Mortgage Lender Sentiment Survey®
Special Topics Report

APIs and Mortgage Lending

First Quarter 2019

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Executive Summary

Lenders view Application Program Interfaces (APIs) as the technology with the greatest potential to streamline business processes. Ease of integration and competitive advantages are the most important criteria for API adoption cited by lenders. The most appealing API ideas to lenders are borrower qualification verification and appraisal value and comparables.

Top Two Technology Areas with Greatest Potential to Streamline Business Processes and Most Likely to be Rolled Out Broadly

63% say Application Programming Interfaces (APIs)

62% say Document Management and Optical Character Recognition (OCR)

Top Two Most Important Criteria in Deciding to Adopt a Third-Party API

47% say ease of technology integration or adoption

41% say competitive advantages brought by API adoption

Most Appealing API Ideas to Improve Business Processes

1 **Borrower Qualification Verification:** Enter a borrower's personal identifiable information (e.g. name & social security number) and the API will return this borrower's income, assets, employment history, and credit profile.

2 **Appraisal:** Enter a home address and the API will tell the appraisers' appraisal value and comparables.

Business Context and Research Questions

Business Context

Businesses are increasingly leveraging digital technologies to reduce errors and costs, speed up transactions, and drive richer and better customer service. Over the past few years, technology advancements such as Artificial Intelligence (AI) with Machine Learning (ML), Application Program Interfaces (APIs), and document digitization have gained traction, enabling digital transformation.

Fannie Mae's Economic & Strategic Research (ESR) Group surveyed senior mortgage executives in February 2019 through its quarterly Mortgage Lender Sentiment Survey® to understand lenders' views on various technologies, their criteria for adoption of a third-party API, and to gauge their interests in various API ideas.
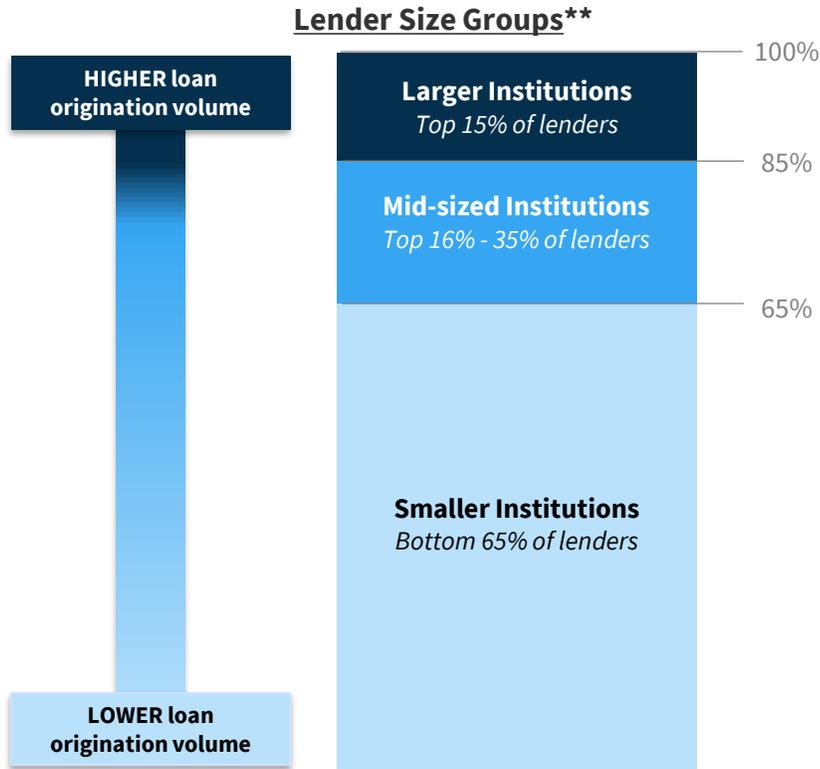
Research Questions

1. What technologies do lenders view as having the greatest potential to improve or streamline business processes? Technologies we asked about included AI/ML, APIs, document management and OCR (Optical Character Recognition), RPA (Robotic Process Automation), DLT (Distributed Ledger Technology), and chatbots. For each technology, what do lenders view as the status of adoption in two years?

2. What are the most important criteria lenders use in deciding to adopt a third-party API?

3. What API ideas are most appealing to lenders to improve or streamline business processes? Ideas tested included borrower qualification verification, appraisals, loan data submission quality, loan program eligibility, loan underwriting status, loan closing status, and loan limits.

Q1 2019 Respondent Sample and Groups

The current analysis is based on first quarter 2019 data collection. For Q1 2019, a total of 202 senior executives completed the survey during February 6 - 17, representing 184 lending institutions.*
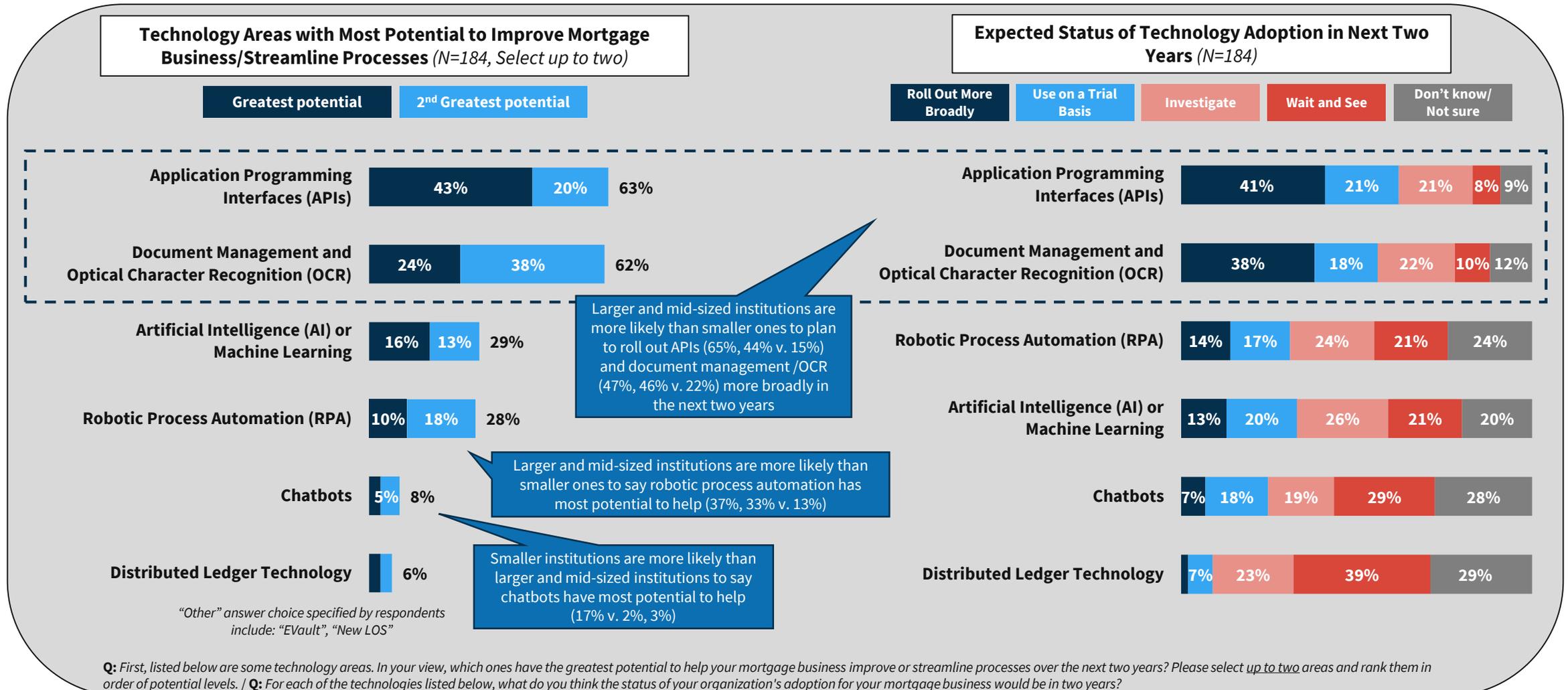
Lender Size Groups**

HIGHER loan origination volume	**Larger Institutions** *Top 15% of lenders* — 100% / 85%
	Mid-sized Institutions *Top 16% - 35% of lenders* — 65%
LOWER loan origination volume	**Smaller Institutions** *Bottom 65% of lenders*

Sample Q1 2019		Sample Size
Total Lending Institutions The "Total" data throughout this report is an average of the means of the three lender-size groups listed below.		184
Lender Size Groups	**Larger Institutions** Lenders in the Fannie Mae database who were in the top 15% of lending institutions based on their total 2017 loan origination volume (above $1.18 billion)	49
	Mid-sized Institutions Lenders in the Fannie Mae database who were in the next 20% (16%-35%) of lending institutions based on their total 2017 loan origination volume (between $400 million and $1.18 billion)	43
	Smaller Institutions Lenders in the Fannie Mae database who were in the bottom 65% of lending institutions based on their total 2017 loan origination volume (less than $400 million)	92
Institution Type***	**Mortgage Banks** (non-depository)	53
	Depository Institutions	79
	Credit Unions	33

* The results of the Mortgage Lender Sentiment Survey are reported at the lending institutional parent-company level. If more than one individual from the same institution completes the survey, their responses are averaged to represent their parent institution.
** The 2017 total loan volume per lender used here includes the best available annual origination information from Fannie Mae, Freddie Mac, and Marketrac. Lenders in the Fannie Mae database are sorted by their firm's total 2017 loan origination volume and then assigned into the size groups, with the top 15% of lenders being the "larger" group, the next 20% of lenders being the "mid-sized" group and the rest being the "small" group.
*** Lenders that are not classified into mortgage banks or depository institutions or credit unions are mostly housing finance agencies.

Technology Areas with Greatest Potential and Expected Adoption Status in Two Years

Lenders see APIs and document management/OCR as having the greatest potential to help improve or streamline processes. They also cite these two technology areas as the most likely to be rolled out broadly in the next two years.

Technology Areas with Most Potential to Improve Mortgage Business/Streamline Processes *(N=184, Select up to two)*

- Greatest potential
- 2nd Greatest potential

Expected Status of Technology Adoption in Next Two Years *(N=184)*

- Roll Out More Broadly
- Use on a Trial Basis
- Investigate
- Wait and See
- Don't know/ Not sure

Technology Area	Greatest potential	2nd Greatest potential	Total
Application Programming Interfaces (APIs)	43%	20%	63%
Document Management and Optical Character Recognition (OCR)	24%	38%	62%
Artificial Intelligence (AI) or Machine Learning	16%	13%	29%
Robotic Process Automation (RPA)	10%	18%	28%
Chatbots	5%		8%
Distributed Ledger Technology			6%

Technology Area	Roll Out More Broadly	Use on a Trial Basis	Investigate	Wait and See	Don't know/Not sure
Application Programming Interfaces (APIs)	41%	21%	21%	8%	9%
Document Management and Optical Character Recognition (OCR)	38%	18%	22%	10%	12%
Robotic Process Automation (RPA)	14%	17%	24%	21%	24%
Artificial Intelligence (AI) or Machine Learning	13%	20%	26%	21%	20%
Chatbots	7%	18%	19%	29%	28%
Distributed Ledger Technology		7%	23%	39%	29%

> Larger and mid-sized institutions are more likely than smaller ones to plan to roll out APIs (65%, 44% v. 15%) and document management /OCR (47%, 46% v. 22%) more broadly in the next two years

> Larger and mid-sized institutions are more likely than smaller ones to say robotic process automation has most potential to help (37%, 33% v. 13%)

> Smaller institutions are more likely than larger and mid-sized institutions to say chatbots have most potential to help (17% v. 2%, 3%)

"Other" answer choice specified by respondents include: "EVault", "New LOS"

Q: *First, listed below are some technology areas. In your view, which ones have the greatest potential to help your mortgage business improve or streamline processes over the next two years? Please select up to two areas and rank them in order of potential levels.* / **Q:** *For each of the technologies listed below, what do you think the status of your organization's adoption for your mortgage business would be in two years?*

Interest Levels for API Ideas

An API to verify borrower qualification is enormously valued by lenders. An API to obtain property appraisal value and comparables is also highly valued by lenders.

Relative Value of API Ideas (with 100 = average)
Relative Value Scores derived from MaxDiff Analysis (see pg. 12 for additional information)

Borrower Qualification Verification:
Enter a borrower's personal identifiable information (e.g. name & social security number) and the API will return this borrower's income, assets, employment history, and credit profile.
284

Appraisal:
Enter a home address and the API will tell the appraisal value and comparables.
150

Loan Program Eligibility:
Enter key loan and borrower characteristics and the API will tell the types of loan programs (e.g., conventional conforming, jumbo, 97% LTV) this borrower could be qualified for.
86

Loan Data Submission Quality:
Enter a loan reference number and the API will provide details on data quality and consistency across systems throughout the entire loan manufacturing process with secondary market investors to identify data issues and edits.
84

Loan Underwriting Status:
Enter a loan reference number and the API will inform the current status of the loan being processed/reviewed/underwritten by the secondary market investor and call out outstanding items needed.
48

Loan Closing Status:
Enter a loan reference number and the API will inform the closing status such as what documents/disclosures have been e-delivered to the borrower, timing of document delivery, and the status indicating if the borrower has e-signed.
42

Loan Limit:
Enter a zip code and the API will tell the mortgage loan limit for conventional conforming, FHA, and VA loans.
6

Q: In this section, you will see some API development ideas that your organization might leverage in the future to improve or streamline its mortgage business processes. Many of these ideas do not exist yet. These ideas will be presented in a total of 7 sets. Each set will show 3 ideas. Among the 3 ideas in each set, please choose the idea that is the MOST appealing and the idea that is the LEAST appealing to your organization.
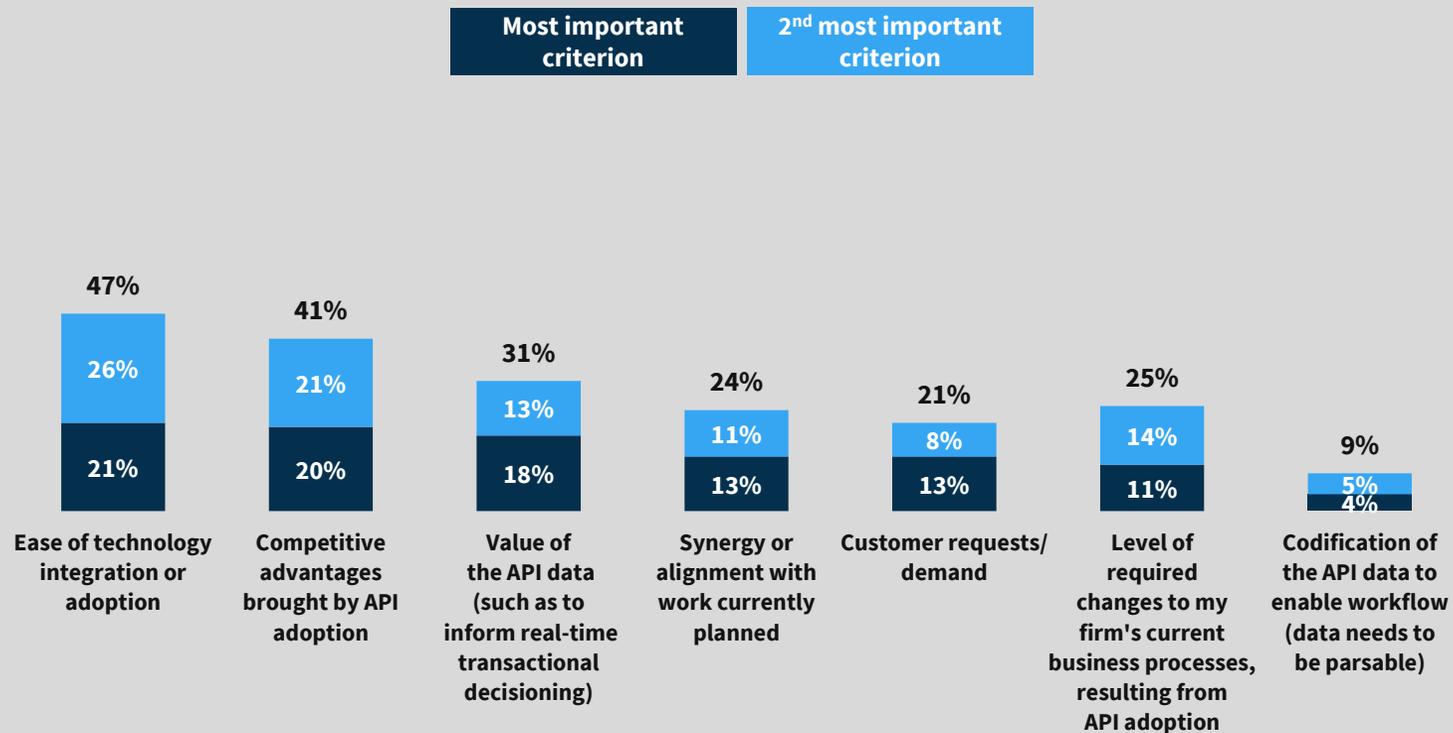
Most Important Criteria for Adopting a Third-Party API

Ease of technology adoption and competitive advantages from API adoption matter the most to lenders when deciding to adopt a third-party API. Lenders say GSEs can help set clear industry standards, provide guidance on best practices, and create user-friendly environments in order to ease integration.

Most Important Criteria in Deciding to Adopt a Third-Party API
Select up to two, N=184

Most important criterion	2nd most important criterion

Chart data:

- **Ease of technology integration or adoption** — 47% (Most important: 21%, 2nd most important: 26%)
- **Competitive advantages brought by API adoption** — 41% (Most important: 20%, 2nd most important: 21%)
- **Value of the API data (such as to inform real-time transactional decisioning)** — 31% (Most important: 18%, 2nd most important: 13%)
- **Synergy or alignment with work currently planned** — 24% (Most important: 13%, 2nd most important: 11%)
- **Customer requests/demand** — 21% (Most important: 13%, 2nd most important: 8%)
- **Level of required changes to my firm's current business processes, resulting from API adoption** — 25% (Most important: 11%, 2nd most important: 14%)
- **Codification of the API data to enable workflow (data needs to be parsable)** — 9% (Most important: 4%, 2nd most important: 5%)

How Secondary-market Investors Can Help with Technology Integration
N=33

*"Establish **standards for industry data** and **best practices**. It is a better industry if all players are efficient."* – Larger Institution

*"Promoting firms which **adapt & adopt GSE standards**."* – Smaller Institution

*"**Advise sellers of new IT innovations**, after you have tested them for capabilities, cost-effectiveness, reliability and ease of integration."* – Mid-sized Institution

*"Create a **user friendly environment** that allows for technologies to **talk to each other more freely**. There are also too many options on the market right now. Providing **guidance on best use** and best practices is important."* – Smaller Institution

*"There are many competing projects for resources. Significant, **time-consuming integrations pull valuable resources** from projects with a greater ROI."* – Larger Institution

Q: *When deciding whether or not to adopt an API developed by a third party, what are your organization's most important criteria? Listed below are some possible criteria. Please select up to two and rank them in order of importance. /* **Q:** *You mentioned that "ease of technology integration" is an important criterion for API adoption. Please share your thoughts on how secondary-market investors like the GSEs could help for this area?*

Appendix

Research Objectives

- The survey is unique because it is used not only to track lenders' current impressions of the mortgage industry, but also their insights into the future.
- The *Mortgage Lender Sentiment Survey*®, which debuted in March 2014, is a quarterly online survey among senior executives in the mortgage industry, designed to:

Track insights and provide benchmarks into current and future mortgage lending activities and practices.

Quarterly Regular Questions

- Consumer Mortgage Demand
- Credit Standards
- Profit Margin Outlook

Featured Specific Topic Analyses

- Housing Supply and Affordability
- Artificial Intelligence for Mortgage Lending
- Cost Cutting as a Top Business Priority
- Mortgage Data Initiatives
- Lenders' Customer Service Channel Strategies
- Lenders' Experiences with APIs and Chatbots

- A quarterly 10-15 minute online survey of senior executives, such as CEOs and CFOs, of Fannie Mae's lending institution customers.
- The results are reported at the lending institution parent-company level. If more than one individual from the same institution completes the survey, their responses are averaged to represent their parent company.

Mortgage Lender Sentiment Survey®

Survey Methodology

- A quarterly, 10- to 15-minute online survey among senior executives, such as CEOs and CFOs, of Fannie Mae's lending institution partners.
- To ensure that the survey results represent the behavior and output of organizations rather than individuals, the Fannie Mae Mortgage Lender Sentiment Survey is structured and conducted as an establishment survey.
- Each respondent is asked 40-75 questions.

Sample Design

- Each quarter, a random selection of approximately 3,000 senior executives among Fannie Mae's approved lenders are invited to participate in the study.

Data Weighting

- The results of the Mortgage Lender Sentiment Survey are reported at the institutional parent-company level. If more than one individual from the same parent institution completes the survey, their responses are averaged to represent their parent institution.

MaxDiff Methodology for Q1 2019 MLSS

What is MaxDiff?

- Maximum Difference Scaling, or simply MaxDiff, is an approach to measure preference or importance scores on a number of items or "attributes" (e.g., product ideas and product features).

- Each respondent goes through a number of exercises, and, for each exercise/set, chooses the most important (most preferred) option and the least important (least preferred) option. In the Q1 2019 MLSS, we asked about 7 different API ideas that could help streamline business processes. Respondents were shown randomly preselected sets of 3 ideas each for a total of 7 sets. An example set that respondents were shown is below:

Below are some API development ideas that your organization might leverage in the future to improve or streamline its mortgage business processes. Please choose the idea that is the MOST appealing and the idea that is the LEAST appealing to your organization.

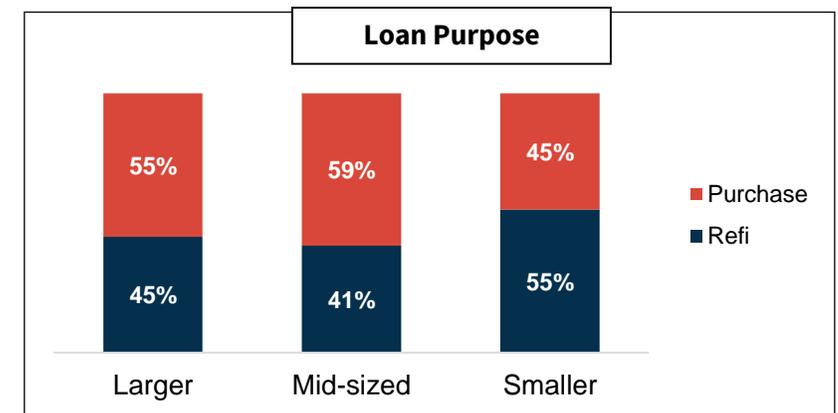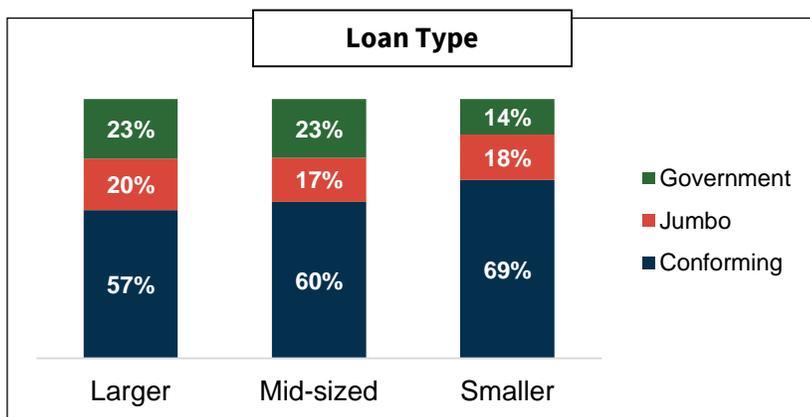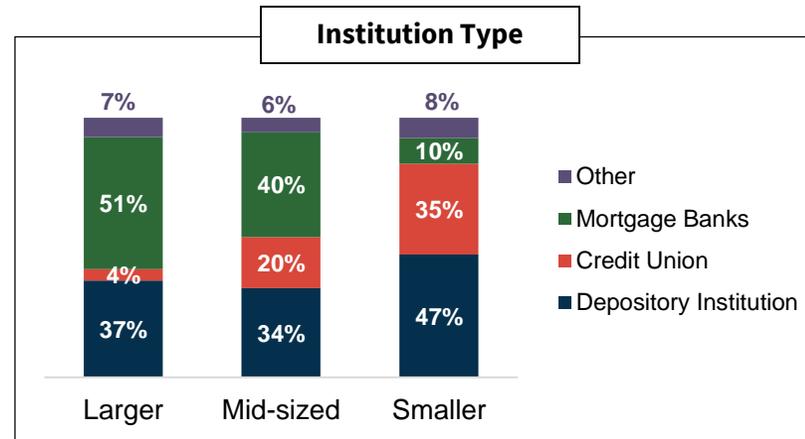| Most appealing		Least appealing
○	**Loan Limit:** Enter a zip code and the API will tell the mortgage loan limit for conventional conforming, FHA, and VA loans.	○
○	**Appraisal:** Enter a home address and the API will tell the appraisal value and comparables.	○
○	**Loan Underwriting Status:** Enter a loan reference number and the API will inform the current status of the loan being processed/reviewed/underwritten by the secondary market investor and call out outstanding items needed.	○

Interpreting MaxDiff Results

- MaxDiff analysis produces a "utility" value for each attribute. To help ease the interpretation, utility scores are converted and expressed as index values, with 100 = average. Higher scores above the average of 100 indicate stronger preferences or higher importance.

Lending Institution Characteristics

Fannie Mae's customers invited to participate in the Mortgage Lender Sentiment Survey represent a broad base of different lending institutions that conducted business with Fannie Mae in 2017. Institutions were divided into three groups based on their 2017 total industry loan volume – Larger (top 15%), Mid-sized (top 16%-35%), and Smaller (bottom 65%). The data below further describe the composition and loan characteristics of the three groups of institutions.

Institution Type

	Larger	Mid-sized	Smaller
Other	7%	6%	8%
Mortgage Banks	51%	40%	10%
Credit Union	4%	20%	35%
Depository Institution	37%	34%	47%

Loan Type

	Larger	Mid-sized	Smaller
Government	23%	23%	14%
Jumbo	20%	17%	18%
Conforming	57%	60%	69%

Loan Purpose

	Larger	Mid-sized	Smaller
Purchase	55%	59%	45%
Refi	45%	41%	55%

Note: Government loans include FHA loans, VA loans and other non-conventional loans from Marketrac.

2019 Q1 Cross-Subgroup Sample Sizes

	Total	Larger Lenders	Mid-Sized Lenders	Smaller Lenders
Total	**184**	**49**	**43**	**92**
Mortgage Banks (non-depository)	53	21	21	11
Depository Institutions	79	18	15	46
Credit Unions	33	1	6	26

How to Read Significance Testing

On slides where significant differences between three groups are shown:

- Each group is assigned a letter (L/M/S, M/D/C).
- If a group has a significantly higher % than another group at the 95% confidence level, a letter will be shown next to the % for that metric. The letter denotes which group the % is significantly higher than.

Example:

> For each of the technologies listed below, what do you think the status of your organization's adoption for your mortgage business would be in two years?
> *Application Programming Interfaces (APIs)*

	Total	LOAN VOLUME			INSTITUTION TYPE		
		Larger (L)	Mid-sized (M)	Smaller (S)	Mortgage Banks (M)	Depository Institutions (D)	Credit Unions (C)
N=	*184*	*49*	*43*	*92*	*53*	*79*	*33*
Roll out more broadly	41%	65%$^{S/M}$	44%^{S}	15%	50%^{D}	26%	29%
Use on a trial basis	21%	14%	23%	25%	20%	22%	27%
Investigate	21%	8%	25%^{L}	29%^{L}	17%	24%	29%
Wait and see	8%	8%	3%	13%	9%	14%	3%
Don't know/not sure	9%	5%	5%	18%	4%	14%	12%

65% is significantly higher than 44% (mid-sized institutions) and 15% (smaller institutions)

50% is significantly higher than 26% (depository institutions)

Calculation of the "Total"

The "Total" data presented in this report is an average of the means of the three loan origination volume groups (see an illustrated example below). Please note that percentages are based on the number of financial institutions that gave responses other than "Not Applicable." Percentages below may add not sum to 100% due to rounding.

Example: First, listed below are some technology areas. In your view, which ones have the greatest potential to help your mortgage business improve or streamline processes over the next two years? Please select up to two areas and rank them in order of potential levels.

Showing Greatest + 2nd Greatest Potential	Total	LOAN VOLUME		
		Larger (L)	Mid-sized (M)	Smaller (S)
N=	184	49	43	92
Application Programming Interfaces (APIs)	63%	61%ᴹ	55%	74%
Document Management and Optical Character Recognition (OCR)	62%	62%	75%ᴸ	49%
Artificial Intelligence (AI) or Machine Learning	29%	30%	30%	26%

"Total" of 62% is
(61% + 55% + 74%) / 3

Other API Ideas Suggested by Lenders

Lenders suggested other APIs, including one that references borrower information against historical performance and another for new construction appraisals. Some also suggest more use of big data and working through the current API ideas available.

Other API Ideas Suggested by Lenders to Help Improve/Streamline Business Processes
N=17

" *"An API that **references borrower/loan program characteristics** against [historical performance and] a projected credit model to highlight probability of default and loss given default." – Smaller Institution*

" *"The API ideas that are currently a WIP are **enough to try and grasp and integrate** for awhile!" – Larger Institution*

" *"Something for **new construction appraisals**." – Larger Institution*

" *"Markets are so different and also differ by counties for API appraisal info…**API would be good to use for what programs are available to buyers and show the differences.**" – Smaller Institution*

" *"Less dependence on appraisers…**more use of Big Data** as it applies to property valuation." – Mid-Sized Institution*

" *"Loan eligibility with **estimated closing date** based on **GSE standards**." – Smaller Institution*

Q: *Are there any API ideas that you would like to be developed to help improve or streamline your organization's mortgage business processes? Please share your thoughts. (Optional)*

Potential for Technology Areas to Improve Mortgage Business/Streamline Processes

First, listed below are some technology areas. In your view, which ones have the greatest potential to help your mortgage business improve or streamline processes over the next two years? Please select up to two areas and rank them in order of potential levels.

Showing Greatest + 2nd Greatest Potential	Total	LOAN VOLUME			INSTITUTION TYPE		
		Larger (L)	Mid-sized (M)	Smaller (S)	Mortgage Banks (M)	Depository Institutions (D)	Credit Unions (C)
N=	*184*	*49*	*43*	*92*	*53*	*79*	*33*
Application Programming Interfaces (APIs)	63%	61%^{M}	55%	74%	59%	70%	82%^{M}
Document Management and Optical Character Recognition (OCR)	62%	62%	75%^{L}	49%	63%	59%	47%
Artificial Intelligence (AI) or Machine Learning	29%	30%	30%	26%	28%	28%	29%
Robotic Process Automation (RPA)	28%	37%^{S}	33%^{S}	13%	36%^{D}	14%	24%
Chatbots	8%	2%	3%	17%$^{L/M}$	7%	14%	6%
Distributed Ledger Technology (DLT, also known as blockchain)	6%	7%	2%	10%	6%	8%	6%
Other	2%	1%	0%	5%	2%	4%	3%

L/M/S - Denote a % is significantly higher than the annual loan origination volume group that the letter represents at the 95% confidence level
M/D/C - Denote a % is significantly higher than the institution type group that the letter represents at the 95% confidence level

Expected Adoption Status in Two Years: Application Programming Interfaces (APIs)

For each of the technologies listed below, what do you think the status of your organization's adoption for your mortgage business would be in two years?

	Total	LOAN VOLUME			INSTITUTION TYPE		
		Larger (L)	Mid-sized (M)	Smaller (S)	Mortgage Banks (M)	Depository Institutions (D)	Credit Unions (C)
N=	184	49	43	92	53	79	33
Roll out more broadly	41%	65%S/M	44%S	15%	50%D	26%	29%
Use on a trial basis	21%	14%	23%	25%	20%	22%	27%
Investigate	21%	8%	25%L	29%L	17%	24%	29%
Wait and see	8%	8%	3%	13%	9%	14%	3%
Don't know/not sure	9%	5%	5%	18%	4%	14%	12%

L/M/S - Denote a % is significantly higher than the annual loan origination volume group that the letter represents at the 95% confidence level
M/D/C - Denote a % is significantly higher than the institution type group that the letter represents at the 95% confidence level

Expected Adoption Status in Two Years: Document Management And Optical Character Recognition (OCR)

For each of the technologies listed below, what do you think the status of your organization's adoption for your mortgage business would be in two years?

	Total	LOAN VOLUME			INSTITUTION TYPE		
		Larger (L)	Mid-sized (M)	Smaller (S)	Mortgage Banks (M)	Depository Institutions (D)	Credit Unions (C)
N=	184	49	43	92	53	79	33
Roll out more broadly	38%	47%^{S}	46%^{S}	22%	43%	32%	26%
Use on a trial basis	18%	26%^{S}	16%	12%	21%	15%	14%
Investigate	22%	10%	22%	34%^{L}	17%	25%	30%
Wait and see	10%	11%	8%	10%	9%	11%	15%
Don't know/not sure	12%	6%	8%	21%^{L}	10%	17%	15%

L/M/S - Denote a % is significantly higher than the annual loan origination volume group that the letter represents at the 95% confidence level
M/D/C - Denote a % is significantly higher than the institution type group that the letter represents at the 95% confidence level

Expected Adoption Status in Two Years: Robotic Process Automation (RPA)

For each of the technologies listed below, what do you think the status of your organization's adoption for your mortgage business would be in two years?

	Total	LOAN VOLUME			INSTITUTION TYPE		
		Larger (L)	Mid-sized (M)	Smaller (S)	Mortgage Banks (M)	Depository Institutions (D)	Credit Unions (C)
N=	184	49	43	92	53	79	33
Roll out more broadly	14%	26%S	14%	2%	15%	8%	9%
Use on a trial basis	17%	28%S	15%	8%	23%	12%	6%
Investigate	24%	17%	35%L	20%	22%	21%	24%
Wait and see	21%	11%	19%	34%L	17%	26%	39%M
Don't know/not sure	24%	19%	17%	36%L	23%	32%	21%

L/M/S - Denote a % is significantly higher than the annual loan origination volume group that the letter represents at the 95% confidence level
M/D/C - Denote a % is significantly higher than the institution type group that the letter represents at the 95% confidence level

Expected Adoption Status in Two Years: Artificial Intelligence (AI) Or Machine Learning (ML)

For each of the technologies listed below, what do you think the status of your organization's adoption for your mortgage business would be in two years?

	Total	LOAN VOLUME			INSTITUTION TYPE		
		Larger (L)	Mid-sized (M)	Smaller (S)	Mortgage Banks (M)	Depository Institutions (D)	Credit Unions (C)
N=	184	49	43	92	53	79	33
Roll out more broadly	13%	16%	15%	8%	17%	9%	17%
Use on a trial basis	20%	35%S	19%	7%	20%	15%	11%
Investigate	26%	21%	30%	26%	28%	26%	23%
Wait and see	21%	15%	23%	24%	17%	26%	23%
Don't know/not sure	20%	13%	12%	34%L/M	17%	24%	27%

| L/M/S - Denote a % is significantly higher than the annual loan origination volume group that the letter represents at the 95% confidence level
M/D/C - Denote a % is significantly higher than the institution type group that the letter represents at the 95% confidence level |
| --- |

Expected Adoption Status in Two Years: Chatbots

For each of the technologies listed below, what do you think the status of your organization's adoption for your mortgage business would be in two years?

	Total	LOAN VOLUME			INSTITUTION TYPE		
		Larger (L)	Mid-sized (M)	Smaller (S)	Mortgage Banks (M)	Depository Institutions (D)	Credit Unions (C)
N=	184	49	43	92	53	79	33
Roll out more broadly	7%	7%	10%	4%	12%	6%	0%
Use on a trial basis	18%	24%^{S}	21%	8%	23%	12%	12%
Investigate	19%	19%	16%	21%	17%	18%	24%
Wait and see	29%	21%	30%	35%	19%	36%^{M}	36%
Don't know/not sure	28%	28%	23%	32%	30%	27%	27%

L/M/S - Denote a % is significantly higher than the annual loan origination volume group that the letter represents at the 95% confidence level
M/D/C - Denote a % is significantly higher than the institution type group that the letter represents at the 95% confidence level

Expected Adoption Status in Two Years: Distributed Ledger Technology (DLT)

	For each of the technologies listed below, what do you think the status of your organization's adoption for your mortgage business would be in two years?

		Total	LOAN VOLUME			INSTITUTION TYPE		
			Larger (L)	Mid-sized (M)	Smaller (S)	Mortgage Banks (M)	Depository Institutions (D)	Credit Unions (C)
N=		*184*	*49*	*43*	*92*	*53*	*79*	*33*
Roll out more broadly		2%	4%	0%	1%	4%	1%	0%
Use on a trial basis		7%	7%	9%	4%	4%	9%	6%
Investigate		23%	19%	27%	22%	24%	23%	21%
Wait and see		39%	41%	38%	38%	33%	38%	55%^M
Don't know/not sure		29%	28%	26%	34%	36%	30%	18%

L/M/S - Denote a % is significantly higher than the annual loan origination volume group that the letter represents at the 95% confidence level
M/D/C - Denote a % is significantly higher than the institution type group that the letter represents at the 95% confidence level

Most Important Criteria in Deciding to Adopt a Third Party API

When deciding whether or not to adopt an API developed by a third party, what are your organization's most important criteria? Listed below are some possible criteria. Please select up to two and rank them in order of importance.

Showing Most Important + 2nd Most Important	Total	LOAN VOLUME			INSTITUTION TYPE		
		Larger (L)	Mid-sized (M)	Smaller (S)	Mortgage Banks (M)	Depository Institutions (D)	Credit Unions (C)
N=	*184*	*49*	*43*	*92*	*53*	*79*	*33*
Ease of technology integration or adoption	47%	38%	49%	51%	56%^D	37%	51%
Competitive advantages brought by API adoption	41%	36%	47%	42%	47%	44%	35%
Value of the API data (such as to inform real-time transactional decisioning)	31%	36%	31%	26%	24%	30%	32%
Level of required changes to my firm's current business processes, resulting from API adoption	25%	28%	28%	19%	19%	26%	26%
Synergy or alignment with work currently planned	24%	31%^S	26%^S	12%	23%	20%	11%
Customer requests/demand	21%	14%	11%	37%^{L/M}	17%	28%	36%^M
Codification of the API data to enable workflow (data needs to be parsable)	9%	10%	6%	7%	9%	8%	6%
Other	1%	0%	0%	2%	0%	2%	0%

L/M/S - Denote a % is significantly higher than the annual loan origination volume group that the letter represents at the 95% confidence level
M/D/C - Denote a % is significantly higher than the institution type group that the letter represents at the 95% confidence level

API Development Ideas MaxDiff

In this section, you will see some API development ideas that your organization might leverage in the future to improve or streamline its mortgage business processes. Many of these ideas do not exist yet.

These ideas will be presented in a total of 7 sets. Each set will show 3 ideas. Among the 3 ideas in each set, please choose the idea that is the MOST appealing and the idea that is the LEAST appealing to your organization.

Showing MaxDiff Scores	Total	LOAN VOLUME			INSTITUTION TYPE		
		Larger (L)	Mid-sized (M)	Smaller (S)	Mortgage Banks (M)	Depository Institutions (D)	Credit Unions (C)
N=	*184*	*49*	*43*	*92*	*53*	*79*	*33*
Borrower Qualification Verification	284	284	287	281	287	280	270
Appraisal	150	158	143	149	135	159	168
Loan Program Eligibility	86	83	87	88	107	88	73
Loan Data Submission Quality	84	77	102	74	89	71	65
Loan Underwriting Status	48	45	46	54	42	52	59
Loan Closing Status	42	49	31	46	35	43	57
Loan Limit	6	5	5	8	5	8	8

Question Text

QR285a-R285b: First, listed below are some technology areas. In your view, which ones have the greatest potential to help your mortgage business improve or streamline processes over the next two years? Please select up to two areas and rank them in order of potential levels.

QR286-QR291: For each of the technologies listed below, what do you think the status of your organization's adoption for your mortgage business would be in two years?

QR292a-QR292b: When deciding whether or not to adopt an API developed by a third party, what are your organization's most important criteria? Listed below are some possible criteria. Please select up to two and rank them in order of importance.

QR293: You mentioned that "ease of technology integration" is an important criterion for API adoption. Please share your thoughts on how secondary-market investors like the GSEs could help for this area? (Optional)

QR294: Are there any API ideas that you would like to be developed to help improve or streamline your organization's mortgage business processes? Please share your thoughts. (Optional)

MaxDiff Text:
In this section, you will see some API development ideas that your organization might leverage in the future to improve or streamline its mortgage business processes. Many of these ideas do not exist yet.

These ideas will be presented in a total of 7 sets. Each set will show 3 ideas. Among the 3 ideas in each set, please choose the idea that is the MOST appealing and the idea that is the LEAST appealing to your organization.