COMMUNITY BANKS AND TECHNOLOGY

William C. Dunkelberg and Jonathan A. Scott
Temple University*

Introduction

Technology and banking share a long history. The rapid growth over the past 20 years in adoption of technology for front and back office operations in banks of all sizes is well documented. In a recent paper by Feng and Wu (2018), they show that the median real technology expenditures per bank has doubled since 2000 with no observable difference between large and small banks.[1] Feng and Wu (2018) also note that importance of new technology to allow all banks to better compete in the marketplace, whether through new products, improved quality of existing products, or improved efficiency.

One of the interesting findings from Feng and Wu (2018) is that bank performance measure are positively and significantly correlated with lagged technology spending but there is little evidence of this phenomenon at small banks. One interpretation (the authors') of these results is that technology investment involves significant fixed costs and often must be made (e.g. regulatory compliance) even if not optimal for the bank. As such, financial performance may not be improved. But at the same time small banks and large banks look the same size on a monitor screen (online banking) or a smart phone (mobile banking). What matters are the products and services provided and the bank's platform flexibility (internal provision versus third party, partial digitization versus full digitization).

The 2014-2016 National Surveys conducted by the Conference of State Banking Supervisors and the Federal Reserve Bank of St. Louis asked questions about technology expenditures as a percent of assets but not how technology was deployed. No questions were asked directly about technology in the 2017 Survey, but the 2018 Survey asked a number of new questions related to technology use and importance. This Survey provides a unique opportunity to look at specific technology use, not just expenditures. Most importantly, it provides insight to the importance of emerging technologies and the constraints community banks face in pursuing online/digital product strategies.

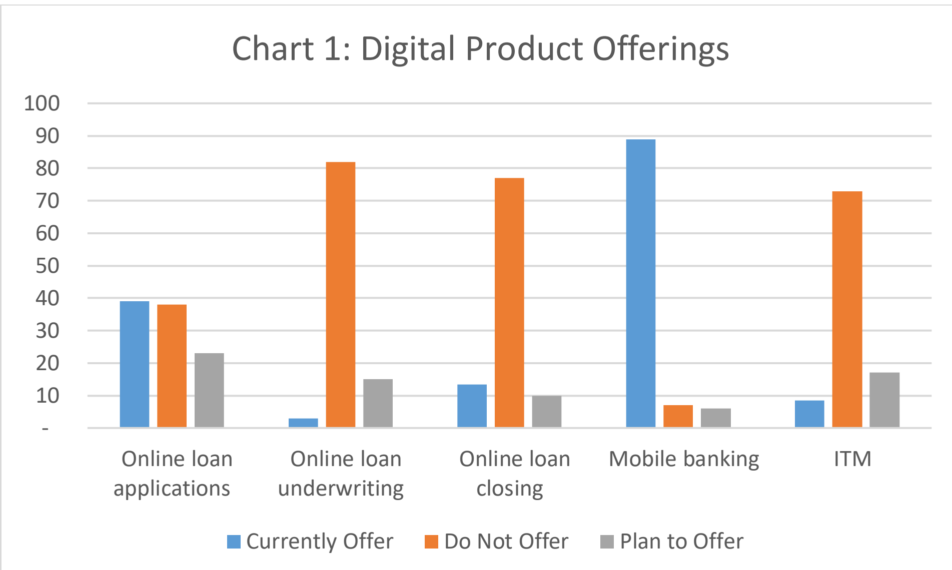
Product Offerings and Technology

* This work was supported by the Conference of State Bank Supervisors. We are grateful for expert research assistance from Kyle Zhang and for helpful conversations with Michael Stevens and James Potter at the CSBS.

[1] See Feng and Wu (2018), Technology Investment, Firm Performance and market Value: Evidence from Banks. Between 2000 and 2017, the median increase in technology and communication expense per bank increased 2.7X for small banks and 2.6X for large banks.

Technology can be an equalizer by allowing community banks to compete more effectively with their larger competitors on many dimensions but with some limitations as noted below. The 2018 Survey provides initial insight to the use of technology for all aspects of on-line banking as well as the adoption of an emerging technology, interactive teller machines.

Offering of on-line loan applications (39%) and mobile banking (89%) are most frequently reported by community banks, with negligible use of online underwriting, and low use of online loan closing and the use of interactive teller machines (see Chart 1). Across all products community banks plan to add in the next 12 months, the largest increases reported are for online loan applications (23%), online underwriting (15%), and interactive teller machines (17%).



d Product Offerings

A clear divide exists around $200 million in assets for current offerings of online loan applications (Table 1a).[2] Banks with greater than $200 million in assets more frequently report currently offering online loan applications. Plans to offer online loan applications, however, show no strong size effect, which suggests that offerings of this online service may have plateaued.

Table 1a: Online Loan Applications by Bank Size

Online loan applications	Under $100m	$100m - $200m	$200m - $400m	$400m - $800m	$800m +
Currently offer	8	13	27	22	31
Do not offer	32	31	20	12	5

[2] The bank size intervals are divided approximately into quintiles.

Plan to offer	17	24	21	17	21
Total	19%	22%	23%	17%	19%

Online loan underwriting shows a strong size effect for both current offerings and plans to offer (Table 1b). Banks with assets greater than $400 million more frequently report current offerings (31% versus 27% in the $400-$800 million category and 23% versus 18% for $500 million or higher) and plans to offer. The smallest banks (under $100 million in assets) do not offer this service nor plan to offer it. Online loan closing (Table 1c) shows a similar response by bank size with the largest banks more frequently reporting current offering and plans to offer and smaller banks with assets below $200 million less frequently offering or plans to offer this product.

Table 1b: Online Loan Underwriting by Bank Size

Online loan underwriting	Under $100m	$100m - $200m	$200m -$400m	$400m - $800m	$800m +
Currently offer	0	31	15	31	23
Do not offer	24	23	24	15	15
Plan to offer	0	18	20	27	35
Total	19%	22%	23%	17%	19%

Table 1c: Online Loan Closing by Bank Size

Online loan closing	Under $100m	$100m - $200m	$200m -$400m	$400m - $800m	$800m +
Currently offer	6	9	21	20	44
Do not offer	24	25	23	16	11
Plan to offer	4	13	23	21	40
Total	19%	22%	23%	17%	19%

The current offerings of mobile banking do not have a noticeable size effect above $100 million (Table 1d). The banks not offering mobile banking are almost exclusively concentrated in the smallest banks with below $100 million in assets. These small banks comprise 20% of the total, and 92% of them report not currently offering mobile banking. However, these small banks disproportionately report plans to offer this service with 52% of those planning to offer the service likely reflecting a need required by their customers.

Table 1d: Mobile Banking by Bank Size

Mobile banking	Under $100m	$100m - $200m	$200m -$400m	$400m - $800m	$800m +
Currently offer	13	23	25	18	21
Do not offer	92	8	0	0	0

Plan to offer	52	24	12	9	3
Total	19%	22%	23%	17%	19%

The current and planned offerings of interactive teller machines (ITM) also show a strong bank size effect (Table 1e). Although only 19% of the banks reporting are over $800 million, 52% of these banks report offering ITM. For the 20% of the respondents that are under $100 million, only 2% currently offer and 5% plan to offer ITMs. These results suggest that ITM is an emerging technology for community banks.

Table 1e: Interactive Teller Machines by Bank Size

Interactive Teller Machines	Under $100m	$100m - $200m	$200m -$400m	$400m - $800m	$800m +
Currently offer	2	21	12	12	52
Do not offer	25	24	23	13	14
Plan to offer	5	13	29	31	22
Total	19%	22%	23%	17%	19%

Platform and Vendor Usage Trend

The survey provides a first look at how community banks interact with their vendors as providers for technology solutions. Respondents were asked whether their technology-enabled products were provided in-house or with outside partnerships and many respondents reported using both. Only 30% of the banks offering online loan products reported using an in-house platform more than half the time, while 86% of those using an outside platform reported using it more than half the time (Table 2). For non-loan digital products, the responses were similar. About two-thirds with an in-house platform reported using it more than half the time while over 90% of those with an outside platform reported using it more than half the time.

Table 2: Technology Platform and Digital Product Offerings

Platform Usage for Those Reporting Digital Product Offerings	Loan Product – In House Platform	Loan Product – Outside Platform	Non-Loan Product – In House Platform	Non-Loan Product – Outside Platform
Never/rarely	68	14	75	8
About half the time	10	8	10	6
Usually/always	22	78	15	86
Total	100%	100%	100%	100%
No. of observations	207	213	428	463
% Missing Cases	60%	59%	19%	12%

Unlike the offering of digital products, the association of bank size with platform usage is strong for digital loan products but weak for non-lending digital products (Table 2a and

2b).[3] Smaller banks tend to report more frequent use of in-house technology (and less frequent use of outside providers) for digital loan products (45% and 58% versus overall usage 22% and 78%) and large banks with assets exceeding $800 million less frequently report using in-house platforms and more frequently rely on outside partnerships (15% and 83% versus overall usage of 15% and 86%).

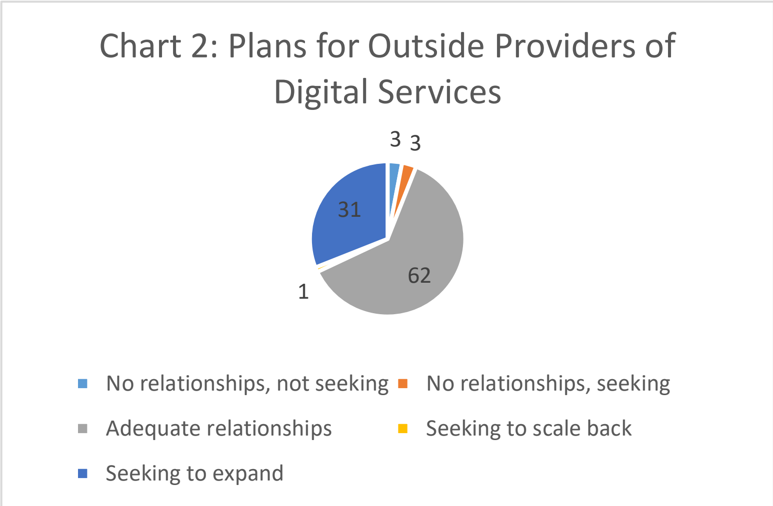
Table 2a Use of Platforms for Loan Products by Bank Size

Digital loan products platform (usually/always)	Under $100m	$100m - $200m	$200m - $400m	$400m - $800m	$800m +	Total (row)
In-house technology	45	25	20	23	15	22%
Outside partnerships	58	72	83	77	83	78%

Table 2a Use of Platforms for Non-Lending Products by Bank Size

Digital non-lending platform (usually/always)	Under $100m	$100m - $200m	$200m - $400m	$400m - $800m	$800m +	Total (row)
In-house technology	17	13	13	18	14	15%
Outside partnerships	80	85	93	85	84	86%

The survey also asked about the status of outside providers of digital banking services (Chart 2). Most of respondents report that they have adequate relationships with outside providers (62%) and about one-third are seeking to expand their relationships. The status of outside providers shows some association with size (Table 3). Larger banks more frequently report (and small banks less frequently) actively seeking to expand relationships with outside providers, especially those with assets over $800 million.



Aside from asset size, the only other responses that showed a positive association with seeking to expand outside relationships was if the respondents viewed Fintech firms as a future competitor (36% versus 24% overall) and if the bank currently offered non-lending online products (98% versus 93% overall).

[3] Tables 2a and 2b are constructed using column percentages because the percentages for the rows are taken from separate cross tabulations.

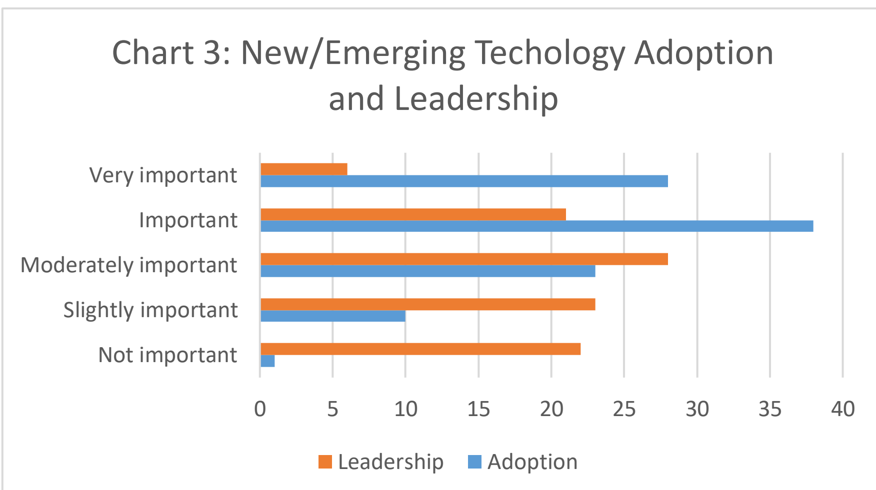
Otherwise, neither growth in income, growth in assets, CEO age, compliance burden (regulatory costs/total expenses), or location had any association with plans to expand outside relationships.

Table 3: Bank Size and Status of Outside Providers

	Under $100m	$100m - $200m	$200m -$400m	$400m - $800m	$800m +	Total
No relationships, not seeking	18	29	24	18	12	100
No relationships, seeking	31	15	31	23	0	100
Adequate relationships	19	26	23	16	16	100
Seeking to scale back	0	50	25	25	0	100
Seeking to expand	7	16	26	20	31	100
Total	19%	22%	23%	17%	19%	100

Outlook for New/Emerging Technologies and Leadership

Two new questions are in the 2018 Survey that add to our understanding of whether technology is being "forced" on some small banks. Respondents are asked to assess 1) the importance of adopting new or emerging technologies to meet customer demand in their market and 2) how important it is to be a leader in technology adoption (Chart 3).



A majority of the community banks (64 percent) believe technology adoption is important to their business but they do not see themselves as leaders with only 27 percent viewing this strategy as important. This outcome is not surprising because small banks do not have the resources to absorb the costs of taking risks on products that might fail. While the survey did ask about how quickly community banks would adopt new technologies to meet customer demand, the differences in these response to adoption versus leadership suggest a "fast follower" strategy.

The importance of adoption and leadership of new and emerging technologies has a strong association with size (Table 4a and 4b). Smaller banks more frequently report that adoption of new/emerging technologies is “not important”, while banks above $800 million more frequently report adoption as “very important”. A similar pattern is observed for the importance of being a local market leader in technology adoption.

Table 4a: Importance of Adopting New/Emerging Technologies and Size

	Under $100m	$100m - $200m	$200m - $400m	$400m - $800m	$800m +
Not important	29	71	0	0	0
Slightly important	44	16	20	14	6
Moderately important	30	32	17	13	8
Important	14	21	27	18	20
Very important	9	15	24	20	30
Total	19%	22%	23%	17%	19%

Table 4b: Importance of Leading New/Emerging Technology Adoption and Size

	Under $100m	$100m - $200m	$200m - $400m	$400m - $800m	$800m +
Not important	30	26	25	11	9
Slightly important	24	22	19	21	13
Moderately important	18	24	21	14	23
Important	7	16	30	21	27
Very important	13	17	17	27	27
Total	19%	22%	23%	17%	19%

In addition to size, current offering of online loan or non-loan products has an impact on the importance of both adopting new technologies and leading new technology adoption. As shown in the left panel of Table 5, banks currently offering loan or non-loan products more frequently report that it is “very important” that the technology is adopted to meet customer demand in their market (56% and 96%, respectively versus 43% and 88% overall). Similarly in the right panel, these same banks more frequently report that it is “important” for online loan products and “very important” for non-loan products to be a leader in new and emerging technology adoption (38% and 30%, respectively versus 33% and 22% overall). Interestingly, there was no association between banks that reported a plans to offer online products and the important of adoption or leadership in adoption of new technologies. Nor was there any association with reporting Fintech firms as a future competitor for any product or service.

Table 5: Technology Importance Adoption/Leadership and Online Product Offerings

	Adoption Importance			Leadership in Adoption	
	Reports a Current	Reports a Current Online		Reports a Current Online	Reports a Current Online Non-

	Online Loan Product	Non-Loan product		Loan Product	Loan product
Not important	0	29		29	25
Slightly important	18	76		37	26
Moderately important	39	83		32	17
Important	44	91		38	22
Very important	56	96		27	30
Total	43%	88%		33%	22%

Other than size and current online product offerings, neither asset growth, profitability nor CEO age is associated with either question. Nor is rural versus urban location or region associated with technology importance. Additionally, data processing expenses as a percent of total expenses (or as a percent of non-regulatory expenses) is not associated with the report adoption of new technologies. Thus we conclude that technology adoption for the largest banks appears to be purely driven by the needs of the marketplace and the desire to remain competitive, while smaller banks appear to be in a "wait and see" mode because of uncertainty about the payoff of large technology investments.

Conclusion

Small banks and large banks look the same size on a monitor screen (online banking) or a smart phone (mobile banking). What matters are the products and services provided and the bank's platform flexibility (internal provision versus third party, partial digitization versus full digitization). Most of the research into technology the use and effectiveness of technology investment is focused on aggregate levels of expenditures without the ability to link to products or strategies for use. The 2018 National Survey provides a unique opportunity to examine what technology enabled products small banks current offer and plan to offer, platform (in-house versus vendor) usage for online loan and non-loan products, plans for outside providers of digital services, and the outlook for new/emerging technologies and leadership.

The responses for product usage are not surprising with most banks (almost 90%) offering mobile banking where about 40% of banks offer online loan applications, with negligible use of other products. Looking to the future, small banks will be increasing their offerings of online loan underwriting and closing along with interactive teller machines. With the exception of mobile banking, bank size was the only characteristic that explained online product usage with larger banks more frequently reporting usage.

Small banks were asked about the extent to which they rely on "in-house" technology versus partnerships with outside digital providers for their digital loan and non-loan products. Neither platform was exclusively used for product delivery. Of the small banks reporting that they "never/rarely" used an in-house platform, 94% reported "usually/always" using and outside platform. However the converse was not true: of the small number that reported "never/rarely" using an outside platform, only 77% reported “usually/always” using an inhouse platform. Platform use had a strong bank size effect for digital loan products but not for non-loan products.

About two-thirds of the small banks reported that their relationships with outside providers was adequate with almost one-third seeking to expand the relationships. Once again, responses varied by bank size with the largest banks more frequently seeking to expand relationship. Other than size, only banks that viewed Fintech as a future competitor for any product and banks that currently offered non-lending online products were more likely to seek to expand outside relationships.

Almost two-thirds of mall banks viewed the adoption of new or emerging technologies to meet customer demand as “important” or “very important,” but less than one-third reported that it was important to be a leader in technology adoption. Once again, larger banks more frequently reported both the importance of adoption and the importance of being a leader in adoption. Not surprisingly, banks that more frequently reported offering online loan and non-loan products were more likely to view both adoption and leadership of new/emerging technologies as important to their businesses.