



VICHARA
TECHNOLOGIES



FINTECH IN HOUSING FINANCE

Request for Information Response 10/31/2022

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Vichara Technologies, Inc.

response to

FHFA – Fintech in Housing RFI

Vichara is a proven capital markets technology specialist with experience designing, implementing & customizing enterprise systems for securities trading, portfolio management, asset securitization, risk management, e-finance, and financial operations. We bridge the knowledge gap between technology and capital markets to develop robust financial systems that give our clients a competitive advantage. Leading securities dealers, investment managers, banks, consumer finance, and financial services companies use our highly quantitative and enterprise risk management systems.

The mortgage industry is complex and must be regulated to protect consumers while ensuring the market's stability. FHFA is the primary regulator of the mortgage industry. Risk management and compliance functions are the most promising areas for regtech. Relying on self-reporting by lenders to verify compliance with risk management activities and regulatory requirements is not sustainable. It leaves borrowers at risk of being taken advantage of by lenders, and unregulated products and firms put the entire industry's stability at risk. Vichara can help FHFA solve these problems with innovative solutions to track enterprise risk management and independently verify compliance with regulations.

We apply technology to automate and increase the efficiency and effectiveness of compliance and regulatory processes. Fintech provides opportunities to enhance transparency, consistency, and standardization of operations for the industry. We are primary and secondary mortgage markets experts, and our solutions manage hundreds of billions of dollars in assets.

We welcome and look forward to partnering with FHFA and the newly created Office of Financial Technology.

Highlights of Ideas:

Transferable loans

1. To Buyer

Transferable loans allow the seller of a home to transfer the loan and interest rate to the buyer. The advantage of this type of loan is that it allows the buyer to take on the responsibility of the loan without having to go through the process of applying for a new loan. This can save time and money streamlining the purchase for the buyer.

- Buyer is not able to obtain a traditional loan.
- Buyer has bad credit or is self-employed.
- Buyer can assume the loan without a traditional underwriting process.
- Useful alternative to traditional financing options.

2. Seller keeps the loan

A transferable loan but the seller keeps their loan, and they change the home used as collateral for the loan to their new home.

- Seller can keep their current interest rate and terms
- Speed up the process of buying and selling a home
- Eliminates the need to apply for a new loan

Mortgage Certification Program

Is a program that would help educate borrowers and streamline the mortgage process.

Obtaining a mortgage can be complex and time-consuming, but it doesn't have to be. With the proper certification, you can apply for a loan in minutes and be on your way to owning your dream home.

The Mortgage Certification Program is an online course that provides you with everything you need to know about mortgages. Upon completion of the course, you will take a test to earn your certification. This certificate will demonstrate to lenders that you understand your new mortgage loan and are fully qualified to receive financing.

With the Mortgage Certification Program, you can streamline the loan process and get into your new home faster. Don't worry about dealing with paperwork and appointments - get certified today!

New programs

Several government-sponsored programs could dramatically change the mortgage industry. Similar to trusted traveler programs like Global Entry that require extra screening, documentation, fingerprints, background checks, etc. FHDA could use the framework from similar government programs and expand them to the mortgage industry. Below are some examples.

1. The Trusted Financial Identity- “Trust us- it’s worth it!”

The Trusted Financial Identity program would be a volunteer-based program run by the government. It would require individuals to provide and document additional identifying information with the Federal Housing Finance Agency (FHFA). In exchange, participants have access to an online portal where their financial identity is securely maintained. This would include all assets, liabilities, tax returns, etc., with real-time data.

The Trusted Financial Identity program would allow members to provide lenders temporary access to this information. This information would allow for real-time loan approvals from lenders. Consequently, this innovative program has the potential to redefine the way we think about financial identity. “Trust us – it’s worth it!”

2. Trusted Borrower Program

The Trusted Borrower Program is a new initiative making waves in the financial world. The program promises to revolutionize how loans are approved and processed by tracking the entire history of a person's liabilities and payments for rent, mortgages, credit cards, and cars under one system. This information would then be shared with third parties, such as loan officers and underwriters, to get a complete picture of a person's financial history. The Trusted Borrower Program has the potential to make the mortgage approval process faster and more efficient while also giving borrowers peace of mind that their information is safe and secure.

The Trusted Borrower Program will revolutionize how loans are approved and processed, making borrowing more accessible and seamless.

3. Trusted Property Program

The Trusted Property Program is a new initiative that aims to make the mortgage process easier and faster for everyone involved. Here's how it works: participating properties will undergo periodic inspections and have their maintenance records, insurance claims, and renovations tracked in a central database. This information will be used to generate a "property facts" report that will give lenders an instant and accurate picture of a property's value.

The Trusted Property Program is voluntary, but its many benefits will quickly make it the industry standard. By making the mortgage process easier and more efficient, we can help families realize their dreams of homeownership.

Innovation

Create an active exchange to trade RMBS futures and options

Residential Mortgage-Backed Securities (RMBS)

A critical factor in the 2008 collapse was the poorly regulated market for residential mortgage-backed securities. RMBS is a type of asset-backed security backed by a pool of residential mortgages.

The lack of an active exchange for RMBS futures and options means there is no efficient way to hedge risks associated with these securities. This contributes to the volatility of the RMBS market and makes it more difficult for investors to manage their exposure to this asset class.

An active exchange for RMBS futures and options would provide this market with transparency and liquidity while allowing investor to hedge their exposure.

General Questions on Fintech and Innovation	
Question A.1	How do primary and secondary mortgage market participants define fintech in the housing finance sector? What key factors should be considered?
Question A.2	How could FHFA facilitate adoption of “responsible innovation”?
Question A.3	What factors currently inhibit the adoption of fintech and innovation in the primary and secondary housing finance sector? Are there specific challenges related to privacy laws, industry standards, or current practices?

A.1

Primary

The term 'fintech' is used by various stakeholders in the housing finance sector – from primary mortgage lenders and servicers to vendors like Fannie Mae & Freddie Mac. While there is no one-size-fits-all definition of fintech, a few key factors should be considered when defining fintech in the context of the housing finance sector.

First, fintech should be considered with its impact on the efficiency and effectiveness of the mortgage process. This includes everything from the application and origination to servicing and loss mitigation. Any technology can make borrowing easier and more efficient for borrowers and lenders, including online application and approval platforms and automated underwriting systems.

Second, fintech should be evaluated regarding its potential to improve access to credit for underserved borrowers. This includes borrowers with low or moderate incomes and non-traditional credit profiles. Some fintech companies are developing platforms that allow borrowers to shop for the best mortgage deals from a network of lenders, using data and analytics to lower the cost of title insurance and new home equity products that offer borrowers more choice and flexibility. Fintech is changing how we think about housing finance, and its impact is only beginning to be felt.

Finally, fintech should be considered in terms of its ability to foster innovation in the mortgage industry. This can be done by developing new products and services or using new technologies to improve the overall mortgage experience for everyone involved.

Secondary

Fintech's also play a significant role in the secondary mortgage markets. Secondary mortgage market participants are vital to the overall housing market by providing the capital lenders need to fund new mortgages. Secondary market participants define fintech as the technology used to improve innovation, efficiency, and transparency, starting at securitization to managing all data and analytics of loans and platforms to make better pricing decisions, data models, and risk management. They include blockchain, artificial intelligence, big data, and analytics, leveraging the cloud to compute and store data.

Vichara's Solutions

Vichara's V* (pronounced V-Star) solutions focus on trading analytics, valuation, risk management and portfolio management of various equity & fixed income securities and derivatives, including RMBS, CMBS, CDOs, CLOs, bonds, and whole loans. V* solutions also include products for high performance data management, analysis & modelling associated with these asset classes

Vichara helps clients optimally manage all aspects of proprietary technology development, including analysis, strategy, design, implementation, deployment and maintenance. Vichara also helps clients manage and transform their IT infrastructure through consolidation, integration, automation and virtualization.

Designing, implementing & customizing enterprise systems for securities trading, portfolio management, asset securitization, risk management, e-finance and financial operations. Vichara has special expertise in analyzing structured products such as RMBS, CMBS, CLOs, ABS CDOs, other consumer ABS as well as residential mortgages, commercial mortgages & corporate loan portfolios. Vichara utilizes its risk modeling framework powered by big data management & analysis platform to develop, validate and fine tune risk models using large scale historical data. The analytics framework integrates 3rd party & proprietary models and runs on a high-performance distributed cloud computing environment to analyze large portfolios in a short amount of time.

Our solutions address requirements mandated by regulatory frameworks like Basel, Dodd-Frank and IFRS.

Technology Consulting

Vichara and its principals have helped some of the world's foremost securities dealers, investment managers, and issuers develop technology platforms for trading decision support, portfolio management, risk management, operations, and e-finance. These systems currently manage multi-billion dollar positions and all aspects of risks.

Regulatory Solutions

Vichara leverages its expertise in risk management, financial modeling and big data management to provide highly transparent regulatory solutions.

Vichara, with its business domain and technology expertise, is uniquely placed to help financial firms comply with growing regulatory requirements. We assist our clients overcome quantitative and operational challenges to meet the demands of auditors and regulators for better transparency and increased due diligence

Capital Markets Technology Specialists

Vichara bridges the knowledge gap between technology and the capital markets to develop powerful financial systems that give our clients true competitive advantage. We have deep expertise and experience designing enterprise-class systems and highly quantitative software solutions for some of the world's leading securities dealers, investment managers, banks, consumer finance companies, and financial information service providers.

Vichara does a lot more than just write code. We help our clients assess and document in-house processes and technology, formulate requirements, select technologies and tools, architect computing and development infrastructure, implement best processes for software engineering and systems management, develop and deploy customized enterprise class systems, and significantly enhance the return on their proprietary technology investment.

Developing a large complex software system requires the application of specialized software engineering expertise, disciplined engineering processes, in-depth technical know-how, and solid understanding of the application problem domain. Vichara has tremendous experience engineering and modifying large complex systems.

A.2

Specific steps FHFA could take are:

Establish fintech standards and promote the use of open-source code.

As the regulator of the mortgage industry, the FHFA is in a unique position to encourage the adoption of new technologies that can improve the efficiency and effectiveness of the mortgage process. By establishing standards for fintech innovation, the FHFA can help ensure that new technologies are deployed safely and soundly. Moreover, by making open-source code available, the FHFA can encourage developers to create new applications that can be used by lenders and borrowers alike. In this way, the FHFA can play a vital role in promoting technology to improve the mortgage process.

Develop and release guidance on responsible innovation.

This guidance could include principles for how the agency expects firms to approach innovation and specific examples of innovations that the agency views as being mainly responsible. This

would ensure that firms are aware of the agency's expectations and give them a better sense of what types of innovations are likely to be viewed favorably.

Create internal and external working groups on responsible innovation.

These groups could be tasked with identifying best practices for responsible innovation within the agency and mortgage market participants and promoting and coordinating efforts to adopt these practices. This would ensure that the agency and market participants are taking a coordinated and proactive approach to responsible innovation,

- Identifying barriers to responsible innovation in the housing finance industry and developing recommendations for overcoming those barriers.
- Promoting responsible innovation through outreach and education to industry participants and other stakeholders
- Develop best practices for responsible innovation and encourages industry participants to adopt those practices.
- Monitor trends in responsible innovation and report back to the FHFA on a regular basis.

Establish a Center for Responsible Innovation.

This center could serve as a resource for information and expertise on responsible innovation, both within the agency and for the mortgage industry, more broadly. The center could also provide training and technical assistance on responsible innovation to firms seeking to adopt these practices.

Provide financial incentives for firms to adopt responsible innovation practices.

These incentives could take the form of grants, loans, or other forms of financial assistance. This would encourage firms to invest in responsible innovation practices, as they would have a financial incentive to do so.

Require firms to adopt certain responsible innovation practices.

This could be done through regulation or other means. This would ensure that all firms under the agency's jurisdiction are taking steps to adopt responsible innovation practices and would help to level the playing field for those who are already doing so voluntarily.

A.3

The primary and secondary housing finance system historically has been slow to adapt to change. This inflexibility has long been a hindrance to meaningful innovation in the sector. In recent years fintech investment, popularity, market share and growth has accelerated exponentially.

One of the most significant obstacles to change is the role of government-sponsored enterprises (GSEs) like Fannie Mae and Freddie Mac. These entities were created to promote stability in the housing market, but they need to be faster to adopt new technologies that could make the mortgage process more efficient.

Another factor that inhibits innovation is the lack of standardization in the mortgage industry. Because there are so many different agencies and non-agencies it can be difficult for fintech companies to develop products that work for all borrowers. As a result, many borrowers find themselves stuck with outdated technology when they try to get a mortgage.

Finally, the high cost of entry into the mortgage industry can discourage startups from taking risks on new products and technologies. All these factors and more inhibit the adoption of fintech and innovation in the primary and secondary housing finance sector.

Privacy

The housing finance sector is subject to privacy law challenges. One key challenge is the need for comprehensive federal legislation regulating the sector. Another challenge is the patchwork nature of state laws governing the sector, which can create compliance difficulties for lenders and borrowers alike.

Another privacy law challenge in the housing finance sector is sharing consumer data. In recent years, there has been a growing trend toward sharing consumer data among financial institutions. However, this practice raises several privacy concerns. For example, it may allow institutions to target consumers with marketing messages unrelated to their needs or interests. Additionally, it may lead to the unauthorized disclosure of sensitive information, such as credit scores. As a result, housing finance companies need to develop policies and procedures that protect the privacy of their customers.

The use of new technology is a challenge to privacy laws and the housing finance sector. With the advent of new technology, there are many ways in which financial institutions can collect and use consumer data. For example, many institutions now use social media to collect information about potential borrowers. Additionally, some companies have developed mobile applications that allow consumers to apply for loans directly from their smartphones. While these innovations can provide several benefits, they also raise privacy concerns. These challenges underscore the need for reforms to ensure that consumers' privacy rights are adequately protected in this vital sector of the economy.

Industry Standards

The housing finance sector had remained unchanged for decades, and a lack of innovation has led to many challenges that must be addressed to ensure the industry's long-term viability. While some of these standards are well established, others are still in flux which can pose significant challenges for lenders and borrowers. One key challenge is the need to adapt continually to new regulatory requirements. In addition, there is a growing demand for more transparency and disclosure from lenders, which can take time to achieve given the complex nature of many financial products. Another challenge is the need for more standardized processes and documentation. This is particularly important in loan origination and servicing, where a lack of standardization has led to disparate and incompatible system. Ultimately, the housing finance sector will continue to face technology challenges without mandated industry standards.

Questions on Fintech Opportunities	
Question B.1	What kind of fintech activities have the greatest potential to positively impact the housing finance sector? Describe several situations in which a product or service has been or could be used, the factors considered in determining importance, and associated impacts.
Question B.2	What are the typical time requirements of each process within the mortgage lifecycle? What are the “critical path” activities that drive the mortgage timeline and borrower expense? How could fintech be applied to improve efficiency, reduce costs, reduce time requirements, or facilitate equitable outcomes for borrowers?
Question B.3	What are the typical drivers of repetitive requests to borrowers or reevaluation of underwriting information by the lender in the mortgage process, and what opportunities exist to automate processes?
Question B.4	What are the existing data challenges that most prevent data-driven decision-making in the mortgage lifecycle?
Question B.5	What are the existing regulatory and policy barriers to adopting and implementing fintech within the mortgage lifecycle?

B.1

Fintech Activities that have the greatest potential to impact the housing finance sector positively

Mortgage Lending

They are making the process more efficient and transparent. For example, online platforms that connect borrowers with lenders can help to streamline the application process and provide borrowers with more information about their loan options. Additionally, data and analytics can help lenders better assess risk and identify potential borrowers who may be a good fit for a particular loan product.

Fintech companies are using big data and machine learning to revolutionize the mortgage lending process. By analyzing a borrower's financial history, fintech companies can provide lenders with a much more accurate assessment of creditworthiness than traditional methods. This could lead to more people qualifying for mortgages and lower interest rates for those who qualify.

Home Equity Lending

For example, online platforms that offer home equity loans can provide borrowers with more information about their loan options and help them to compare rates and terms from multiple lenders. Additionally, the use of data and analytics can help lenders to assess risk better and identify potential borrowers who may be a good fit for a particular loan product.

Mortgage Servicing

Making the process more efficient and transparent. For example, online platforms that offer automatic payment options can help to streamline the payment process and reduce the risk of missed payments. Additionally, the use of data and analytics can help servicers to identify potential problems with a loan better and take action to prevent delinquency or foreclosure.

Homebuyer Education

Technology to develop new ways of educating homebuyers about the home-buying process. By providing interactive tools and educational content, fintech companies can help homebuyers feel more confident and knowledgeable when making one of the biggest financial decisions of their lives.

- Online mortgage education programs offered in text, audio, video, interactive, mobile apps, and any combination.
- Education courses can be offered in different languages and tailored to address cultural differences.

Home Maintenance and Repair

Companies are developing apps that allow homeowners to schedule and track home maintenance tasks and connect with service providers. This can help to ensure that homes are well-maintained, and repairs are made promptly, which can help to prevent larger, more costly problems down the road.

Rental Housing

They are developing platforms that make it easier for landlords to screen tenants and collect rent payments. Additionally, some fintech companies are working on solutions allowing renters to build up equity in their rental units, which could eventually lead to them becoming homeowners.

Blockchain

The use of blockchain technology. Blockchain is a distributed database that allows for secure, transparent, and tamper-proof transactions. The use of blockchain in the housing finance space could revolutionize the way that mortgages are originated, serviced, and sold.

Artificial intelligence (AI)

AI can be used for a variety of tasks in the mortgage process, including fraud detection, underwriting, and loan servicing. AI can make the mortgage process faster, easier, and more efficient for borrowers and lenders.

Big data and analytics

Big data can be used better to understand borrower behavior and trends in the housing market. This information can then be used to make better-informed decisions about pricing, product offerings, and risk management.

Peer-to-peer lending

Peer-to-peer lending platforms connect borrowers with investors willing to fund their loans. This lending can provide borrowers access to the capital they may not otherwise have access. Additionally, peer-to-peer lending platforms typically have lower costs than traditional lenders, making borrowing more affordable for borrowers.

B.2

The mortgage life cycle can last as long as 30 years. The mortgage approval to closing process can take 45-60 days but, in many cases, longer.

1. Mortgage Application

The mortgage application is the first step in the mortgage life cycle. This is when the borrower submits their financial information to the lender for approval. Depending on the lender and borrower, the process can take anywhere from a few days to a few weeks.

2. Mortgage Approval

Once the lender has received and reviewed the borrower's financial information, they will either approve or deny the loan. If the loan is approved, the borrower will receive a conditional commitment letter outlining the loan terms. The approval process can take anywhere from a few days to a few weeks.

3. Mortgage Commitment

A mortgage commitment is a formal agreement between the lender and borrower that outlines the loan's terms. This is typically issued once the borrower's financial information has been verified and all loan conditions have been met. The commitment process can take anywhere from a few days to a few weeks.

4. Mortgage Closing

The mortgage closing is when all of the paperwork associated with the loan is signed and finalized. This includes the mortgage note, deed of trust, and other documents related to the loan. The closing process can take anywhere from a few days to a few weeks.

5. Mortgage Funding

Mortgage funding is when the lender gives the borrower the funds for the loan. This typically happens on the closing day but can sometimes happen a few days afterward. Once funded, the borrower will begin making monthly payments on their loan.

6. Mortgage Servicing

Mortgage servicing is when the lender manages the loan on behalf of the borrower. This includes collecting monthly payments, managing escrow accounts, and handling customer service inquiries. Mortgage servicing can last for as long as an outstanding loan balance.

7. Mortgage Payoff

The mortgage payoff is when the borrower pays their outstanding balance in full and owns their home outright. This can happen at any time during the life of the loan but typically happens when the borrower sells their home or refinances their mortgage.

Critical Paths

Appraisal

The first critical path activity is the appraisal, which the lender orders to assess the property's value. The appraised value is used to determine the loan-to-value ratio, which is used to calculate the down payment and loan amount. The appraisal typically takes 1-2 weeks to complete.

Loan Application

The second critical path activity is the loan application, which is completed by the borrower and submitted to the lender. The loan application includes the borrower's employment history, income, debts, and assets. The lender uses this information to determine whether the borrower qualifies for a loan.

Loan Approval

The third critical path activity is loan approval, which the lender grants after reviewing the loan application and other documentation during the underwriting process. Lenders use a variety of criteria to assess risk, including credit score, employment history, and debt-to-income ratio. Once a loan is approved, the borrower will be given a loan estimate, which outlines the loan terms. Loan underwriting typically takes one to two weeks to complete.

Mortgage Insurance

The fourth critical path activity is mortgage insurance, which is required if the down payment is less than 20% of the home's purchase price. Mortgage insurance protects the lender in case of default and typically adds 0.5-1% to the borrower's monthly mortgage payment.

Home Inspection

The fifth critical path activity is a home inspection, which the borrower orders to assess the property's condition. The home inspector will look for any major defects or problems that could affect the property's value. The home inspection typically costs \$300-\$500 and takes 1-2 days to complete.

Closing

The sixth and final critical path activity is closing when all of the paperwork associated with the loan is signed and finalized. Closing typically takes 30-60 days after loan approval and takes 1-2 hours to complete.

Post-Closing

After closing, borrowers are responsible for making their monthly mortgage payments on time and keeping their property insurance up to date. Borrowers who fail to make their payments on time or allow their property insurance to lapse may be subject to foreclosure.

Efficiency

Fintech is revolutionizing the mortgage industry. By automating repetitive tasks and using data analytics to identify risk, fintech is making the mortgage loan process more efficient for borrowers and lenders. One way that fintech could improve the housing mortgage loan process is by streamlining the application process. For example, fintech could automatically verify income and employment information. This would not only save time for borrowers, but it would also reduce the likelihood of errors. In addition, fintech could be used to verify property information and appraisals. This would ensure that borrowers get the best deal on their mortgage loan. Ultimately, fintech has the potential to make the entire mortgage loan process more efficient for everyone involved.

For example, borrowers could use an online application to submit their information directly to lenders. This would reduce the need for paper documents and eliminate the need to schedule in-person meetings. In addition, fintech could be used to verify borrower information more quickly and securely. This would speed up the lender's decision-making process and help ensure that borrowers get the best possible terms.

Fintech can help

- Improve the loan process by reducing the time it takes to close a loan.
- Streamline the home mortgage loan process by automating various tasks, repetitive workflows, and efficient ways to collect and track borrower information
- Streamline and improve communication between lenders and borrowers.
- Reduce the amount of paperwork involved in the home mortgage loan process.
- Speed up the home mortgage loan approval process by providing instant access to loan decision tools.
- Make it easier for borrowers to compare different home mortgage loans.

- Provide borrowers with more personalized service.
- Improve the accuracy of loan underwriting by providing access to more data and analytics to make better decisions
- Reduce the cost of the home mortgage loan process by providing a more efficient way to connect borrowers with lenders.
- Improve the overall experience of the home mortgage loan process by providing a more user-friendly interface for borrowers and lenders.
- Promote transparency in the home mortgage loan process by providing a more open and accessible platform for sharing information between borrowers and lenders.
- The home mortgage loan process can be improved by streamlining communication between lenders and borrowers.

B.3

The typical driver of repetitive requests to borrowers is time. The current process is often full of delays but it's typical to takes months to complete. Because the data first collected is static and a snapshot that applies to the specific date captured, many key data points must be updated and verified again just before closing.

Lenders and borrowers also face mortgage interest rate risk since it could take months to close. Most lenders will lock in rates for a set period, but if the loan takes longer to underwrite or the closing is delayed, the rate will most likely change. The only way to lock in an interest rate past the standard period is to pay points, adding another cost for the borrower.

Information that is provided more than once during the current loan process:

- Employment status
- Employment payroll statements
- Bank and investment account balances
- Any large dollar deposits/withdrawals of financial accounts
- Creditworthiness
- Interest rates
- Tax returns
- Changes and increase in liabilities

Automate the Entire Process

The borrower should be removed from this process as much as possible. With fintech and industry standardization the entire process can be automated. Access to documents and records needed for underwriting can be automated and facilitated by the borrower signing agreements allowing information to be gathered quickly.

Some companies offer services that link financial accounts through an app. Temporary access to the app can be granted to third parties allowing data to easily be shared.

B.4

The data challenges that prevent data-driven decision-making in the mortgage lifecycle

Lack of:

Data Standardization

Mortgage data is collected from various sources, including borrowers, lenders, real estate agents, and title companies. This data is often stored in different formats, making it difficult to compare and analyze.

Data Quality

Mortgage data is often inaccurate or incomplete, which can lead to incorrect decisions being made.

Data Integration

Mortgage data is often siloed, which is not easily accessible or shareable between different departments or organizations. This makes it difficult to get a complete picture of the mortgage process and make informed decisions.

Data Governance

Data governance is the process by which organizations ensure that their data is accurate, consistent, and compliant with regulations. Organizations need proper data governance to make decisions based on correct or outdated information.

Data Analytics

Data analytics is the process of analyzing data to extract insights that can be used to make better decisions. Organizations risk making suboptimal decisions based on their data without proper data analytics.

Data Literacy

Data literacy is reading, understanding, and using data effectively. Without proper data literacy, individuals within an organization are at risk of being unable to understand or use the organization's data effectively, leading to suboptimal decisions.

Transparency

Mortgage lenders must disclose certain information to borrowers under federal law; however, they are not required to share all information with borrowers or other interested parties. This lack of transparency makes it difficult for borrowers to make informed decisions about their mortgages and for others to hold lenders accountable for their actions.

Access

Although there are numerous public sources of mortgage data, such as Freddie Mac and Fannie Mae, these sources are not always accessible or easy to use. Additionally, many private companies that collect mortgage data do not make this information publicly available. As a result, it can be difficult for interested parties to obtain the data they need to make informed decisions about mortgages.

B.5

Regulatory and Policy Barriers to Adopting and Implementing Fintech

Lack of awareness

One of the primary regulatory and policy barriers to adopting fintech in the mortgage lifecycle is the need for more awareness. Many lenders and borrowers need to be made aware of the potential benefits of fintech, which can make it difficult to justify the investment. Additionally, many regulators and policymakers must be aware of fintech and its potential applications in the mortgage industry.

Fragmented market

A barrier to adopting fintech in the mortgage lifecycle is the fragmented nature of the market. The mortgage industry comprises many players, including lenders, servicers, investors, and insurers. This fragmentation makes it difficult to develop a unified approach to adopting fintech across the entire industry. There is no one-size-fits-all solution, making it difficult for lenders and borrowers to find a solution that meets their specific needs. Additionally, there are no agreed-upon set of fintech solutions standards, making it difficult for lenders and borrowers to compare different solutions.

Financial Stability

Fintech creates new risks that could threaten financial stability. For example, the potential for cyberattacks or the misuse of data and the potential for disruptive innovations to upend traditional financial institutions.

Data Privacy Regulations

Mortgage data is often siloed within individual institutions, making it difficult to develop comprehensive solutions. Data privacy regulations make sharing data between agencies and companies difficult, further hindering innovation.

Cybersecurity and Privacy

As with any technology, there is always a risk that hackers could target a fintech solution and access sensitive data. Many people are concerned that using fintech could put their personal information at risk. Additionally, there are concerns that lenders may use fintech to deny loan applications or discriminate against certain borrowers unfairly. Some policymakers may worry that consumers will not be adequately protected if they use fintech products or services. Additionally, they may worry that consumers will not have adequate protections if something goes wrong with a fintech product or service.

Regulatory Uncertainty

The mortgage industry is heavily regulated, and regulations are constantly changing by various agencies, making it difficult for companies to keep up with the latest requirements. This uncertainty makes lenders and borrowers hesitant to invest in or use fintech solutions because they could be obsolete tomorrow. There must be a clear regulatory framework for fintech companies operating in the mortgage space.

High Costs

Fintech solutions often require a significant upfront investment, which can be a deterrent and prohibitive for many companies. Many fintech solutions are still in the early stages of development and are thus relatively expensive. Many government agencies are already stretched thin and need more resources to invest in new technologies. Lenders and borrowers may be unwilling to invest in these solutions due to the high costs. Additionally, some established companies charge high fees for access to their platforms or licensing their technology.

Organization / Cultural resistance

Many industries are resistant to change and are reluctant to adopt new technologies that could disrupt existing business models.

Understanding

Many people do not understand how fintech works or how it can be used to improve the mortgage process. This lack of understanding can make it difficult to develop regulations or policies that would promote the use of fintech.

Incentives

Financial incentives for lenders or borrowers to use fintech in the mortgage process would help offset high costs and encourage investment in fintech.

Questions on Equitable Access	
Question C.1	What new fintech tools and techniques are emerging that could further equitable access to mortgage credit and sustainable homeownership? Which offer the most promise? What risks do the new technologies present?
Question C.2	What emerging techniques are available to facilitate or evaluate fintech compliance with fair lending laws? What documentation, archiving, and explain ability requirements are needed to monitor compliance and to facilitate understanding of algorithmic decision-making?
Question C.3	Are there effective ways to identify and reduce the risk of discrimination, whether during development, validation, revision, and/or use fintech models or algorithms? Please provide examples if available.

C.1

New fintech tools and techniques

1. Blockchain

One of the most promising emerging fintech tools for mortgage credit is blockchain. Blockchain is a distributed database that allows for secure, transparent, and tamper-proof transactions. This makes it an ideal platform for streamlining the mortgage application and approval process. Using blockchain could mask all Personal Identifiable Information removing the potential for bias based on name, location, career, etc.

2. Artificial Intelligence

Another emerging fintech tool that holds great promise for mortgage credit is artificial intelligence (AI). AI can automate the underwriting process, making it faster and more efficient. Additionally, AI can be used to identify fraud and other risks associated with mortgage applications, like money laundering. It can also ensure equitable access by removing the human element.

3. Big Data

Big data refers to large data sets that can be analyzed to reveal trends and patterns. Mortgage lenders are using big data to understand borrower behavior better and identify potential risks associated with loans. This same data can be used to verify that lenders are following fair lending laws.

4. Cloud Computing

Cloud computing allows businesses to store and access data and applications remotely via the internet. This can benefit mortgage lenders by allowing them to scale their operations quickly and efficiently. Cloud computing allows the availability of technology platforms without the huge overhead costs of hardware, making it more affordable to smaller lenders and underserved communities.

Risk of new technology

1. Experience

While some new technologies may have been tested in small pilot programs, they have yet to be widely used in the mortgage industry. This lack of experience can lead to problems when these technologies are implemented on a larger scale.

2. Implementation Costs

New technologies can be expensive to purchase and implement, and there is no guarantee that they will be successful. Additionally, if a new technology works differently than intended, it can be very costly to fix.

3. Security & Data

As more and more data are stored electronically, there is an increased risk of data breaches and cyber-attacks. Data breaches can put consumers at risk of identity theft and fraud. They also damage a company's reputation and lead to financial losses. New technologies may create new opportunities for fraud.

4. Operational

If a new technology fails or does not work as intended, it could disrupt the mortgage process and cause delays or errors. Additionally, new technologies may require additional training for staff members, which can also lead to disruptions.

5. Reputational

If a new technology fails or causes problems, it could damage the company's or institution's reputation. Additionally, customers may take their business elsewhere if they are not satisfied with the new technology.

6. Compliance

Compliance risks arise when companies fail to comply with laws and regulations about handling sensitive data. It may be more challenging to monitor new technology for compliance if the agency tasked with that does not understand the technology. Non-compliance with these laws and regulations can result in hefty fines and penalties.

C.2

Fintech Compliance with Fair Lending Laws

The following emerging techniques can be used to evaluate fintech compliance with fair lending laws.

1. Use of Big Data and Data Mining

Data mining of Big Data is the process of extracting information from large data sets. It can be used to identify patterns and trends in data, which can then be used to make predictions about future behavior. Data mining can be used to evaluate compliance with fair lending laws by identifying patterns in loan data that may indicate discrimination.

2. Use of Machine Learning & Fair Lending Models

Machine learning is a type of artificial intelligence that allows computers to learn from data without being explicitly programmed. Machine learning models can be developed to identify fair lending risks. Fair lending models are mathematical models used to evaluate compliance with fair lending laws and identify potential improvement areas.

3. Natural Language Processing

Natural language processing is a type of artificial intelligence that deals with the interpretation and understanding of human language. It can be used to evaluate compliance with fair lending laws by identifying patterns in loan documents that may indicate discrimination.

4. Use of Data Visualization

Another emerging technology that can be used to facilitate fintech compliance with fair lending laws is the use of data visualization. Data visualization is a way of representing data in a graphical or pictorial format. Visualizing data can make identifying potential fair lending risks easier to see.

5. Implementation of Compliance Management Systems

Compliance management systems help organizations manage their compliance with regulatory requirements, including fair lending laws.

6. Regression Analysis

Regression analysis is a statistical technique that can identify relationships between different variables. This technique can be used to evaluate whether fintech products and services are having a disparate impact on certain groups of people.

7. Predictive Analytics

Predictive analytics is a type of data analysis that uses statistical techniques to predict future events. This technique can identify potential compliance issues by looking for patterns indicating discrimination.

8. Support Vector Machines

Support vector machines are machine learning algorithms that can be used to identify patterns in data. This technique can be used to evaluate compliance with fair lending laws.

Documentation

1. A clear and concise explanation of the algorithm

When presenting an algorithm, it is important to provide a clear and concise explanation of how it works. This explanation should be aimed at those who are not experts in the field, as they are the ones who are most likely to be impacted by the algorithm. The explanation should include a description of the input data, the steps involved in the algorithm, and the output data.

2. A description of the assumptions made by the algorithm

It is also important to describe the assumptions made by the algorithm. These assumptions can significantly impact the algorithm's results, so it is important that they be made clear to those using the algorithm. For example, if an algorithm assumes that all data points are independent, it can only accurately process independent data.

3. A description of how the algorithm handles missing data

Another important consideration is how the algorithm handles missing data. Sometimes, an algorithm may ignore missing data points and continue processing the rest. In other cases, an algorithm may use imputation to replace missing data points with estimated values. It is important to ensure that those using the algorithm know how it handles missing data, as this can impact the results.

4. A description of how the algorithm handles outliers

Outliers are another important consideration when presenting an algorithm. An outlier is a data point that is significantly different from the rest of the data. In some cases, an outlier can be caused by errors in the data collection process. In other cases, an outlier may represent a true difference in the underlying population. It is important to ensure that those using the algorithm know how it handles outliers, as this can impact the results.

5. A description of how the results of the algorithm will be used

Finally, it is important to describe how the algorithm's results will be used. Sometimes, an algorithm may provide information that can be used to make decisions. In other cases, an algorithm may make decisions itself. It is important to ensure that those using the algorithm understand how its results will be used, as this can impact their decision-making process.

Archiving

1. A clear and concise description of the algorithms used

When archiving data related to algorithmic decision-making, it is important to include a clear and concise description of the algorithms used. This description should include information on how the algorithms work and what types of data they are designed to work with. Additionally, the description should explain why the algorithms were chosen for use in the specific application.

2. A detailed explanation of the data used

In order to understand how algorithmic decision-making works, it is also important to have a detailed explanation of the data used. This data should include information on what types of data were used, where they came from, and how it was processed. Additionally, it is helpful to visualize the data, such as charts or graphs, to understand its structure better.

3. A description of the results obtained

When archiving data related to algorithmic decision-making, it is also important to include a description of the results obtained. This description should explain what the algorithms found and how this information was used to make decisions. Additionally, it is helpful to include visualizations of the results, such as charts or graphs, to understand their meaning better.

4. A discussion of any limitations

When archiving data related to algorithmic decision-making, it is also important to discuss any encountered limitations. This discussion should explain what data types might not be suitable for use with the algorithms and why this is the case. Additionally, the discussion should address any other issues during the project.

5. Recommendations for future research

Finally, when archiving data related to algorithmic decision-making, it is also important to include recommendations for future research. These recommendations could involve using different algorithms or different types of data. Additionally, the recommendations could address how the project could be improved or expanded upon in future iterations.

C.3

Identify and reduce the risk of discrimination.

1. Look for Unexplained Variations in Outcomes

Suppose you suspect that a mortgage fintech model or algorithm may be discriminatory. In that case, one of the first things you can do is look for unexplained outcome variations or use predictive analysis to identify patterns. This means looking at the data to see if any patterns cannot be explained by factors such as credit score, income, or location. If you notice any unexplained variations, this could indicate that discrimination is taking place.

2. Big Data, Data Mining, Predictive Analytics

Big data involves analyzing large sets of data to identify trends and patterns. Data mining involves extracting information from large sets of data. Predictive analytics involves using mathematical and statistical techniques to identify patterns in data. This information can then be used to make predictions about future events.

3. Compare Outcomes to Similar Borrowers

Another way to identify discrimination is to compare the outcomes of similar borrowers. For example, if two borrowers have the same credit score and income, but one is denied a loan while the other is approved, this could indicate discrimination. By comparing outcomes, you can look for patterns that may indicate discrimination is taking place.

4. Examine the Data Used to Train the Model

If you have access to the data used to train a mortgage fintech model or algorithm, you can examine this data to see if there are any patterns of discrimination present. This means looking at the data to see if certain groups are disproportionately represented or if there are any other indications that discrimination may be taking place.

Questions on Fintech Risk	
Question D.1	What risks do fintech and fintech firms present to the economy and the financial sector? To the housing finance sector? To FHFA-regulated entities? To counterparties of FHFA-regulated entities and other third parties? To mortgage borrowers and consumers?
Question D.2	What risk management practices do industry participants use to address the risks posed by fintech and innovation in housing finance?
Question D.3	What particular risks to consumer privacy have been associated with fintech? What practices are being used to manage these risks?

D.1

Risk to the economy, financial sector, borrowers, consumers

Fintech and Fintech firms are relatively new and untested. They are not subject to the same regulations as traditional financial firms. They can also be the source of financial fraud, scams, and money laundering and can harm consumer protection and the financial sector if they fail.

Housing Finance Sector

1. Lack of Regulation

One of the biggest risks that fintech firms present to the housing finance sector are the lack of regulation. Fintech firms are not subject to the same regulations as traditional financial institutions, which can make them more prone to fraud and abuse. Additionally, fintech firms often operate in grey areas regarding regulation, which can create uncertainty for both consumers and investors.

2. Lack of Transparency

Another risk that fintech firms present to the housing finance sector are their lack of transparency. Fintech firms are often opaque regarding their business practices and operations, making it difficult for consumers and investors to understand how they work. This lack of transparency can lead to problems, such as when a fintech firm goes out of business or is unable to meet its obligations.

3. Fluctuating Property Values

Another risk that fintech firms present to the housing finance sector are their tendency to fluctuate property values. Fintech firms often use algorithms to determine the value of a property, which can lead to wide swings in prices. These fluctuations can make it difficult for borrowers to get accurate information on the value of their home and may lead them to overpay or underpay for their property.

4. Limited History

Finally, another risk that fintech firms present to the housing finance sector are their limited history. Fintech firms have only been around for a few years, and they have limited data on their performance during an economic downturn or other crisis. This lack of data makes it difficult for investors and consumers to assess the risks that fintech firms pose.

5. Fintech firms may not have the same level of experience as a traditional lender

This lack of experience can pose a risk to the housing finance sector as fintech firms may need help to assess and manage risk properly. This could lead to higher levels of defaults and foreclosures, which would ultimately harm the housing market.

6. The growth of fintech could lead to a consolidation of the housing finance sector.

Consolidating the housing finance sector could lead to fewer choices for consumers and less competition among lenders, leading to higher mortgage rates and other costs associated with borrowing money for a home purchase.

Counterparties

1. Credit Risk

One of the primary risks that fintech firms present to their counterparties is credit risk. Fintech firms typically have high levels of debt, which can make them more likely to default on their obligations if they experience financial difficulties.

2. Liquidity Risk

Fintech firms typically have high debt levels and may also be highly leveraged, making them more susceptible to liquidity problems.

3. Market Risk

Fintech firms may be exposed to market risk if their assets' value declines. Additionally, fintech firms may be more likely to experience financial difficulties if there is a general economic downturn.

4. Operational Risk

Fintech firms may be more susceptible to operational risks due to their reliance on technology and their often-complex business models.

5. Regulatory Risk

Regulatory risk is the risk that a firm will face increased regulatory scrutiny or be subject to new regulations that could adversely affect its business model or financial condition. Fintech firms are often subject to heightened regulatory scrutiny due to their use of innovative technologies and business models.

D.2

Risk Management Practices

1. Develop a clear understanding of the fintech landscape and the risks posed to housing finance.
2. Establish a clear and concise policy of risk management for fintech
3. Implement strong due diligence processes for any fintech products or services being considered for use by the housing finance institution.
4. Monitor fintech developments on an ongoing basis and update risk management policies and procedures as needed.
5. Conduct regular training for staff on fintech risks and how to mitigate them.

D.3

Risk to Consumer Privacy

1. Lack of Data Protection

Fintech firms collect a lot of sensitive data from their users, including financial data, personal information, and transaction history. This data is often stored on servers that are not well-protected, making it vulnerable to hacking and theft.

2. Poor Security Practices

fintech firms need to have adequate security measures to protect their user data. This can lead to data breaches, jeopardizing users' safety and privacy.

3. Lack of Regulation

Unlike traditional financial institutions, fintech firms are not subject to the same regulations. This means they are not required to follow the same rules and guidelines regarding safeguarding user data. As a result, there is a greater risk that user data will be mishandled or misused by fintech firms.

4. Dependence on Technology

Fintech firms also rely heavily on technology, which can sometimes be unreliable.

Practices to Manage Consumer Privacy Risks Include:

- Establish a data governance framework
- Conduct a data risk assessment
- Implement data security controls
- Educate employees on data privacy risks
- Monitor compliance with data privacy regulations

Questions on Regtech

Question E.1

What are the most promising areas for applying technology to regulatory and compliance functions? Please describe opportunities for “regtech” to simplify or improve compliance with FHFA, Enterprise, or FHLBank requirements.

E.1

Promising areas for applying technology to regulatory and compliance functions.

1. Automation of regulatory filings

Timely and accurate submission of reports, as well as reducing the burden on compliance staff.

2. Improved management of data and transparency of compliance risks

Data analytics can be used to identify trends that may represent a risk to the company. Additionally, technology can be used to develop and implement policies and procedures to mitigate risks.

3. Greater efficiency in the conduct of regulatory inspections

Technology can be used to monitor compliance-related activities within the company. This would allow for the identification of potential problems or areas of non-compliance. Additionally, technology can be used to develop systems for auditing compliance-related activities and enforcement.

4. Training and Education

Technology can be used to provide training and education on compliance-related topics. This would ensure that all employees are aware of the company's compliance requirements and could help to prevent potential problems.

Regtech FHFA opportunities

1. Streamlining the Mortgage Origination Process

Regtech can streamline the mortgage origination process by automating the collection and validation of required documentation. This can reduce the time and cost associated with origination while ensuring compliance with FHFA guidelines.

2. Automating Mortgage Servicing

Regtech can also automate the mortgage servicing process, which can help to improve customer service and reduce operational costs. Additionally, automated servicing can help to ensure compliance with FHFA regulations by providing a clear audit trail of all servicing activities.

3. Enhancing Fraud Detection and Prevention

Regtech can also enhance fraud detection and prevention by monitoring loan data for suspicious activity. This can help protect lenders from fraud losses and improve compliance with FHFA guidelines.

4. Improving Data Management and Reporting

Regtech can also improve data management and reporting by providing a centralized platform for storing loan data. This can improve efficiency and accuracy in reporting while also ensuring compliance with FHFA guidelines.

5. Implementing Blockchain Technology

Blockchain technology can create a decentralized ledger of all mortgage data, which can help improve transparency and security while ensuring compliance with FHFA guidelines.

Regtech can help Enterprise and FHLBank:

- FHLBank's Regtech Roadmap
- Simplify and improve their compliance with these regulations.
- Automate their compliance processes.
- Reduce their compliance costs.
- Improve their risk management.
- Their data management.
- Improve their customer service.
- Increase their efficiency.
- Meet their regulatory obligations in a more effective and efficient manner.
- Variety of compliance-related tasks, including customer due diligence, anti-money laundering, and Know Your Customer (KYC) requirements.
- Monitor customer transactions in real-time and flag any suspicious activity for further review.
- Quickly and easily generate the required reports and documentation.
- Compliance Management Systems
- Enterprise Risk Management Systems
- Data Management and Analytics Systems
- Training and Education

Questions on Stakeholder Engagement	
Question F.1	What forms of stakeholder engagement are most effective in facilitating open, timely, and continuous discussion on the challenges and opportunities presented by the application of fintech to housing finance?
Question F.2	What are some topics for a housing finance-focused “tech sprint” and how could FHFA encourage participation?

F.1

Stakeholder Engagement

These changes impact numerous stakeholders and all avenues of engagement should be used.

- Formal gatherings
- Informal gatherings
- Meeting with industry leaders
- Meeting those new to the industry
- Meet those with decades in the industry
- One-on-one discussions
- Group
- Virtual
- Social Media
- Online Surveys
- Run Focus Groups
- Short and long formats. Segmented narrow topics to the entire system
- Those most impacted
- Those that aren't impacted

F.2

Some suggested topics for a housing finance-focused "tech sprint."

1. Develop a mobile app for homebuyers that includes a mortgage calculator and access to current interest rates.
2. Create an online portal for lenders that streamlines government-backed loan applications and underwriting processes.
3. Develop a program that allows borrowers to compare different loan products and select the one that best meets their needs.
4. Create an online tool that helps lenders identify borrowers who may be eligible for government assistance programs.
5. Develop a system that allows borrowers to track their loan progress online and receive updates from their lenders.
6. Implement a fraud detection system that can flag potentially fraudulent activity in loan applications.
7. Create a database of approved contractors to which lenders can refer borrowers for home improvement projects.
8. Develop a program to help lenders identify properties at risk of foreclosure and provide resources to assist borrowers in avoiding foreclosure.
9. Implement a system that allows lenders to submit loan documents to FHFA for review and approval electronically.
10. Establish guidelines for lenders on how to modify loans for borrowers struggling to make their payments.
11. Develop mortgage education programs for various age groups, kids to adults.

How to encourage participation

- Networking opportunity
- Offer education resources to learn something new
- Encourage participants to support your industry
- Incentives like gift cards or swag
- Recognition of those that participate
- Personalized invitations
- Offer a prizes
- Offer food
- Make it convenient
- Keep it small
- Make it fun
- Make it count