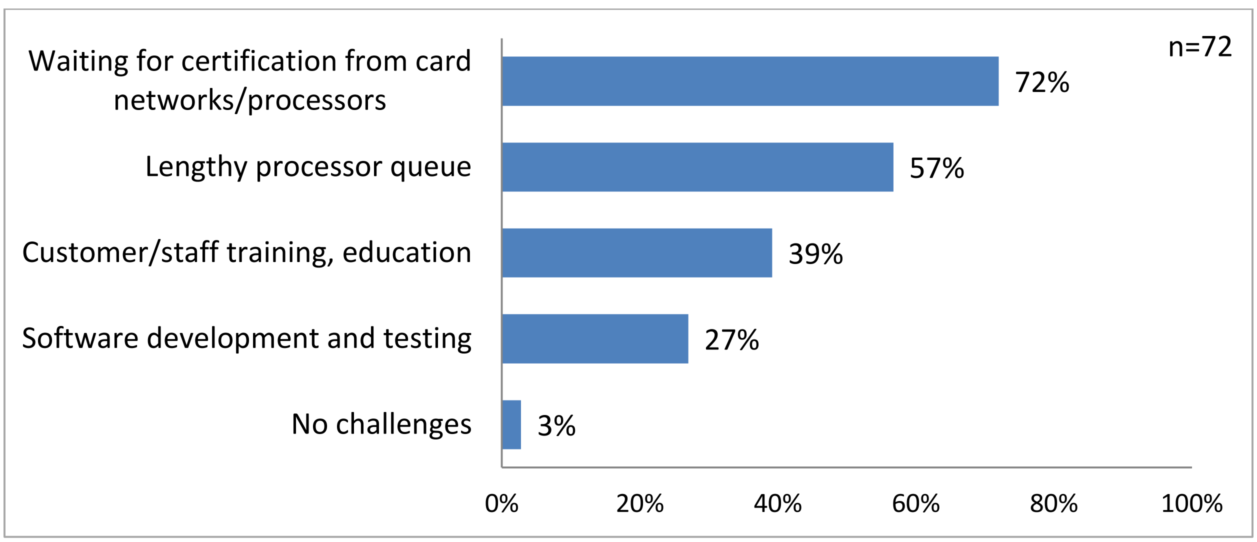
Figure 29: NFC Mobile Wallet Implementation (*percent of respondents*)



Q40. About how much time did it take for your FI to implement the NFC MOBILE WALLET service?

Nearly three-quarters (72 percent) of FIs that had implemented NFC mobile wallets cited 'waiting for certification from card networks or processors' as their biggest challenge (Figure 30). More than half (57 percent) faced a 'lengthy processor queue,' and over one-third (39 percent) reported 'customer/staff training, education' challenges.

Figure 30: NFC Mobile Wallet Implementation Challenges (*percent of respondents*)

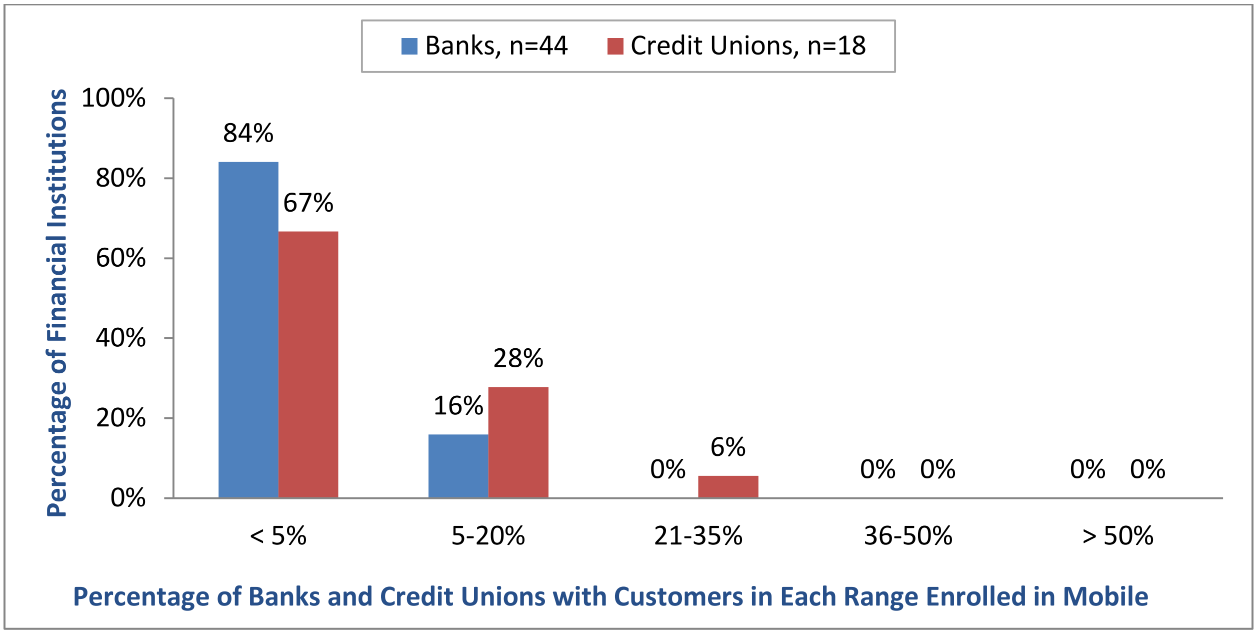


Q41. What challenges did your FI experience implementing the NFC MOBILE WALLET? (Check ALL that apply)

Consumer Adoption of Mobile Payment Services

Figure 31 shows customer enrollment ranges of the 44 banks and 18 credit unions that currently offer and capture mobile payments enrollment data. Mobile payments enrollment is growing at a slow pace. Most FIs (84 percent of banks and 67 percent of credit unions) have enrolled fewer than five percent of their customers. Only 16 percent of banks and 28 percent of credit unions have enrolled between five and 20 percent of their retail customers, and only one credit union has 21 to 35 percent of its customers enrolled in its mobile payment services.

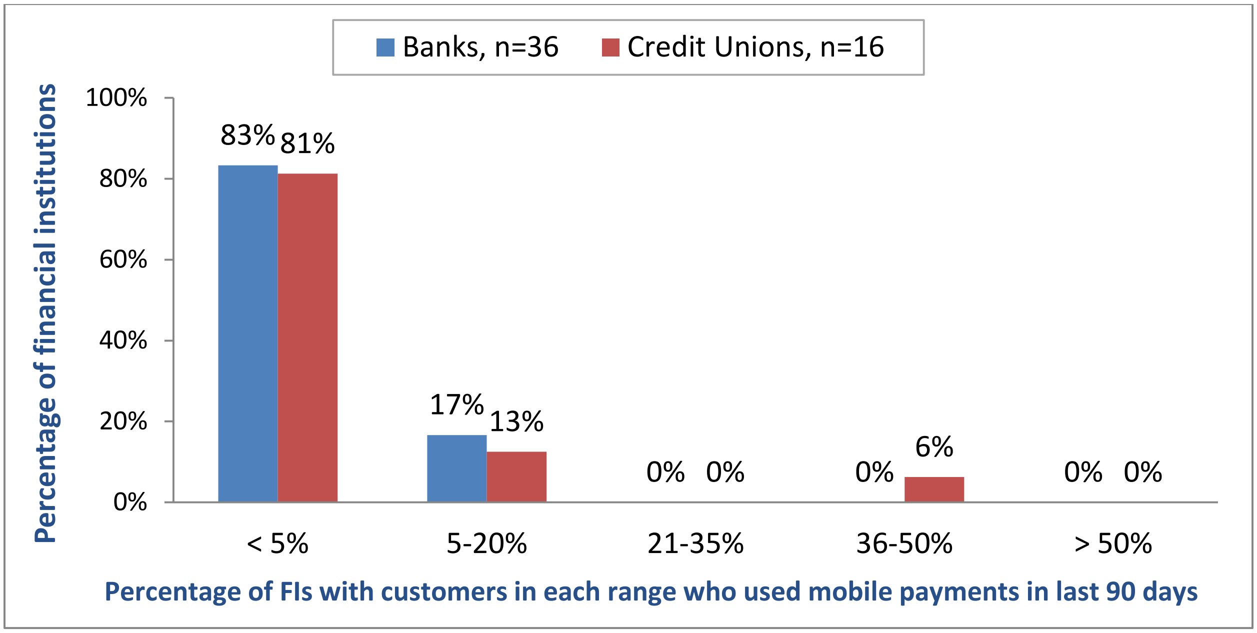
Figure 31: Customer Enrollment in Mobile Payment Services (*percent of respondents*)



Q43. What percentage of your RETAIL customers uses your mobile payment/wallet services?

Figure 32 shows the percentage of FIs (Y-axis) with customers who used mobile payments within each range in the last 90 days (X-axis). The FIs include 36 banks and 16 credit unions that offer and track active mobile payments use. For example, 83 percent of banks and 81 percent of credit unions have fewer than five percent of their customers actively using mobile payment services. None of the FIs that offer mobile payments have over 50 percent of their customers who actively use mobile payments.

Figure 32: Customer Use of Mobile Payment Services (*percent of respondents that track use*)

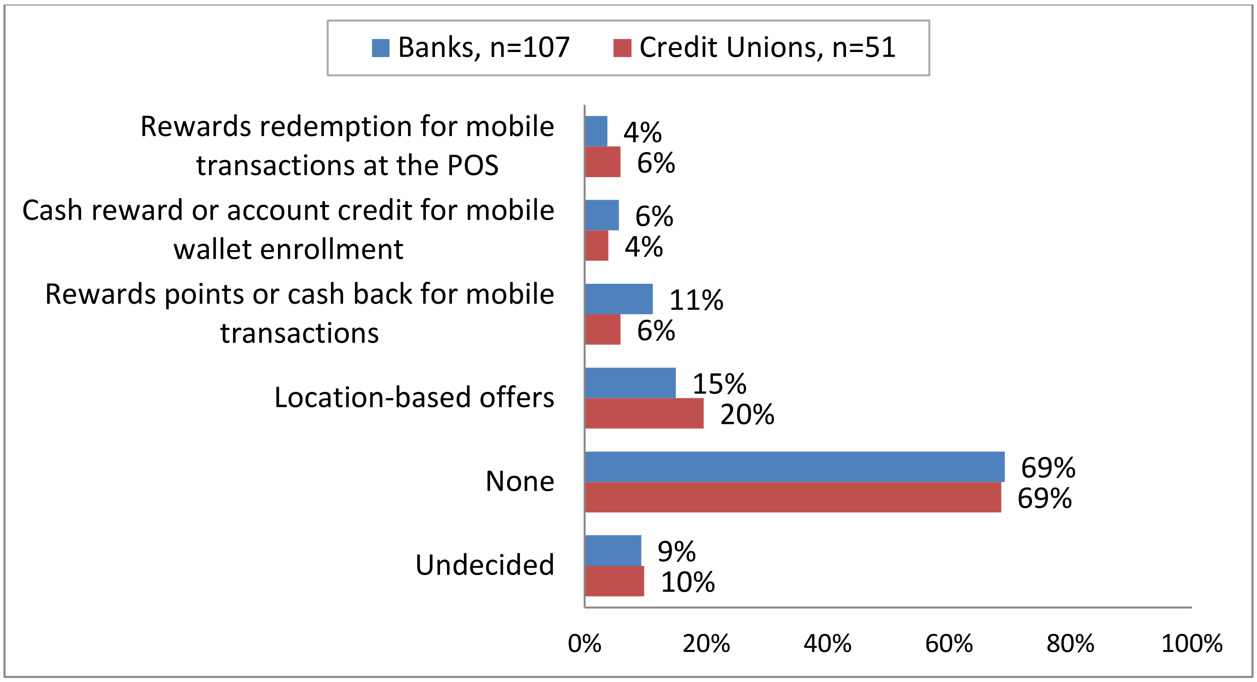


Q43. What percentage of your RETAIL customers uses your mobile payment/wallet services?

Twelve banks and 11 credit unions currently offer mobile payments but do not track customer enrollment. Furthermore, 20 banks and 13 credit unions do not track mobile payments use. These FIs are not included in Figure 32.

According to industry survey findings, 94 percent of consumers would use mobile wallets more frequently if they could earn and redeem loyalty rewards.[34] While loyalty rewards are highly sought by consumers, 69 percent of NE FIs indicated that they do not offer or plan to offer incentives tied to mobile payments and wallets (Figure 33). However, as more FIs offer and merchants accept mobile payments, and as consumer adoption grows, providing incentives should increase in importance for the FIs – as it has for merchants. For now, only 15 percent of banks and 20 percent of credit unions plan to offer location-based offers, and 11 percent of banks and six percent of credit unions will offer rewards points or cash back for mobile transactions.

Figure 33: FI Mobile Payment Incentives Offerings (*percent of respondents*)



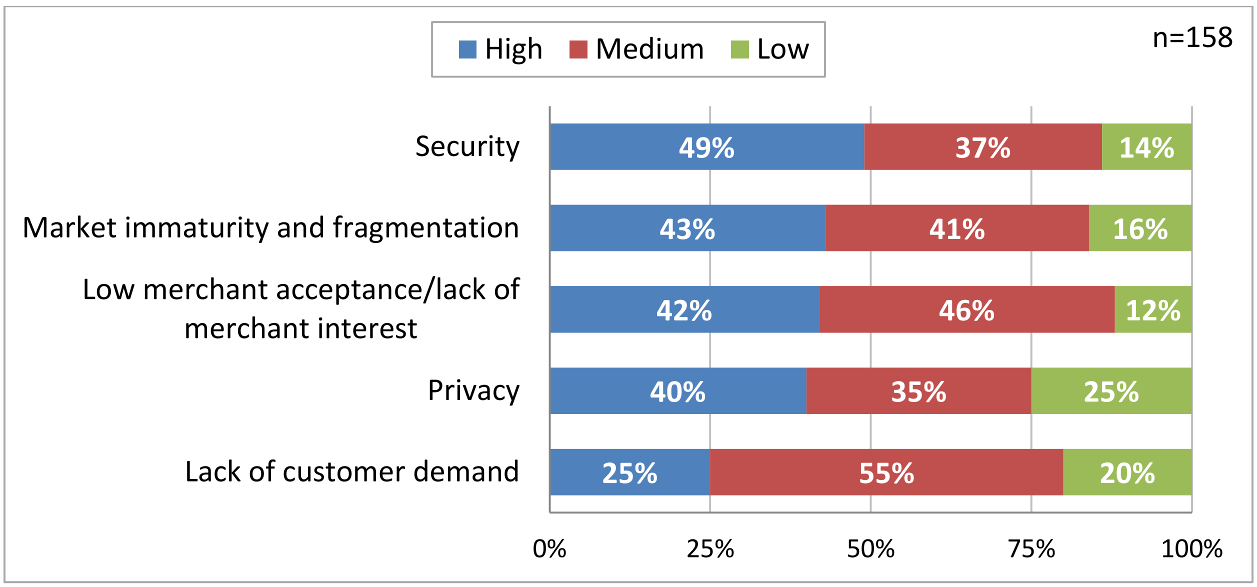
Q42. What types of incentives tied to mobile payments/wallets do you offer or plan to offer? (Check ALL that apply)

[34] "The State of Mobile Wallet Loyalty and Engagement in 2016," *Points*, October 2016. http://media.points.com/new-report-shows-94-of-consumers-would-use-mobile-wallets-more-often-if-they-could-earn-and-redeem-loyalty-rewards.

The barriers to consumer adoption of mobile payments differ somewhat from those related to mobile banking, as FIs directly manage and control access to the mobile banking channel. Because mobile payments can be offered by one or more solution providers and involve multiple parties in the transaction process, there are more points of vulnerability, and less standardization of the functions and processes.

Nearly half of FIs (49 percent) rated 'security' as a high barrier to consumer adoption of mobile payments (Figure 34). Over 40 percent of FIs rated 'privacy,' 'market immaturity and fragmentation,' and 'low merchant acceptance' as high. The fewest number of FIs (only 25 percent) rated 'lack of customer demand' as a high barrier. These findings support broader industry research. Consumers will not adopt on a large scale until there are more merchants that accept mobile payments and some consistency in how to make mobile payments across the different models.

Figure 34: Barriers to Consumer Adoption of Mobile Payments (*percent of respondents*)



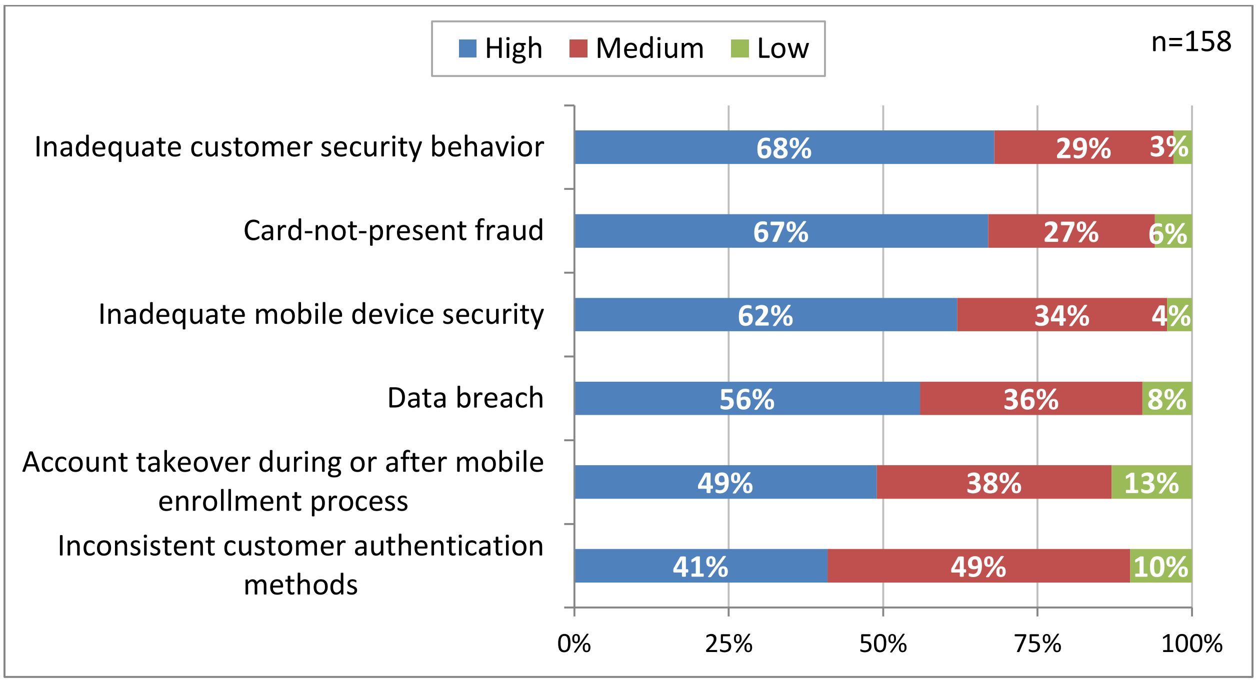
Q44. From your FI's perspective, please RATE the SIGNIFICANCE of these barriers to consumer adoption of mobile payments

Mobile Payment Security

Mobile payment security is a priority for FIs. When asked to rate the importance of their institutions' mobile payment security concerns, over two-thirds of FIs rated 'inadequate consumer security behavior' (68 percent) and 'CNP fraud' (67 percent) as high (Figure 35). Nearly as many FIs ranked 'inadequate mobile device security' (62 percent) as high, followed by 'data breach' (56 percent). Not surprisingly, fewer than 13 percent of the FIs rated any of the security concerns 'low' because all options are exposed to multiple points of vulnerability across payment methods and channels.

'Inadequate customer security behavior' relates to how consumers protect (or do not protect) their mobile phones (e.g., not using PIN/passwords to lock phones and prevent access if lost or stolen, downloading malicious apps, or jail breaking/rooting their phones). Although 41 percent of respondents rated 'inconsistent customer authentication methods' as high, 59 percent rated this option medium or low, perhaps because more FIs are better equipped with tools to authenticate customers.

Figure 35: FI Ratings of Mobile Payment Security Concerns *(percent of respondents)*

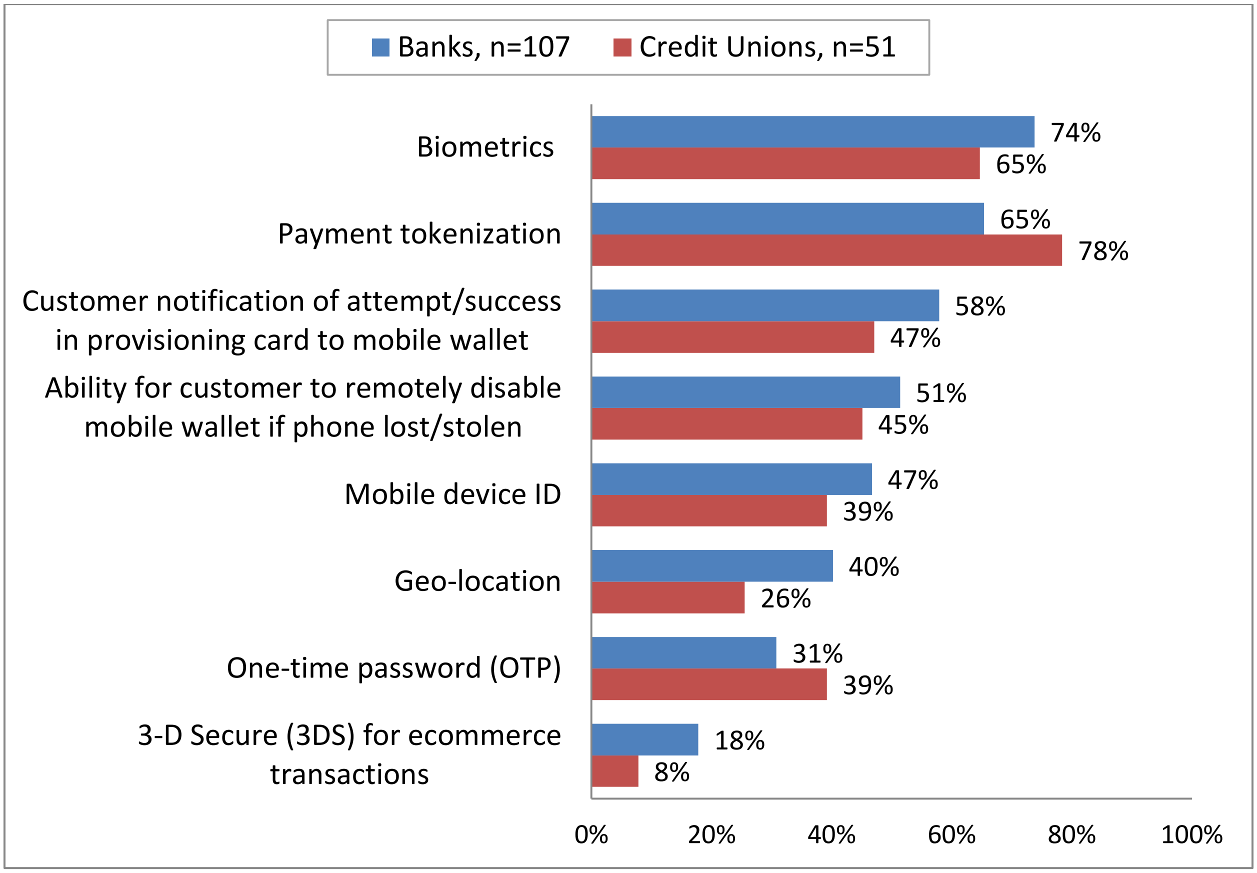


Q46. Please RATE the IMPORTANCE of your FI's security concerns associated with mobile payment/wallet services.

Some security tools listed in Figure 36 are available with certain mobile wallet solutions. For example, "Pay" wallets allow customers to authenticate with a fingerprint, and tokenize the payment credentials for storage in the mobile phone. As a result, FIs that have implemented "Pay" wallets support both biometrics and tokenization. When asked in the survey feedback section specifically if they thought that a mobile payment that uses payment tokenization and biometrics is more secure than a card payment, ninety-five percent of FI respondents said yes.

Other tools gaining traction in the industry include 3-Domain Secure[35] (3DS) which can be used by merchants and FIs to perform risk-based authentication for mobile/ecommerce transactions.

Figure 36: Security Tools used for Mobile Payments (*percent of respondents*)

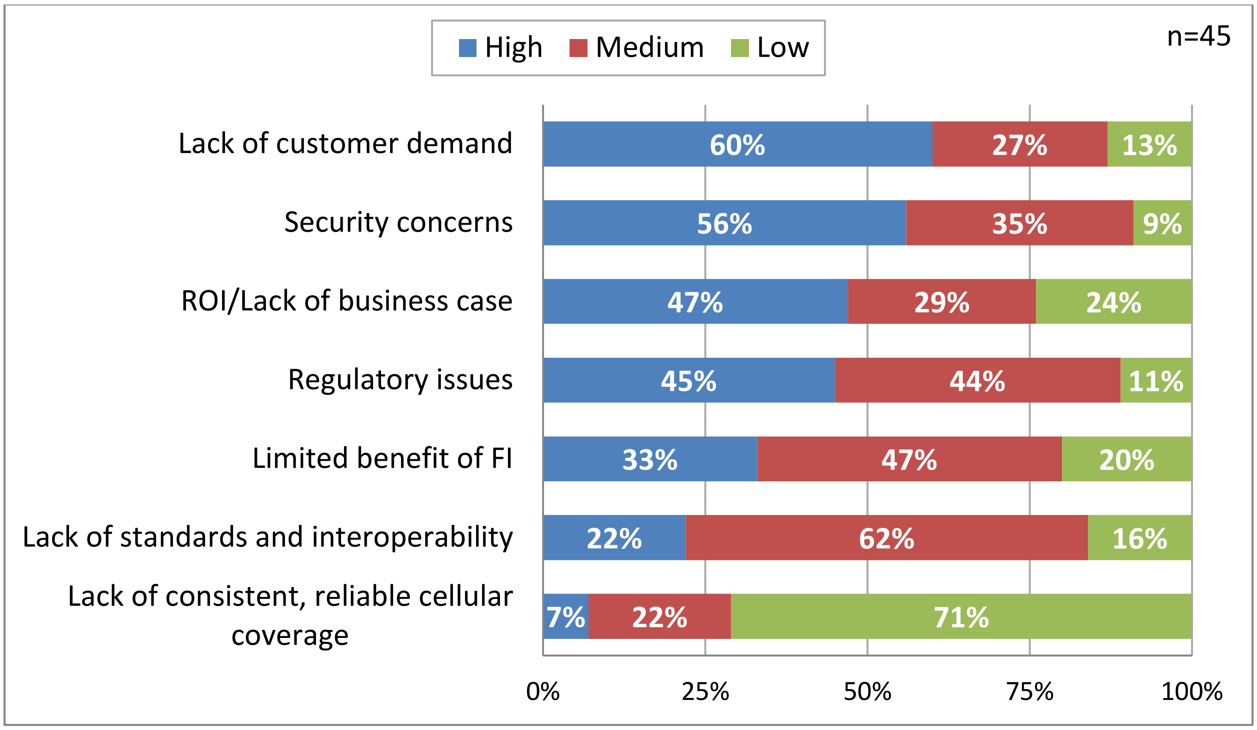


Q47. Do you use or plan to use the following mobile security tools? (Check ALL that apply)

35 EMVCo recently released an enhanced version of the 3DS specification that reduces some of the friction, which should be more acceptable to U.S. merchants and FIs. For more information on 3DS, see https://www.emvco.com/specifications.aspx?id=299.

Figure 37 shows how forty-five FI respondents (21 percent) rated the reasons why they chose not to offer mobile payments. Most of them rated 'lack of customer demand' (60 percent) and 'security' (56 percent) as 'high' importance factors that influenced their decision not to offer mobile payments. Forty-seven percent of FIs showed their skepticism about the 'return on investment and lack of business case' by rating it 'high;' while 45 percent rated 'regulatory issues' as high. Banks and credit unions differ sharply on two issues: credit unions have higher concerns about regulatory issues (63 percent of credit unions compared to 31 percent of banks); while 58 percent of banks rate business case issues higher, compared to 32 percent of credit unions.

Figure 37: Reasons FIs do not Offer Mobile Payments (*percent of respondents*)



Q48. Please RATE the IMPORTANCE of factors that influenced your decision NOT TO OFFER mobile payment/wallet services.

VI. CONCLUSIONS

Innovation and rapid change are hallmarks of the mobile marketplace, and both large banks and nonbanks are finding new ways to deliver a greater range of services on the mobile device. The situation among New England institutions is somewhat different. Although the findings from this 2016 survey illustrate an active mobile banking environment as they did in 2014, the data show a steady maturing of services over the past two years rather than to aggressive change. Mobile banking today is a must-have service for almost 90 percent of FI respondents. While the survey results may overstate this percentage somewhat because very small FIs in the region did not participate, it is clear that the vast majority of banks and credit unions are obligated to provide mobile banking services.

Typically, FI respondents in 2016 are implementing market-proven functionalities (e.g., mobile money movement) that mirror online banking, rather than emerging payment features. Attention is focused on honing services, customer experience, and security. The exceptions to this trend are a small cadre of banks and credit unions rolling out mobile PFM, card-related functions and information, and mobile account opening. Some FIs are also increasing the range of alerts provided to customers via mobile apps to provide additional value.

In response to market momentum and competition with other institutions, more FIs are developing plans for mobile payment and wallet solutions. The “Pay” wallets have had a leveling effect on the market by bringing mobile wallets within the reach of most FIs, which was not the case at the time of the 2014 survey. The 2016 survey found that a third of the NE region’s FIs had already implemented mobile digital wallets, and an even higher percentage was considering future strategies for mobile payments.

Respondents have yet to be as forward moving when it comes to overall customer adoption. On a positive note, customer adoption – both enrollment and usage rates – has increased since 2014. Over half of the respondents have at least 20 percent adoption by their retail customers in mobile banking, although active usage is somewhat lower among credit union members.

While some progress has been made since 2014 to increase business customer adoption, over half of the FI respondents offering mobile banking services to businesses still have five percent or fewer of their business customers enrolled and using mobile banking. This is something of a “chicken and egg” problem: while there are not yet many business-specific mobile services available from FIs, there is also an understandable latency among small businesses that are dealing with EMV implementations and other needs to want to adopt mobile banking.

Expanding mobile payments is a somewhat different situation in that over 40 percent of respondents perceive a variety of challenges to offering payment/wallet services. Actual implementations reflect these concerns –both enrollment and usage rates are where mobile banking was several years ago, although the widespread ownership of smartphones and the “Pay” wallets should drive adoption far more quickly.

Taken together, these themes of continuing mobile banking maturity and prospective mobile payments activity, in concert with customer adoption pressures, are progressing toward a full-service mobile environment. Despite underlying security concerns inherent in emerging technologies NE FIs have solidly embraced mobile as a vital channel for new products and services.

VII. RECOMMENDATIONS

1. FIs should create or expand their mobile strategies to encompass banking and payments, leveraging synergies, but still treating each as a separate channel. This is particularly important, given the maturity in standard, baseline services and the emergence of mobile payment opportunities.

2. FIs should strengthen their marketing plans to encourage customers to use mobile banking and payments. Marketing is a key component of increasing adoption and usage of mobile services.

   - Develop marketing plans that segment consumers by generation (i.e., millennials and Gen X/Y), payment preferences, and banking status (e.g., underbanked, active banker, etc.), and businesses by size and type (e.g. corporate, small and independent businesses). Survey these customer groups periodically to better understand their different needs, and tailor the FI's mobile solutions to meet the requirements of each group.

   - Consider tracking enrollment and customer use of mobile banking and payment services in total and by segment. Collecting and analyzing this data will help to manage the services and develop effective marketing plans to increase adoption and build consistent usage. Even limited tracking is better than no tracking: not tracking mobile banking and payment statistics is a major gap and missed opportunity to increase mobile adoption over time.

   - Be more conspicuous in the placement of mobile banking and payment services offered on the FI website. Offer reminders in key locations and consider using homepage banners to highlight new mobile capabilities.

3. FIs should use the findings from the NE FI mobile survey to analyze and benchmark their current mobile banking and payment service offerings.

   - Assess what the situation is in New England more broadly, and what comparable FIs are doing and planning more specifically

   - Determine if there are gaps in services that the FI might want to consider adding.

   - Research what competitors, large FIs, and nonbanks are doing in the mobile space and the mobile services their providers offer.

   - Enhance mobile service offerings to make them more customer-friendly. For example, make more online banking features available via the FI's mobile app (e.g., redeeming rewards, setting travel notifications, etc.) or consider enhancing mobile RDC by adding customer-controlled features, such as customizing deposit limits, reviewing check images, or automatic check picture taking.

   - Strengthen customer engagement with alerts and notifications, such as those that provide information about security and new mobile services. Leverage mobile alerts strategically to meet the institutions' objectives (e.g., notifications that warn of suspicious activity, announcements and reminders about mobile features).

- Treat money movement services as a top priority. Consider offering mobile P2P payments, given the growing number of FIs, payment processors, and nonbanks in the market, and related consumer adoption and demand, particularly among millennials that use P2P solutions linked to social media sites.

4. FIs should develop robust risk management programs for mobile banking and payments.

- Leverage available mobile security tools in the market, and highlight the security of the mobile device and risk management features of FI's mobile services to customers, but balance security with simplicity to build adoption.

- Take a proactive approach with education to build consumer trust in mobile services and mitigate risky customer behavior. Communicate how the institution protects its customers, especially consumers who use its mobile banking and payment services, and how consumers can also help protect their own information. For example, provide a clear explanation of how the FI secures its mobile banking app. Communicate the payment security features of a mobile device (e.g., tokenization to protect account credentials).

VIII. APPENDIX A: 2016 Survey Questionnaire

2016 Federal Reserve Mobile Banking and Payments Survey

Please complete this online survey to help us better understand your organization's mobile banking and payments initiatives and service offerings. Your responses are very important. They will enable us to give you a detailed description of mobile banking and payments activities at financial institutions within our region. Your responses will be kept confidential and data will be consolidated at the district level with no individual financial institution data being reported.

Survey Instructions:

Please answer all questions. If a question is not applicable, please answer using the "Other: (please specify)" option.

If more than one person from the same financial institution receives this survey, please consolidate your responses into a single survey.

If completing this survey using the PDF format, please scan completed survey and send as an attachment to Elisa.Tavilla@bos.frb.org.

Thank you for taking the time to complete this survey.

Section 1: Respondent Profile

1. Financial institution name:____
2. ABA number:____
3. Contact name:____
4. Contact title:____
5. Functional area of contact (e.g., business line, operations, etc.):_______________________
6. Email*:____
7. Contact phone: (optional)____

*An electronic copy of the survey results report will be emailed to respondents.

Section 2: Demographics

8. Corporate address:

   Address line 1:____
   Address line 2: ____
   City/town: ____
   State: ____
   ZIP: ____

9. What is your FI's asset size?

   ☐ < $100 Million
   ☐ $100 Million to $250 Million
   ☐ $250 Million to $500 Million
   ☐ $500 Million to $1 Billion
   ☐ > $1 Billion

10. Please indicate your financial institution type:

    ☐ Commercial bank
    ☐ Cooperative or mutual bank
    ☐ Credit union
    ☐ Savings bank
    ☐ Other: (please specify)____

11. Please indicate to whom you provide services. (Check ALL that apply)

    ☐ Consumers (retail customers)
    ☐ Corporate/commercial entities
    ☐ Small businesses
    ☐ Government agencies (including local)
    ☐ Educational and/or non-profit
    ☐ Other: (please specify)____

Section 3: Consumer Mobile Banking

Please refer to the definition below for questions in the **MOBILE BANKING** section:

MOBILE BANKING is the use of a mobile phone to connect to a financial institution (FI) to access bank/credit account information (e.g., view balance), transfer funds between accounts, pay bills, receive account alerts, locate ATMs, deposit checks, etc.

12. When did you start offering mobile banking to **CONSUMERS**? (Check only ONE)

- ☐ More than one year ago
- ☐ Within the past year
- ☐ Currently do not offer mobile banking, but plan to offer within next 2 years
- ☐ Do not plan to offer mobile banking*

*If you checked "Do not plan to offer mobile banking," please go directly to Question 34 on Page 9.

13. What is your **PRIMARY** business reason for offering or planning to offer mobile banking? (Check only ONE)

- ☐ Retain existing customers
- ☐ Attract new customers
- ☐ Be market leader with technology
- ☐ Competitive pressure
- ☐ Increase revenue
- ☐ Other: (please specify)____

14. Which mobile operating system(s) (OS) does or will your mobile banking application support? (Check ALL that apply)

- ☐ Apple iOS
- ☐ Google Android
- ☐ Windows Phone
- ☐ Blackberry
- ☐ Other: (please specify)____

15. Do you offer or plan to offer mobile banking services to consumers via a tablet? (Check ALL that apply)

- ☐ iPad
- ☐ Android
- ☐ Kindle
- ☐ No
- ☐ Other: (please specify)____

16. Who provides or will provide your mobile banking services?

- ☐ Core deposit processor or online banking provider
- ☐ Mobile solution provider
- ☐ In-house system
- ☐ Other: (please specify):____

17. Which of the following mobile banking features do you currently offer or plan to offer to consumers within the next 2 years? (Check ALL that apply)

Mobile Banking Feature	Currently offer	Plan to offer	No plans to offer
Check balances (DDA, Savings)	☐	☐	☐
View statements and/or transaction history (DDA, Savings)	☐	☐	☐
View credit card balances, statements and/or transaction history	☐	☐	☐
Bill payment	☐	☐	☐
Bill presentment	☐	☐	☐
Transfer funds between same owner's accounts within your FI	☐	☐	☐
Transfer funds between same owner's accounts at different FIs	☐	☐	☐
Mobile person-to-person payment (P2P)	☐	☐	☐
Mobile remote deposit capture (RDC)	☐	☐	☐
ATM/branch locator	☐	☐	☐
Personal financial management (PFM)	☐	☐	☐
Access to brokerage services	☐	☐	☐
Cross-border payments	☐	☐	☐

18. Do you offer or plan to offer the following mobile features? (Check ALL that apply)

- ☐ Enroll for mobile banking using a mobile device (mobile enrollment)
- ☐ Open accounts over mobile device (mobile account opening)
- ☐ Single sign-on/authentication credentials for online and mobile services

- ☐ Multilingual mobile website or app
- ☐ None.

19. Do you market or plan to market any mobile banking products to the underbanked?

- ☐ Yes, market today
- ☐ Yes, plan to market within next 2 years
- ☐ No

20. What percentage of your **RETAIL** customers has used your mobile banking services?

% of customers ENROLLED	% of customers who USED services within last 90 days
☐ Not yet offered	☐ Not yet offered
☐ <5%	☐ <5%
☐ 5-20%	☐ 5-20%
☐ 21-35%	☐ 21-35%
☐ 36-50%	☐ 36-50%
☐ >50%	☐ >50%
☐ Do not track customer enrollment	☐ Do not track customer use

21. For your FI, which are the **THREE** most common barriers to greater **CONSUMER** adoption of mobile banking? (Check only THREE)

- ☐ Ineffective marketing by FIs
- ☐ Security concerns
- ☐ Difficulty of use
- ☐ Lack of trust in the technology
- ☐ Banking needs are being met through other channels
- ☐ Do not see any reason to use mobile banking
- ☐ Other: (please specify)____

22. Do you charge or plan to charge a fee for any **CONSUMER** mobile banking services?

- ☐ Yes
- ☐ No*

*If you checked "No," please go directly to Question 24 on Page 6.

23. Please indicate **ALL** services for which you charge or plan to charge a fee. (Check ALL that apply)

- ☐ Mobile RDC
- ☐ Mobile P2P
- ☐ Mobile funds transfer between same customer's accounts within your institution
- ☐ Mobile funds transfer between same customer's accounts at different FIs
- ☐ Other: (please specify)____

Section 4: Consumer Mobile Banking Security

24. What types of mobile alerts does your FI offer or plan to offer? (Check ALL that apply)

- ☐ Insufficient funds
- ☐ Low balance
- ☐ Credit card balance close to or over limit
- ☐ Online purchase (card-not-present) transaction
- ☐ Funds transfer completed
- ☐ Credit payment confirmation
- ☐ Bill payment due
- ☐ International charge/debit
- ☐ Suspicious activity/other fraud monitoring alerts
- ☐ Two-way actionable alerts (e.g., FI sends customer insufficient funds alert, customer replies to schedule transfer)
- ☐ Other: (please specify)____

25. Please **RATE** the **IMPORTANCE** of your FI's security concerns associated with offering mobile banking services to consumers.

	High	**Medium**	**Low**
Data breach			
Weak authentication*			
Identity theft			
Inadequate customer protection behavior**			

*e.g., 'Easy to guess' password or answers to security questions
**e.g., Consumer may use unsecured network, not use antivirus solutions, not set-up mobile password, not protect device from theft or loss

26. Which of the following card control features does your FI's mobile banking app support or plan to support? (Check ALL that apply)

- ☐ Activate new card
- ☐ Change PIN

- ☐ Order a replacement card
- ☐ Turn payment card on or off if lost/stolen
- ☐ Block use of credit and/or debit card
- ☐ Set travel notification
- ☐ None

27. Which of the following does your FI use or plan to use to enhance mobile security? (Check ALL that apply)

- ☐ Multi-factor authentication
- ☐ Time-out due to inactivity
- ☐ Out-of-band authentication (e.g., calls/texts to alternate phone number)
- ☐ Login with PIN
- ☐ Biometrics (e.g., fingerprint, facial, voice recognition, etc.)
- ☐ Mobile notifications (e.g., SMS text message, push notifications)
- ☐ Mobile device ID
- ☐ Geo-location
- ☐ Other: (please specify)____

Section 5: Business Mobile Banking

28. Do you offer or plan to offer mobile banking services to your **BUSINESS** customers?

- ☐ Yes
- ☐ No*

* If you checked "No," please go directly to Question 35 on Page 10.

29. What mobile banking services do you offer or plan to offer within the next 2 years to your **BUSINESS** customers? (Check ALL that apply)

- ☐ Check corporate balances and monitor accounts
- ☐ Cash management functions
- ☐ Mobile funds transfer between same business customer's accounts within your institution
- ☐ Mobile funds transfer between same business customer's accounts at different FIs
- ☐ Mobile funds transfer from one business customer's account to another business customer's account at same or different FIs
- ☐ Administration tools (e.g., setup and manage users, reset passwords, etc.)
- ☐ Mobile card acceptance plug-in reader/mobile POS (e.g., Square, QuickBooks GoPayment)
- ☐ Other: (please specify)____

30. Do you charge or plan to charge your **BUSINESS** customers a fee for any mobile banking services?

☐ Yes
☐ No*

* If you checked "No," please go directly to Question 32 on Page 9.

31. Please indicate **ALL BUSINESS** services for which you charge or plan to charge a fee. (Check ALL that apply)

☐ Mobile RDC
☐ Other product /service (e.g., cash management) transaction fee
☐ Mobile funds transfer between same business customer's accounts within your institution
☐ Mobile funds transfer between same business customer's accounts at different FIs
☐ Commercial/small business customers flat monthly fee for services
☐ Commercial/small business customers by transaction type or volume
☐ Other: (please specify)____

32. What percentage of your **BUSINESS** customers has used your mobile banking services?

% of customers ENROLLED	**% of customers who USED services within last 90 days**
☐ Not yet offered	☐ Not yet offered
☐ <5%	☐ <5%
☐ 5-20%	☐ 5-20%
☐ 21-35%	☐ 21-35%
☐ 36-50%	☐ 36-50%
☐ >50%	☐ >50%
☐ Do not track business customer enrollment	☐ Do not track business customer use

33. What challenges do you see in offering mobile banking services to your **BUSINESS** customers? (Check ALL that apply)

☐ Business banking software for mobile not available
☐ Available products do not meet business customer needs
☐ Available products are not suited to all FI segments
☐ Implementation difficult or costly
☐ Other: (please specify)____

34. Please **RATE** the **IMPORTANCE** of factors that influenced your decision **NOT TO OFFER** mobile banking services.

	High	**Medium**	**Low**
Lack of customer demand			
Security concerns			
Regulatory issues			
Lack of standards and interoperability			
ROI/Lack of business case			
Lack of consistent, reliable cellular coverage			
Processor does not offer a solution			
Lack of resources to offer in-house solution			
Other: (please specify)			

Section 6: Mobile Payments

Please refer to the definition below for questions in the **MOBILE PAYMENTS** section:

MOBILE PAYMENT is the use of a mobile phone to pay for a retail purchase at point of sale (POS) using near field communication (NFC) or quick response (QR) code, or to pay remotely via mobile app or web for digital content, goods and services (e.g., transit, parking, ticketing, etc.).

MOBILE WALLET is an app within the mobile phone that controls access to credit, debit, prepaid or bank account credentials (or payment token substitutes) stored securely in the mobile phone and used to pay for mobile purchases.

35. Do you offer or plan to offer mobile payment/wallet services to consumers?

- ☐ Currently offer mobile payment services
- ☐ Plan to offer mobile payment services within next 2 years
- ☐ Do not plan to offer mobile payment services*

*If you checked "Do not plan to offer mobile payment services," please go directly to Question 48 on Page 15.

36. Please **RATE** the **IMPORTANCE** of factors that influenced your FI's decision to offer or plan to offer mobile payments.

	High	**Medium**	**Low**
Mobile payments are gaining momentum			
Customer demand			
Increase customer engagement with loyalty, rewards, and other incentives			
Generate revenue and/or reduce costs			
Compete with other FIs			
Compete with nonbanks (e.g., Amazon, Apple, Google, PayPal, etc.)			
Mobile device is more secure than card or other payment methods			
Provide two-way mobile communication tool with customers			
Other: (please specify)			

37. Please indicate the mobile wallet service(s) that you are familiar with. (Check ALL that apply)

- ☐ Apple Pay
- ☐ Android Pay
- ☐ Samsung Pay
- ☐ Microsoft Wallet
- ☐ Visa Checkout
- ☐ MasterCard MasterPass
- ☐ AmEx Express Checkout
- ☐ PayPal
- ☐ Amazon Payments
- ☐ LevelUp
- ☐ Walmart Pay
- ☐ Other: (please specify)____

38. How do you offer or plan to offer mobile payment/wallet services? (Check ALL that apply)*

- ☐ Partner with a card network (e.g., AmEx, MasterCard, Visa or Discover to offer online digital wallet (check-out) services via mobile)
- ☐ Partner with a NFC-enabled wallet provider (e.g., Apple Pay, Android Pay, Samsung Pay)
- ☐ Partner with third-party payment processor (e.g., FIS, Fiserv)
- ☐ Develop your own mobile payment solution (e.g., Capital One Wallet, Chase Pay, CU Wallet, Wells Fargo Wallet)
- ☐ Other: (please specify)____

*If you did not check at least one of the first two answers, please go directly to Question 42 on Page 12.

39. Which of the following **MOBILE WALLET** service(s) do you offer or plan to offer? (Check ALL that apply)

Mobile Wallet	**Currently offer**	**Plan to offer**
Apple Pay	☐	☐
Android Pay	☐	☐
Samsung Pay	☐	☐
Microsoft Wallet	☐	☐
Visa Checkout	☐	☐
MasterCard MasterPass	☐	☐
AmEx Express Checkout	☐	☐
Other: (please specify)	☐	☐

40. About how much time did it take for your FI to implement the **NFC MOBILE WALLET** service? (If you have not implemented NFC Mobile Wallet service, please check 'N/A')

- ☐ Less than 3 months
- ☐ 3 months
- ☐ 6 months
- ☐ More than 6 months
- ☐ N/A

41. What challenges did your FI experience implementing the **NFC MOBILE WALLET**? (Check ALL that apply)

- ☐ Waiting for certification from card networks or processors
- ☐ Lengthy processor queue
- ☐ Software development and testing
- ☐ Customer/staff training, education, etc.
- ☐ Other: (please specify)____

42. What types of incentives tied to mobile payments/wallets do you offer or plan to offer? (Check ALL that apply)

- ☐ Location-based offers
- ☐ Cash reward or account credit for mobile wallet enrollment
- ☐ Rewards points or cash back for mobile transactions
- ☐ Rewards redemption (e.g., pay with points) for mobile transactions at the POS
- ☐ None
- ☐ Other: (please specify)____

43. What percentage of your **RETAIL** customers uses your mobile payment/wallet services?

% of customers ENROLLED	**% of customers who USED services within the last 90 days**
☐ Not offered yet	☐ Not offered yet
☐ <5%	☐ <5%
☐ 5-20%	☐ 5-20%
☐ 21-35%	☐ 21-35%
☐ 36-50%	☐ 36-50%
☐ >50%	☐ >50%
☐ Do not track customer enrollment	☐ Do not track customer use

44. From your FI's perspective, please **RATE** the **SIGNIFICANCE** of these barriers to consumer adoption of mobile payments.

	High	Medium	Low
Security			
Privacy			
Market immaturity and fragmentation			
Lack of customer demand			
Low merchant acceptance/lack of merchant interest			
Other: (please specify)			

45. Do you offer or plan to offer mobile payment/wallet services for your **BUSINESS** customers?

☐ Currently offer
☐ Plan to offer within the next 2 years
☐ No plans at this time

Section 7: Mobile Payments Security

46. Please **RATE** the **IMPORTANCE** of your FI's security concerns associated with mobile payment/wallet services.

	High	Medium	Low
Account takeover during or after mobile enrollment process			
Card-not-present fraud (for online purchases made via mobile phone)			
Data breach			
Inadequate customer security behavior			
Inadequate mobile device security			
Inconsistent customer authentication methods			
Other: (please specify)			

47. Do you use or plan to use the following mobile security tools? (Check ALL that apply)

- ☐ Biometrics (e.g., fingerprint, facial, voice recognition, etc.)
- ☐ Geo-location
- ☐ Payment tokenization
- ☐ Customer notification of attempt/success in provisioning card to mobile wallet
- ☐ Mobile device ID
- ☐ One-time password (OTP)
- ☐ Ability for customer to remotely disable mobile wallet if phone lost/stolen
- ☐ 3-D Secure* (3DS) for ecommerce transactions
- ☐ Other: (please specify)____

***3-D Secure** is an XML protocol designed to provide an additional layer of authentication to CNP online transactions, supported by Visa Verified by Visa, MasterCard SecureCode and AmEx SafeKey.

48. Please **RATE** the **IMPORTANCE** of factors that influenced your decision **NOT TO OFFER** mobile payment/wallet services.

	High	**Medium**	**Low**
Lack of customer demand			
Limited benefit to FI			
Security concerns			
Regulatory issues			
Lack of standards and interoperability			
ROI/Lack of business case			
Lack of consistent, reliable cellular coverage			
Other: (please specify)			

Section 8: Financial Institution Feedback

49. In your opinion, do you think a mobile payment that uses payment tokenization and biometrics is more secure than a card payment?

- ☐ Yes
- ☐ No (please explain)____

50. In your opinion, how long will it take for industry-wide **CONSUMER** adoption (at least one mobile payment within 90 days) of mobile payments to exceed 50%?

At POS	In-App/Mobile Web
☐ 2 years ☐ 3 years ☐ 5 years ☐ > 5 years	☐ 2 years ☐ 3 years ☐ 5 years ☐ > 5 years

51. Please share your ideas on what role(s) the Federal Reserve can play in helping to increase your knowledge of mobile banking and payments, and other feedback.

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52. Please indicate the **FIRST TWO DIGITS** of your ABA number to help us link your response with appropriate Federal Reserve district:

☐ 01 or 21
☐ 04 or 24
☐ 05 or 25
☐ 06 or 26
☐ 09 or 29
☐ 10 or 30
☐ 11 or 31
☐ Other: (please specify)____

IX. APPENDIX B: References

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