



FHFA'S VELOCITY TECHSPRINT

AN ANALYSIS OF KEY THEMES IN DATA DIGITIZATION AND TECHNOLOGY
INNOVATION IN MORTGAGE ORIGINATIONS

December 2023

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1. Introduction

The Federal Housing Finance Agency (FHFA) uses regulatory TechSprints as a collaborative approach to encourage responsible innovation in the mortgage finance sector. The TechSprint model seeks to bring together participants from across and outside the financial services sector to develop technology-based concepts or solutions to address industry-wide challenges. These initiatives promote a proactive stance on responsible innovation by shining a light on barriers and pain points, widening discussions and perspectives, and enabling the exploration of new ideas.

In July 2023, FHFA held its first TechSprint. Named “Velocity,” the TechSprint brought together technology service providers, academics, regulators, and mortgage industry experts to broadly explore innovative, digital solutions that further promote efficiency and cost savings in mortgage origination processes. Over the four days of the Velocity TechSprint, 80 participants from 60 entities were divided into 10 teams and set upon a common challenge: *How might data digitization drive transparency and increase access, fairness, affordability, and sustainability in mortgage lending?*

The Velocity TechSprint was intentionally designed as an “ideation” TechSprint to maximize innovative thinking and explore the mortgage ecosystem’s vision for the future of mortgage technology. The ideas showcased at the TechSprint exemplified the innovative spirit of the event. In addition to showcasing the potential uses of emerging technology in mortgage finance processes, the TechSprint participants (Sprinters) explored the fundamental themes and barriers that underpin the adoption and utilization of data-driven technology in the landscape of mortgage origination.

This document serves to summarize and bring public awareness to the key themes that were uncovered through the Velocity TechSprint, including the challenges that may inhibit the broader adoption and integration of data digitization and technology in mortgage origination, and potential pathways for addressing these challenges. By publishing this thematic summary, FHFA hopes that readers will gain insights into the key pathways to leveraging technology and data in mortgage origination, paving the way for a more efficient, transparent, and accessible future in the mortgage industry.¹

¹ Please see FHFA’s blog post, [*Recapping FHFA’s Velocity TechSprint*](#) (October 2023), for a day-by-day recap of the TechSprint, including summaries of Opening Day, Demo Day, and the Observer Track panel sessions.

2. The Challenge

The financial services sector is rapidly changing, driven by consumer demand for faster, more efficient, and transparent services. However, despite the widespread adoption of digital technology in various consumer lending products, the continued reliance on paper-based processes in mortgage origination has become an increasingly cumbersome and costly problem. According to the Mortgage Bankers Association (MBA) Quarterly Performance Report, mortgage production costs have doubled over the past decade, rising from approximately \$5,300 in 2012 to \$10,600 in 2022.² Some of these increasing costs can be attributed to inefficiencies in the loan manufacturing process,³ affecting both the operational expenses of lenders and their risk management, as well as the overall experience of homebuyers.

Research indicates that mortgage lenders who embrace digital solutions tend to have lower costs and produce higher-quality loans. A 2023 study by Freddie Mac found that lenders with a higher adoption of digital solutions have 40 percent fewer loan defects compared to those with lower digital adoption rates.⁴ Furthermore, lenders with higher digital solution utilization originated loans that had, on average, approximately 14 percent lower production costs, equivalent to a savings of about \$1,700 per loan.⁵ Digital solutions can also enable lenders to process loans more quickly, leading to reduced operating expenses. Freddie Mac's 2021 *Cost to Originate Study* showed that mortgage processes integrated with digital and technology offerings can save up to 18 days in closing cycle time.⁶ Despite the availability of digital solutions, substantial room for adoption remains, with at least 50 percent of lenders still using paper in their origination processes.⁷

Homebuyer sentiment surveys indicate a rising interest among homebuyers in the broader adoption of digital mortgage tools, particularly since 2020 with the in-person challenges to the mortgage process presented during the COVID-19 pandemic. In addition to using online platforms to submit financial documents, prospective buyers are displaying a growing inclination towards utilizing digital platforms for tasks such as pre-qualification processes, gaining a better understanding of the mortgage process, exploring various loan options, receiving real-time

² MBA Quarterly Performance Reports, cited in Freddie Mac, *Digital Innovation Drives Loan Quality* (February 2023).

³ Ibid.

⁴ Ibid.

⁵ Ibid.

⁶ Freddie Mac, *Cost to Originate Study: How Digital Offerings Impact Loan Production Costs* (November 2021).

⁷ Infosys, *Accelerating Digital Transformation in the Heated Mortgage Industry* (2021).

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updates on their loan status, and scrutinizing the final details of their loans.⁸ Lenders who have committed to digitization efforts have observed that these initiatives effectively enhance the overall homebuyer experience and engagement.⁹ While this trend reflects a rising interest in using digital tools, research also suggests that first-time homebuyers may be less likely to utilize such tools, highlighting the ongoing importance of homebuyer education and the preference for at least some level of human interaction to complement the digital mortgage process.¹⁰

A. Velocity TechSprint Design

FHFA organized the Velocity TechSprint with the intention of diving deeper into the challenges and potential opportunities associated with the expanded use of data digitization and technology in mortgage lending. To develop [problem statements](#) for the Velocity TechSprint, FHFA leveraged public responses to the Request for Information (*Fintech in Housing Finance: Request for Information*) issued in July 2022,¹¹ and insights from external outreach conducted by FHFA's Office of Financial Technology. FHFA developed an umbrella problem statement and five focused statements aimed at addressing:

- Expanding the utilization of direct-to-source data approaches and automated verification processes in mortgage lending;
- Addressing challenges related to the adoption of existing digital mortgage tools;
- Identifying opportunities to further enhance and align data standards in mortgage processes;
- Identifying opportunities for incorporating alternative data in credit underwriting; and
- Enhancing the digital mortgage experience so that homebuyers have greater access to, are better prepared for, and have greater confidence in the use of technology in the mortgage process, and lenders and other participants are trained in a more digitized process.

⁸ Fannie Mae, *Q1 2021 NBS Special Topic Survey - COVID-19, Mortgage Digitization, and Consumer Satisfaction* (2021).

⁹ Douglas Duncan, Fannie Mae, *Lenders Discuss Loan Costs and Efficacy of Recent Tech Investments* (October 2022).

¹⁰ Urban Institute, *FinTech Innovation in the Home Purchase and Financing Market Impact and Gaps* (July 2019)

¹¹ See FHFA, *Fintech in Housing Finance: Request for Information* (July 2022) and FHFA, *Summary of Responses to the Request for Information on Fintech in Housing Finance* (March 2023).

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To optimize engagement in these broad areas over the short period of the TechSprint, FHFA intentionally designed the Velocity TechSprint as an “ideation” TechSprint, with a desire to prioritize community building, collaborative brainstorming, and idea generation across the mortgage ecosystem over the development of specific prototypes or proof-of-concept solutions. Several teams also created applications and visual guides over the course of the TechSprint to demonstrate how their solutions could engage potential homebuyers.

B. Velocity TechSprint Solutions

Through their Demo Day presentations and active engagement with FHFA afterward, Sprinters provided valuable perspectives on the issues surrounding data digitization and technology within the mortgage industry, along with potential approaches to tackling these challenges. Prior to delving into these viewpoints in more detail, this document begins with a brief summary of the 10 solutions showcased during Demo Day, which will provide context for the discussion ahead.¹²

Team Apex (Down Payment Assistance)

- Team Apex proposed the creation of a Down Payment Assistance (DPA) portal with the aim of enhancing access to and engagement with DPA programs among potential homebuyers. This portal would serve as a centralized hub, offering standardized guidelines and prerequisites for the over 2,000 DPA programs offered across jurisdictions nationwide. It would also furnish prospective homebuyers with information regarding DPA programs aligned with their particular circumstances. Furthermore, the portal would facilitate matching potential homebuyers with participating lenders and housing counselors and provide a resource throughout the homebuying process.

Team Fidelis Data (Trusted Data Repository)

- Team Fidelis Data proposed a central repository of verified mortgage data to eliminate the repeated due diligence that mortgage lenders, investors, servicers, and other ecosystem stakeholders perform throughout the life of a mortgage loan. The central data repository would include an upfront data extraction and verification process before receiving a trusted seal, signifying the data as a trusted source for mortgage ecosystem

¹² For video of the 10 team presentations, see the [Velocity TechSprint Demo Day video](#) on FHFA's YouTube channel.

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stakeholders. The central data repository would be set up and managed through a collaboration between public and private entities.

Team FINnovation (Consumer Data Utility)

- Team FINnovation proposed the establishment of an industry collaborative utility focused on enhancing consumer education and empowerment before embarking on the mortgage application journey. This utility would integrate with primary financial data sources, automating upfront verification of the data. It would also grant prospective homebuyers the ability to manage the sharing of their data with mortgage lenders and other stakeholders throughout the mortgage process. As part of its consumer education efforts, the utility would harness generative artificial intelligence (AI) to offer personalized educational materials for prospective homebuyers. Additionally, it would monitor and identify potential biases in the mortgage process.

Team Home4All (Home.gov Portal)

- Team Home4All proposed the establishment of a government-backed website, home.gov, designed to serve as a reliable, centralized resource for information pertaining to the mortgage process and the various conventional and government-backed loan options. Among other features, the home.gov platform would offer personalized financial education services to prospective homebuyers, facilitated by a combination of chatbots powered by generative AI. With the prospective homebuyer's consent, the home.gov platform would use pre-verified, permissioned consumer data to evaluate the homebuyer's mortgage readiness. Those deemed likely to qualify would be directed to a lender marketplace to explore loan options.

Team Home Renew (Home Renovation Tool)

- Team Home Renew proposed the development of a resource to facilitate access to a supply of affordable homes, specifically catering to underserved and first-time homebuyers. This resource would offer potential homebuyers a centralized listing of affordable homes in need of renovation, along with educational materials to empower them with the knowledge required to make informed purchases and plan for the necessary renovations.

Team Mini Mae (Blockchain Origination)

- Team Mini Mae proposed a blockchain or distributed ledger technology (DLT)-based method to simplify the collection and verification of a prospective homebuyer's financial data during and prior to the mortgage process and continuing through the life of the loan.

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The proposed solution aims to utilize DLT to create a centralized, trustworthy source of financial data. The DLT would serve as the primary source of information for homebuyers when they are searching for a mortgage lender and as a vital data source for mortgage lenders and other ecosystem stakeholders during their due diligence processes.

Team Speed Racer (Uniform Data Trust Platform)

- Team Speed Racer proposed a solution to create a system for verified mortgage data, aiming to eliminate the need for repetitive due diligence conducted by mortgage lenders, investors, servicers, and other participants in the mortgage ecosystem over the life of a loan. Their proposal featured the establishment of a central data authority responsible for designating trusted data providers, tasked with verifying the authenticity and accuracy of mortgage data throughout the loan's lifecycle, and issuing verification keys using cryptographic technology. This central data authority would be set up and managed through a collaboration between public and private entities.

Team Tech Toc (Special Purpose Real Estate Investment Trust)

- Team Tech Toc proposed the creation of a special purpose Real Estate Investment Trust (REIT) designed to facilitate access to the nation's available stock of affordable housing, including Real Estate Owned (REO) properties. The special purpose REIT would acquire second homes, rental, and vacant properties and offer underserved and first-time homebuyers an initial opportunity, with DPA, to purchase these homes before making them available to other investors. The special purpose REIT would also provide ongoing support to homeowners after the purchase, providing them with educational resources and tools to sustain homeownership.

Team Trust.Me (Consumer-Owned Data Sharing)

- Team Trust.Me proposed a solution aimed at broadening credit access for underserved homebuyers, including individuals who could potentially benefit from incorporating alternative data into the mortgage underwriting process. This solution would collect a prospective homebuyer's financial data directly from sources such as cash apps, utilizing it to generate a consumer confidence index score that would evaluate their creditworthiness and mortgage readiness.

Team U-Turn ("No-to-Yes" Tool)

- Team U-Turn proposed the development of a No-to-Yes tool designed to assist individuals whose mortgage applications were initially declined in improving their creditworthiness and ultimately securing approval. This tool would pinpoint the specific

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reason(s) for the denial and, utilizing generative AI, provide tailored solutions for remediation to the applicant. It would leverage data provided by housing counselors and lenders while also offering resources to aid applicants in implementing the recommended remediation steps and monitoring their progress.

3. Key Themes

Following the conclusion of the TechSprint event in July, FHFA embarked on a series of activities aimed at gaining a deeper understanding of the concepts presented during the TechSprint. This included analyzing the underlying challenges and issues that were highlighted by the Sprinters, as well as the potential ways in which technology can help tackle these challenges. This approach was grounded in FHFA's broader, thematic approach to responsible innovation which includes:

- Identifying and understanding potential opportunities for removing barriers to innovation in the mortgage ecosystem, balancing the value of new ideas, products, and operational approaches with the need for effective risk management and governance;
- Understanding the underlying challenges to innovation as experienced by mortgage ecosystem stakeholders and, for the Velocity TechSprint, a particular emphasis on prospective homebuyers and mortgage lenders; and
- Understanding the technical and stakeholder landscape of financial technology and innovation in the mortgage ecosystem.

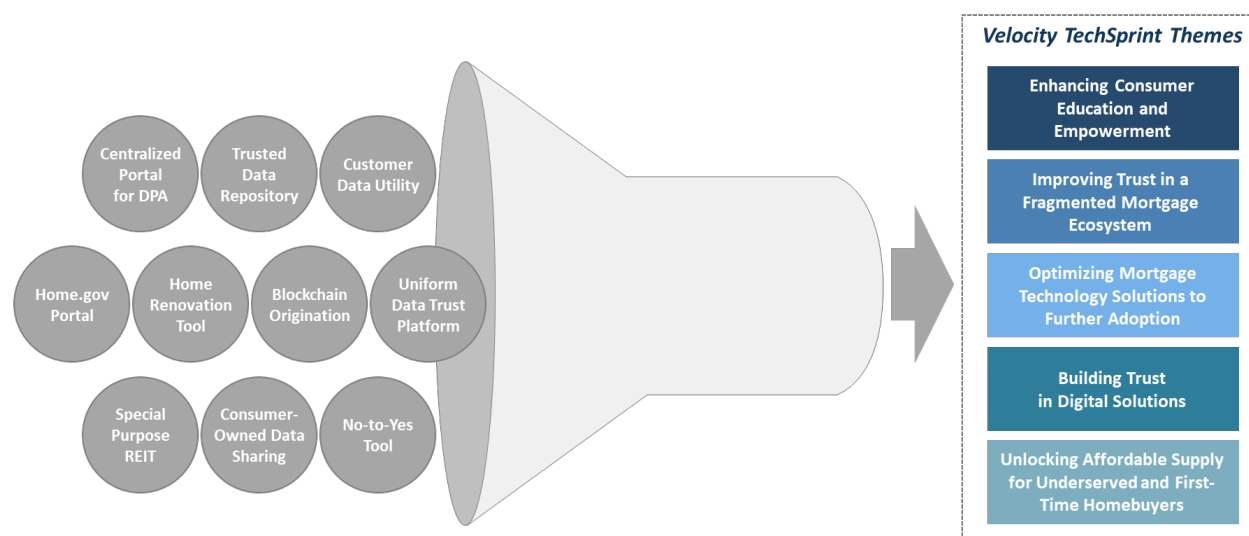
Building upon the Demo Day presentations, the Sprinters were invited back for in-depth sessions to dive deeper into the key features presented in their solutions and the challenges they aimed to resolve on behalf of stakeholders. FHFA also gathered insights from stakeholders within the mortgage ecosystem by discussing the TechSprint at various speaking engagements and engaging in external outreach activities. These activities ultimately helped FHFA identify and frame the five key themes that are explored in this section.

Figure 1 (below) showcases the five key themes that emerged during the post-TechSprint evaluation. Following the introductory visual, this section offers narrative overviews of each of the five themes, along with a discussion of stakeholder feedback on the prevailing industry challenges and the desirable solutions specific to each theme. While digital solutions with some of these features exist today, stakeholders emphasized the importance of not only expanding the

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breadth and depth of the homebuyer and lender services provided by these solutions, but also combining standalone solutions where possible to further industry adoption.

Figure 1: Introduction to Velocity TechSprint Themes



A. Theme 1: Enhancing Consumer Education and Empowerment



The mortgage process involves numerous steps, legal documents, and financial considerations, which can be daunting, especially for first-time homebuyers. While there are currently financial education resources available for homebuyers, they are frequently decentralized and require homebuyers to actively seek authoritative information and guidance from trusted advisors to successfully navigate the process. Additionally, as the demographic landscape of the United States evolves, many interactions associated with the mortgage process are increasingly

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conducted in other languages, underscoring the additional obstacles ethnic minorities may encounter when they seek reliable assistance and navigate the process of securing a mortgage.¹³

During the TechSprint, FHFA heard that financial education resources related to mortgages could be further centralized and enhanced to provide more practical information to better prepare prospective homebuyers for the mortgage process and assess their mortgage eligibility before initiating an application. Some Sprinters placed specific emphasis on identifying opportunities to improve the delivery of information regarding DPA programs. This focus stemmed from the significant level of interest among underserved homebuyers in these programs.¹⁴ Within the theme of consumer education and empowerment, Sprinters also noted that underserved and first-time homebuyers, particularly from racial and ethnic minority backgrounds, may harbor concerns about their mortgage eligibility and have less confidence in the educational resources and financial support offered by financial institutions.¹⁵ They highlighted the potential for government agencies to offer reliable, authoritative guidance on the mortgage process and better meet the needs of these potential homebuyers.

Efforts are being made by Fannie Mae and Freddie Mac (the Enterprises), under the oversight of FHFA, to bolster homebuyer education and preparedness for the mortgage application process.¹⁶ Within the broader umbrella of their Equitable Housing Finance Plans, the Enterprises have undertaken initiatives that focus on expanding access to educational resources and counseling services, including those related to DPA, particularly for underserved communities. The aim is to empower potential homebuyers with the knowledge and tools they need to make informed decisions about sustainable homeownership, navigate the complexities of the mortgage process, improve their overall readiness to secure a mortgage, and subsequently enable sustainable homeownership. These homebuyer education and preparedness initiatives, along with others set out in the Enterprises' Equitable Housing Finance Plans, help promote equitable access to homeownership opportunities and mitigate barriers that have historically disadvantaged certain groups in the housing market.

¹³ Fannie Mae, *The Consumer Housing Journey: With a Closer Look at the Experience of Black and Latino Renters and Homeowners* (2023).

¹⁴ Ibid.

¹⁵ Freddie Mac, *Perceptions of Recent Mortgage Borrowers by Race/Ethnicity: Insights from the National Survey of Mortgage Originations* (January 2023).

¹⁶ The Enterprises' Equitable Housing Finance Plans set out three-year roadmaps designed to help overcome inequities in the housing market. To review the Enterprises' Equitable Housing Finance Plans, see Fannie Mae, *Equitable Housing Finance Plan* (2023) and Freddie Mac, *Equitable Housing Finance Plan* (2023).

**Figure 2: Enhancing Consumer Education and Empowerment –
Sprinter Observations on Challenges and Potential Solution Features**

Sprinter observations on current challenges	Sprinter observations on desirable solution features
Educational resources on mortgages are provided in a decentralized manner and may not come from authoritative sources.	<ul style="list-style-type: none"> Solutions that evaluate a homebuyer's mortgage eligibility and recommend personalized actions to improve their ability to qualify for a mortgage. This was identified by Sprinters as a potential use case for AI. Solutions that provide personalized educational resources for prospective homebuyers. This was identified by Sprinters as a potential use case for AI. Government website, or resources, designed to serve as a reliable, centralized resource for information pertaining to the mortgage process. Offering underserved and first-time homebuyers centralized listings of underutilized, yet affordable homes that require investment or renovation, along with resources and tools to assess the cost of renovation and to renovate. Program enhancements and tools that offer underserved and first-time homebuyers an initial chance to buy affordable homes in need of investment or renovation before making them available to other investors, such as institutional investors. These offerings might also provide supporting educational resources to equip homebuyers with the knowledge to make informed purchases.
Prospective homebuyers may not find educational resources on mortgages helpful when the resources are not personalized to their financial circumstances.	
Prospective homebuyers may not know their mortgage readiness and may enter into a mortgage application process before they are ready.	
Prospective homebuyers might lack the necessary knowledge to understand the financial commitment, process, and contracting support required for home renovation.	
Prospective homebuyers may not be fully aware of opportunities to purchase underutilized yet affordable homes that require investment or renovation, including REO properties.	
Adverse action notices are not reader friendly and do not practically explain the reason(s) for a mortgage denial.	<ul style="list-style-type: none"> Improving adverse action notices to make it easier for a homebuyer to understand the reason(s) for a denial. Sprinters noted that this might require government action. Opportunities for further digitization of adverse action notices. Educational resources provided to homebuyers at the time of an adverse action notice.

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Sprinter observations on current challenges	Sprinter observations on desirable solution features
Information and resources on DPA programs are provided in a decentralized manner, making it difficult for homebuyers and lenders to identify prospective programs.	<ul style="list-style-type: none"> A central source of information on DPA programs to enable homebuyers to easily identify programs for which they might qualify and match them with lenders and housing counselors.
DPA solutions may not always have up-to-date information on active DPA programs, qualification requirements, and the level of available funding for the year.	<ul style="list-style-type: none"> A central source of information on DPA programs that is integrated with point-of-sale and loan origination systems and provides for portfolio-level rather than transaction-level searching. Establishing a common data standard for all DPA programs.

B. Theme 2: Improving Trust in a Fragmented Mortgage Ecosystem



A common observation among Sprinters was a lack of trust in data that is exchanged among mortgage ecosystem stakeholders during the mortgage origination process and throughout the loan lifecycle. Because of due diligence expectations on mortgage lenders and the challenge of tracing mortgage data back to its source, stakeholders repeatedly conduct due diligence on the same mortgage data using decentralized sources or paper documents throughout the life of the loan to verify the data's authenticity and accuracy. The repeated due diligence, sometimes referred to as "check the checker," contributes to the cost and cycle time of mortgage originations and impacts broader industry adoption of automated processes for verifying homebuyer income, assets, and employment.

Trusted data flowing through the entire mortgage process from origination through the loan lifecycle could create significant efficiencies and eliminate the need for multiple points of reverification. Given the lack of data trust and related fragmentation in the mortgage market, Sprinters identified a need for greater government involvement to help establish a trusted source

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of homebuyer financial data and minimize the need for repeated due diligence throughout the life of the loan.

**Figure 3: Improving Trust in a Fragmented Mortgage Ecosystem –
Sprinter Observations on Challenges and Potential Solution Features**

Sprinter observations on current challenges	Sprinter observations on desirable solution features
Mortgage lenders and other ecosystem stakeholders may face regulatory, internal, and investor expectations for verifying the authenticity and accuracy of mortgage data, even when that data was previously verified earlier in the loan lifecycle.	<ul style="list-style-type: none">Establishing centralized, trusted sources of validated mortgage data that are accessible by mortgage ecosystem participants, thereby minimizing the need for data revalidation through the loan lifecycle.Given the fragmentation in the mortgage ecosystem, government collaboration in establishing a centralized, trusted source of validated mortgage data.Tools that aggregate and verify a prospective homebuyer's financial information from direct sources to assess their creditworthiness and mortgage readiness. While such tools currently exist, stakeholders expressed a need for solutions that more frequently identify or verify a true match of a homebuyer's income, assets, and employment.
Given this challenge, some mortgage ecosystem stakeholders place greater trust in decentralized data sources and paper documents over digitized mortgage data.	
The repeated due diligence of the same mortgage data throughout the loan lifecycle contributes to the complexity and cost of the mortgage process.	
The mortgage ecosystem is fragmented, preventing stakeholders from referencing a common source of trusted mortgage data.	

C. Theme 3: Optimizing Mortgage Technology Solutions to Further Adoption



Due to the intricacies involved in mortgage origination and the extensive data exchange, mortgage lenders heavily rely on complex lending systems. These systems are specifically designed to navigate the diverse underwriting requirements for both conventional and

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government-backed loans, ensuring optimal execution while adhering to various compliance requirements throughout the origination process. While some mortgage lenders have adopted modern systems equipped with web services and application programming interfaces (APIs) for efficient data exchange, others still operate with legacy systems that pose operational challenges when integrating with both internal and third-party applications and may rely on manual processes in aspects of loan origination.

Sprinters observed that mortgage lenders grapple with an abundance of specialized third-party technology solutions at each stage of the origination process. They face difficulties in quantifying the actual return on investment associated with new technology, especially given that a lender's capacity to invest in technology may fluctuate with the mortgage market cycle. The challenge of technology spending may be particularly acute for large mortgage lenders who generally face a higher total technology expense per loan.¹⁷

Sprinters noted the value of technology solutions designed to both streamline mortgage data processing across different origination phases and successfully verify homebuyer data from direct sources. They believe such solutions could lead to increased adoption by lenders. This could benefit lenders lacking well-defined technology strategies to effectively integrate multiple third-party solutions throughout the origination process.

**Figure 4: Optimizing Mortgage Technology Solutions to Further Adoption –
Sprinter Observations on Challenges and Potential Solution Features**

Sprinter observations on current challenges	Sprinter observations on desirable solution features
Some mortgage lenders rely on complex, legacy loan origination systems that pose operational challenges when integrating with both internal and third-party applications, often resulting in the use of manual processes in origination.	<ul style="list-style-type: none">Establishing centralized, trusted sources of validated mortgage data that are accessible by mortgage ecosystem participants, thereby minimizing the need for specialized technology

¹⁷ Tom Finnegan, STRATMOR Group, *The Large Bank Mortgage Banking Profitability Conundrum* (June 2019).

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Sprinter observations on current challenges	Sprinter observations on desirable solution features
Lending systems often include workflows that are tailored to the underwriting requirements of the Enterprises and government-backed loans to meet compliance requirements at each stage of the process and to support best execution. Changes to these systems may be complicated to implement.	services and data revalidations (whether that be manual or automated revalidations) at each stage of the mortgage process. <ul style="list-style-type: none"> Solutions that are capable of streamlining mortgage data processing across various origination phases, minimizing a lender's need to adopt multiple, specialized third-party solutions.
There is an abundance of specialized technology vendors supporting each phase of the mortgage process including pricing, closing, and document management. Lenders may be required to piece together the outputs at each stage to move a homebuyer's loan forward, which results in complexity and cost.	<ul style="list-style-type: none"> Solutions that increase a lender's operational capacity and which may feature integrations with lender point-of-sale and loan origination systems and provide for portfolio-level rather than transaction-level search capabilities.
There is an abundance of third-party, automated verification services for homebuyer income, assets, and employment. Lenders are challenged with identifying the most cost-effective service that can provide desired outcomes. Lenders face a technology cost, even when the service does not generate hits or matches for a homebuyer during the origination process.	

D. Theme 4: Building Trust in Digital Solutions



Origination staff, including loan officers, third-party origination (TPO) brokers, and underwriters, play a pivotal role in driving the adoption of digital solutions and other technologies aimed at reducing costs and simplifying the mortgage process within the industry. Sprinters observed that, for various reasons, many origination staff members may still consider paper-based documents as the primary means of gathering homebuyer financial information. This preference for paper documentation persists because of the due diligence expectations on mortgage lenders and the lack of data trust in the mortgage ecosystem, making paper-based

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documents the “source of truth” for verifying the authenticity and accuracy of homebuyer data. Additionally, because lending systems used by lenders often feature tailored workflows designed to accommodate the distinct underwriting requirements of conventional and government-backed loans, obtaining paper documentation at the outset may simplify the lender’s engagement with a homebuyer through the remainder of the loan origination process. Finally, as many digital solutions rely on homebuyers sharing their online banking credentials, some homebuyers may distrust the security of digital solutions and prefer to engage in a paper-based process.

These insights from Sprinters emphasize the ongoing necessity to bolster trust among homebuyers and origination staff in a digital mortgage process. These insights also underscore the pervasive issue of data trust as a significant pain point within the mortgage ecosystem.

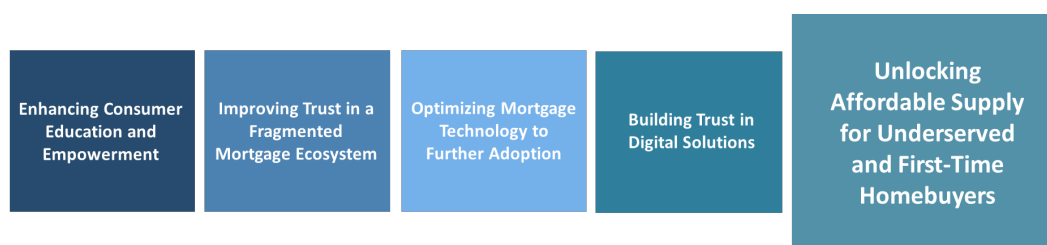
**Figure 5: Building Trust in Digital Solutions –
Sprinter Observations on Challenges and Potential Solution Features**

Sprinter observations on current challenges	Sprinter observations on desirable solution features
While lenders may have invested in third-party services and other technology solutions to automate the verification of mortgage data, many origination staff members (such as loan officers, TPO brokers, and underwriters) may still prefer a paper-based process and forego the use of these solutions.	<ul style="list-style-type: none">Automated verification solutions that deliver a greater frequency of success when verifying homebuyer income, assets, and employment from direct sources, minimizing the likelihood that lenders will need to go back to a homebuyer for financial documentation.Automated verification solutions that provide a secure means of, with the homebuyer’s permission, accessing a homebuyer’s financial information from direct sources, thereby enhancing homebuyer trust in a digital mortgage process and a lender’s interaction with a homebuyer. This was identified by Sprinters as a potential use case for API token-based authentication or for the use of DLT.Solutions that increase a lender’s operational capacity and which may feature integrations with lender point-of-sale and loan origination systems and provide for portfolio-level rather than transaction-level search capabilities.
Origination staff may prefer to ask a homebuyer for paper or PDF copies of their financial information in an effort to simplify their engagement with the homebuyer throughout the origination process. During the origination process, new information uncovered about a homebuyer’s financial situation may affect the best loan option for the homebuyer which, in turn, may affect the information required from the homebuyer.	
Automated verification services often rely on prospective homebuyers sharing their online banking credentials. Some homebuyers may distrust the security of these services and prefer to engage in a paper-based process.	

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Sprinter observations on current challenges	Sprinter observations on desirable solution features
Mortgage lenders and other stakeholders may face regulatory, internal, and investor expectations for verifying the authenticity and accuracy of mortgage data, even when that data was previously verified earlier in the loan lifecycle. Given this challenge, some mortgage ecosystem stakeholders place greater trust in paper documents over digitized mortgage data.	(See page 16 for associated observations)

E. Theme 5: Unlocking Affordable Supply for Underserved and First-Time Homebuyers



The United States is contending with a shortage of affordable housing supply, which has been influenced by a combination of factors, including rising demand, increasing costs, and shifting demographic trends. Following the Financial Crisis of 2008, housing construction has not met the growing demand, especially in the face of demographic shifts that have increased the number of consumers seeking homes.¹⁸ These trends have led to a supply-demand imbalance, with robust demand driving up housing prices and exacerbating affordability issues.¹⁹ The COVID-19 pandemic further complicated this situation, as low interest rates—while initially boosting home buying and refinancing activities—ultimately contributed to a significant rise in home prices, outpacing income growth.²⁰ While the affordability challenges are pronounced in high-cost

¹⁸ Kevin Kliesen, Federal Reserve Bank of St. Louis, *Peaks in Housing Construction as a Recession Signal* (September 2022) and Robert Dietz, National Association of Homebuilders, *A Decade of Home Building: The Long Recovery of the 2010s* (January 2020).

¹⁹ See Federal Reserve Bank of Atlanta, *Low Interest Rates, Inventories Affect Housing Affordability* (March 2021) and Federal Reserve Bank of Atlanta, *Home Ownership Affordability Declines by Record Levels* (July 2022).

²⁰ Katherine Schaeffer, Pew Research Center, *Key Facts About Housing Affordability in the U.S.* (March 2022).

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metropolitan areas, the shortage of affordable housing supply is a nationwide issue, affecting even regions that were historically considered more affordable.²¹

Estimates indicate that the country needs an additional four to five million homes to meet the current demands of the housing market.²² Of particular concern is the shortage of affordable homes tailored to lower- and middle-income buyers, which exacerbates the difficulties faced by underserved and first-time homebuyers in finding suitable properties. Considering this shortage of affordable housing, some Sprinters concentrated their efforts on optimizing the utilization of existing housing stock that remains underutilized due to inadequate investment or disrepair. Research indicates that there are over nine million homes in the United States requiring investment to address deficiencies or connect to essential utilities.²³

Sprinters recognized the necessity for tools capable of unlocking these underutilized yet affordable homes for underserved and first-time homebuyers. Their proposals involved offering these buyers a first opportunity to purchase such homes (including REO properties) before other investors and providing these buyers a centralized platform equipped with educational resources to assist them in identifying and renovating suitable properties.

Figure 6: Unlocking Affordable Supply for Underserved and First-Time Homebuyers – Sprinter Observations on Challenges and Potential Solution Features

Sprinter observations on current challenges	Sprinter observations on desirable solution features
Affordable homes are in short supply for homebuyers, particularly underserved and first-time buyers. However, many prospective homebuyers may not be fully informed about or capitalize on the chance to acquire underutilized yet affordable homes that require investment or renovation.	<ul style="list-style-type: none">Program enhancements and tools that offer underserved and first-time homebuyers an initial chance to buy affordable homes in need of investment or renovation before making them available to other investors, such as institutional investors, after a certain period.

²¹ See Federal Reserve Bank of Atlanta, *Low Interest Rates, Inventories Affect Housing Affordability* (March 2021), Federal Reserve Bank of Atlanta, *Home Ownership Affordability Declines by Record Levels* (July 2022), and Katherine Schaeffer, Pew Research Center, *Key Facts About Housing Affordability in the U.S.* (March 2022).

²² Congressional Research Service, *The U.S. Housing Underbuilding Gap* (July 2023).

²³ Joint Center for Housing Studies of Harvard University, *The State of Housing 2023* (June 2023).

FHFA's Velocity TechSprint: An Analysis of Key Themes

Sprinter observations on current challenges	Sprinter observations on desirable solution features
Prospective homebuyers might not have the necessary educational resources or connections with potential contractors to efficiently assess home renovation costs, leading to lost opportunities for affordable home purchases.	<ul style="list-style-type: none">Tools that provide prospective homebuyers with supporting educational resources and connections with potential contractor resources to efficiently assess the cost and better utilize homes in need of renovation.
Prospective homebuyers could gain an advantage by having an initial opportunity to explore REO properties, which are often more affordable.	

4. Next Steps

The Velocity TechSprint has offered valuable insights into the challenges and opportunities associated with enhancing the adoption of data digitization and technology in mortgage originations. In presenting this thematic summary, FHFA's primary aim is to offer readers an understanding of the insights that were uncovered through the TechSprint, including stakeholder feedback on the key avenues through which technology and data can be harnessed to enhance mortgage origination processes. Ultimately, the Agency's goal is to provide a foundation for a future mortgage ecosystem that is not only more efficient but also marked by enhanced transparency and accessibility.

FHFA is committed to sustaining its engagement with mortgage ecosystem stakeholders on responsible innovation, and this commitment extends beyond the publication of this thematic summary. FHFA will continue its engagement with stakeholders through external outreach and active participation in industry forums to refine our understanding of these TechSprint themes and explore potential pathways toward addressing them. Through this ongoing dialogue and collaboration, FHFA aims to identify concrete ways in which the Agency can contribute to addressing the challenges and opportunities outlined in the TechSprint, ultimately fostering positive change in the mortgage ecosystem.

Please visit FHFA's [Financial Technology](#) web page or contact us at fintech@fhfa.gov for more information about the Velocity TechSprint and other activities undertaken by FHFA to advance responsible innovation in the mortgage ecosystem.