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Chapter 3: Digital infrastructure and its influence on streamlining home lending workflows

3.1. Introduction

A rapidly changing world requires the ability to be flexible and adapt quickly. Lenders who want to capitalize on changes and use these changes to grow top-line business or improve their margins will do so with a strong foundational infrastructure poised to take advantage of the digital revolution (Chava & Rani, 2023; Kannan, 2022; Kumar et al., 2025). Origination workflow automation, dynamic product lines, new and expanded channels, better understanding of borrower needs, and the use of pricing intelligence are among the many values that can be realized with the use of a BPM solution. However, most loan processing is predominantly manual in nature. There are a number of reasons why many lenders have not yet automated their operations. These include initial costs, technology that requires a high level of programming expertise, and operational risk.

That's about to change. With the digital explosion, consumers now have access to new channels and devices where simple products are being marketed directly to their needs, and they expect instant delivery (Burugulla, 2022; Challa, 2023; Pamisetty, 2022). As competition increases, lenders will have only price and service to use as a key differentiator. Today's technology allows these lenders, regardless of size, to compete. The use of a process automation solution addresses all the underlying reasons why lenders have not previously adopted automation as part of their operations. Business processes are natively agile, have excellent performance, and have low initial costs. The use of an intelligent BPM offers the ability to adapt when changes are needed by the lender. This text explores what an intelligent BPM technology provides and the levels of value that it enables lenders to generate with their operations to serve borrowers more affordably and effectively.

3.1.1. Purpose and Scope of the Report

The main purpose of this report is to quantify the benefits of the investment in more modern and efficient infrastructure for home lending, focusing on the local development and application of digital infrastructure technologies. The methodology, which includes multiple sources of financial data and analytical tools, as well as cutting-edge industry expertise, is broadly measured using the home loan industry as the benchmark. In spite of these discrete features, the methodology is, however, generally extensible to the broader category of retail credit products—a point that will be made specifically when we survey how other countries compare. While numerous players participate in the home lending pipeline, both at the origination and servicing stages, the analysis focuses primarily on the GSEs and government agencies that largely determine the pace of credit, credit access, and housing development. Finally, the original motivation for conducting this research is the great regulatory interest that the issue has attracted. Under their specific mandate, the GSEs are required to further modernize the infrastructure of housing finance.

Fig 3 . 1 : Understanding the Mechanics of Digital Lending

In doing so, the common goal is to uphold the standard of due diligence and oversight for mortgage finance that was already there in the best practice of those operating in the market in the years prior to the financial crisis. This means helping to ensure, at a minimum, the operational safety and soundness of those entities servicing residential mortgage loans, along with the absolute integrity of the related accounting and reporting standards. It is in this similarly broad context that digital infrastructure services—per standard, highly networked, and secure technologies for the acquisition, handling, retention, and, as necessary, forward dissemination of communications and data—increase in value. As more operations are handled utilizing identical and mutually recognizable workflows by the different entities active in the market, many common sources of "one-off error" or inefficient work results are reduced. Like the regulatory philosophy that is driving this tightening of standards, the key methodologies used to approach and execute a resolution are conceptually similar across multiple lines of advance. These include proactive modernization implementation planning and, as necessary, supervisory directives—online and in a digitally secure environment—employ highly specific and coherent predefined workflows, and at all levels of the project, highly granular, auditable reporting, as well as continuous intra-agency communications.

3.2. Overview of Home Lending Workflows

To establish a clearer understanding of the influence digital infrastructure has on a particular industry, it is important to first pinpoint the critical workflows associated with that specific field or department (Chakilam, 2022; Komaragiri, 2022; Kumar et al., 2025). The main business engagement approach in home lending relies on building a loan file and privately capturing loan information directly responsible for supporting various loan processes. Different actors and systems support the capture of loan data to prepare the loan file, and materials from a multitude of sources and formats must be validated, for example, via copying, manually re-keying loan data, and forensic review of documents. Each replay of work leads to higher costs, increased potential for error, and a longer time to complete tasks. Clearly, a more efficient means of collecting and validating loan data and the work necessary to support loan activities prior to financial close will shorten the time it takes to get a financial commitment and ultimately to close loans.

Guaranteed implementation of a repeatable, high-quality work procedure and underlying workflow skills are necessary for profitable, safe, and responsive loan production (Malempati, 2022; Challa, 2023; Nuka, 2023). It is not always necessary to eliminate specific points of concern that contribute to the efficiency of operations to get the work done, as mortgage banking is privileged with some level of claim due to its particularly

poor work processes. This view is not surprising, as there is no systematically recorded perspective on formal workflow ingrained in loan generation. Questions must be asked, however, that lead to a consideration of built-in bias that questions the naturally occurring entropy of the real world. There should be discipline regarding how knowledge capture and reuse are enabled; how manual data input and inspection can be replaced, or at least supplemented, without decision-making violations of compliance; and whether any human-tasking contract needs to be developed.

3.2.1. Home Lending Process Lifecycle

For lenders, the business outcomes encompass the entire life cycle of a home loan – origination, funding, servicing, and secondary market trading. Secondary market trading sets and influences a big part of the primary market parameters: credit restrictions, availability of capital, mortgage rates, and final loan execution. Loan servicing provides the data on payment history and loan performance by the borrower that is used to indirectly predict future home loan performance post-close. Loans are priced off a historical model of their expected performance through the life cycle of the mortgage. Payoffs from servicing provide cash flow for future investing, once again influencing the parameters of both primary and secondary mortgage markets.

To enable efficient trading, servicing, and secondary market activity, there are differing views on the level of standardization of data owned by both lenders and servicers. When we look at the outcome of servicing issues as cash flow, and that the most profitable use of portfolio cash flow is to redeploy it to generate more cash flow, it is the lenders that would argue for maximizing data standardization. Accurate pricing of residential loan cash flows should result in fair origination pricing, considering all risk factors. Servicing becomes a commodity that can be provided by third-party servicers most efficiently. This specialized skill can be monetized and lent to other small or mid-sized lenders, reducing their fixed cost infrastructure and risk.

3.3. The Role of Digital Infrastructure

The introduction of digital infrastructure across the mortgage and home lending value chain has been observed in the introduction of new technologies such as appraisals-as-a-service, predictive analytics, and cloud hosting. These technologies have the power to streamline home lending workflows and therefore make home lending more efficient, resulting in margin compression. This panel speaks with a set of U.S. infrastructure companies that are leveraging a range of advanced technologies to streamline mortgage origination workflows, resulting in an estimated reduction in the touch points, time, and cost associated with traditional loan processing.

In order to facilitate workflow improvements in home lending, we need to develop new, consistent infrastructure and information-reporting standards that support the exchange and communication of information, proactively communicate potential data capture issues, and specify the use of key algorithms. This is a formidable task that requires an ecosystem of vertical and sphere subject matter experts, financial industry professionals, and technologists. What are the institutional means to move the mortgage finance industry in this direction?

3.3.1. Significance of Robust Digital Infrastructure

In recent years, particularly during the ongoing pandemic, the rapid increase in the use of digital infrastructure has led to a surge in data generation. This data is inclusive of various aspects ranging from e-commerce, banking transactions, digital entertainment, and communication to social media interactions (Pamisetty, 2023; Kumar et al., 2025; Annapareddy, 2022). Digital infrastructure is the underlying technological framework that makes this data collection and dissemination possible. Its significance can be observed across modern consumer-centric digital platforms and even in infrastructure projects like smart cities, implying the role and importance of digital infrastructure in streamlining complex workflows. However, the significance of having a robust digital infrastructure to facilitate and streamline the workflow processes related to a large-value banking sector, like home mortgages, is generally less emphasized, although there is a lot of discussion on the particular process's efficiency.

With the technological advancements of the past few decades, the finance and banking sector has witnessed a noticeable shift from immersive physical operations and paper-based documentation. Today, for a majority of clients that engage with the banking system, it is the digital interface that they possibly interact with exclusively, guided by the bank's document-filing procedures. Features of the digital infrastructure gained motivation from heavy investments by banks and other financial institutions, as it enables customers to obtain a credit offering without entirely satisfying the lengthy list of mandatory preconditions. The usual benefits that one may experience could include around-the-clock accessibility, faster turnaround service, improved information symmetry, and user-friendly facilities, suggesting enhanced financial inclusion. Improved models, along with the broad categories of digital infrastructure—applications, platform, and infrastructure—have lately been able to emulate complex cognitive human processes, providing various bank engagements, like sales, customer service, advice, etc., in turn engaging in value co-creation and offering improved personalization.

3.4. Key Components of Digital Infrastructure

Streamlining Home Lending Workflows

A secure, agile, and scalable digital infrastructure is critical to optimizing the home lending experience. It connects systems, data, and third-party applications to reduce complexity and friction in the process. When designed and implemented effectively, a digital infrastructure provides a clear line of sight into status, bottlenecks, and other important process information. By improving communication, transparency, and access to trusted data sources, it aligns internal and external stakeholders to streamline workflows throughout the lending lifecycle.

While many different components make up a digital infrastructure, there are four key areas that have a particularly broad-reaching influence: application program interfaces, data sanctity, system flexibility, and system access. By addressing these aspects, organizations can rethink burdensome workflows and cultivate a new way of data and technology innovation. They can become more efficient and effective, and most importantly, they can differentiate themselves and solidify a competitive advantage in the evolving marketplace.

3.4.1. Cloud Computing

Cloud computing is a recent technology that enables access to computer system services delivered over the internet. It provides a greater level of computing facilities and performance. It allows consumers and businesses to use applications without installation and access their personal files from any computer with internet access. The commercial availability of a range of industry-compliant and secure systems has made cloud computing feasible for various applications. Cloud computing reduces integration costs for applications across organizations and allows flexible, scalable systems to be developed by enabling applications to run in shared environments and be provided remotely. Cloud computing is a new technology that follows a simple concept, allowing users to execute different types of applications with no need for installations or specific configurations. The applications are centralized and usually run and are stored in remote facilities, which causes a disconnection between the access interface of the application and the true source program.

Every day, more types of documents and applications are being made available in the cloud. Access to these applications is reasonable for individuals and businesses of all sizes. Depending on its dimensions, a company or individual may have the same types of applications in an easy, fast, and reliable way that would otherwise be impossible. The use of this type of technology allows savings of accessible computational resources. This reflects advantages in quantity and time of handling smaller units of processing or

of smaller complexity. It allows the dislocation of computational costs usually related to processing centers, underused hardware, and an inefficient business dynamic.

3.4.2. Data Management Systems

Data management systems are built to not only effectively and securely store and manage data but also to allow teams to access and interpret the data to ensure workflow processes are on track and of high quality. The challenges for home lending institutions include tightly coupled processes and a reliance on manual solutions that depend on data being moved, transformed, and loaded quickly and accurately. The objective of these organizations is to keep complexity concealed from end users by creating uncomplicated user interfaces with minimal vertigo capabilities. However, as data volumes grow and there are opportunities for reusing and recombining data, effective data management systems are needed. This can involve new and innovative data and information strategies, as well as the use of improved technology solutions, with an emphasis placed on data quality, governance, and time-critical decision making.

The reality is, though, to refine the use cases in their pure data forms and enhance the point-of-sale experience and long-term retention of the data produced. The complexities in devising an implementation of a data management system may be associated with elements of the underlying computing infrastructure, such as high-capacity computing, networking, data movement, big data management, new technologies, and protocols to support distributed computing. More importantly, organizations must consider how to make use of larger and more diverse data. These complexities can push user requirements to the limit, which, in memory and storage systems, makes data management systems a verified and reputable buy versus build proposition. One solution provided in today's environment is the model or cloud-based infrastructure to maximize leveraging computing and storage resources.

3.4.3. Digital Communication Tools

Automating the communication process is a critical part of any digital transformation. This level of connectivity across all the stakeholders in the end-to-end lending process is necessary to deliver an end-to-end digital workflow. It's not enough to create an electronic workflow on paper; we need to recognize that internal micro-portals and unified messaging solutions are simply the digital path around information silos. While these improvements reduce the friction in the loan process, a far more meaningful benefit is derived when collaboration—or a digital conversation—happens within a single context. Aggregating those elements that relate to a borrower's essential attributes—documents, data, tasks—enables the lending community to dramatically reduce loan

cycle times. For an industry so focused on the borrower experience, we have not applied a borrower-centric lens to our staff tools and platforms. Initially, building communication directly into systems will drive significant internal efficiencies. Secondarily, a future that leverages these collaboration and unified communication tools will benefit a wide range of stakeholders through more efficient borrower interactions.

Communication services are a layer or a supplement to the primary communication platform, which is the traditional email system. Accessible via a browser or inside a software application, these services enable users to communicate regardless of location or device. Staff can chat, share documents, search for historical communication between working groups, and document discussions related to loans—often in real time. Operating within a shorthand emoji rule set, these conversations are visible to only those who are members of the appropriate teams or communities, and users can be either consumers of information or active participants. Since all commercial software brands support some form of real-time messaging, the question becomes whether communication tools such as these stand separately as niche applications or can be embedded into our systems, creating a single system that can manage the end-to-end workflow.

3.5. Impact of Digital Tools on Efficiency

With the mortgage and home equity lending business having gone digital, people sometimes overlook the role of the digital infrastructure that supports it. Technology transformation in home lending, be it cloud computing, advanced mobile apps, SaaS, RPA, and AI/ML, all require robust and reliable digital infrastructure to support it. Relatively recent improvements in software and digital infrastructure have changed the lending technology landscape, making digital transformation easier, faster, and cheaper. The impact that modern digital infrastructure can bring to a mortgage origination business is substantial and multifaceted.

Software design has always had to concern itself with system reliability, scalability, fault tolerance, and verifiability. When performance is the factor, software is often tweaked or optimized to adjust to transient or steady-state conditions. But when designing a product for a modern cloud environment, where infrastructure components, such as virtualized hardware, cloud-hosted tools, and specialized software, are available on demand in different combinations, distinct decisions would be made in the development process. When servers are virtualized, robustness is provided by ensuring that the set of redundant components like load balancers, edge servers, virtual machines, and edges are capable of running in any virtual data center across a region. That capability is ensured by replicating everything, not just at the scale-out level, but at the data and security level as well.

3.5.1. Automation of Processes

The growth of the internet and technology has provided a platform for reinventing business models. Digital technologies have provided the opportunity for businesses to change the way they operate, often referred to as the transformation of the business model. It offers a wide range of benefits to the industry participants, in terms of customer satisfaction, more business opportunities, lowering operational costs, and improving existing processes. Digitization has become a fundamental enabler of sustainable and scalable growth for countries and their multifaceted economies. Although benefits are evident, the digital future of many economies is far from secure. The digital future becomes increasingly complex with organizations trying to keep up with evolving customer demands and with the emergence of new digitally advanced competitors. Such advances are essential for the economic growth of our nations to stay in step with the rapid changes in the global economy. An additional discussion is presented, namely on the use of digital infrastructure for the automation of business processes. The concept of robotic processes, as well as their advantages in the business context, was presented. It was also shown through case studies the applicability of RPA to streamline workflows in various industries. As technologies advance, businesses need to digitally transform faster to remain successful and relevant. The business world is adopting robotic process automation across almost all industries to automate work processes and streamline workflows. The principle of robotic process automation (RPA) is the governance of automated business processes through the execution of scripts employing various machine and artificial intelligence capabilities. Robotic process automation uses robots or 'bots' to mimic activities a human or application user might perform, such as opening an electronic file or inputting data into a computer application. The use of RPA in business has a host of benefits, which include reducing errors, increasing flexibility, improving compliance, mitigating brute force, making processes faster and more direct, making processes easier for humans, and leaving data in situ for better future process capabilities.

3.5.2. Reduction of Processing Time

The digital trend is relatively constant through time, and as with any technology embraced, it is successful due to its ability to be easily usable by the layman. Where time management becomes relevant in furthering a streamlined experience for the end consumer is in the effects of the digital embrace. The digital transformation of the property finance ecosystem has had a particularly large impact, reducing the processing time of home loans considerably. Traditional paper processes can now be replicated digitally, and through advanced analytics and heritage data, automated loan processing can reduce loan disbursement times from days down to minutes. This substantial

reduction in processing times and loan disbursement capabilities is the end result of the massive amount of lending data institutions hold about their customers, and the effective use of this data to automate lending workflows.

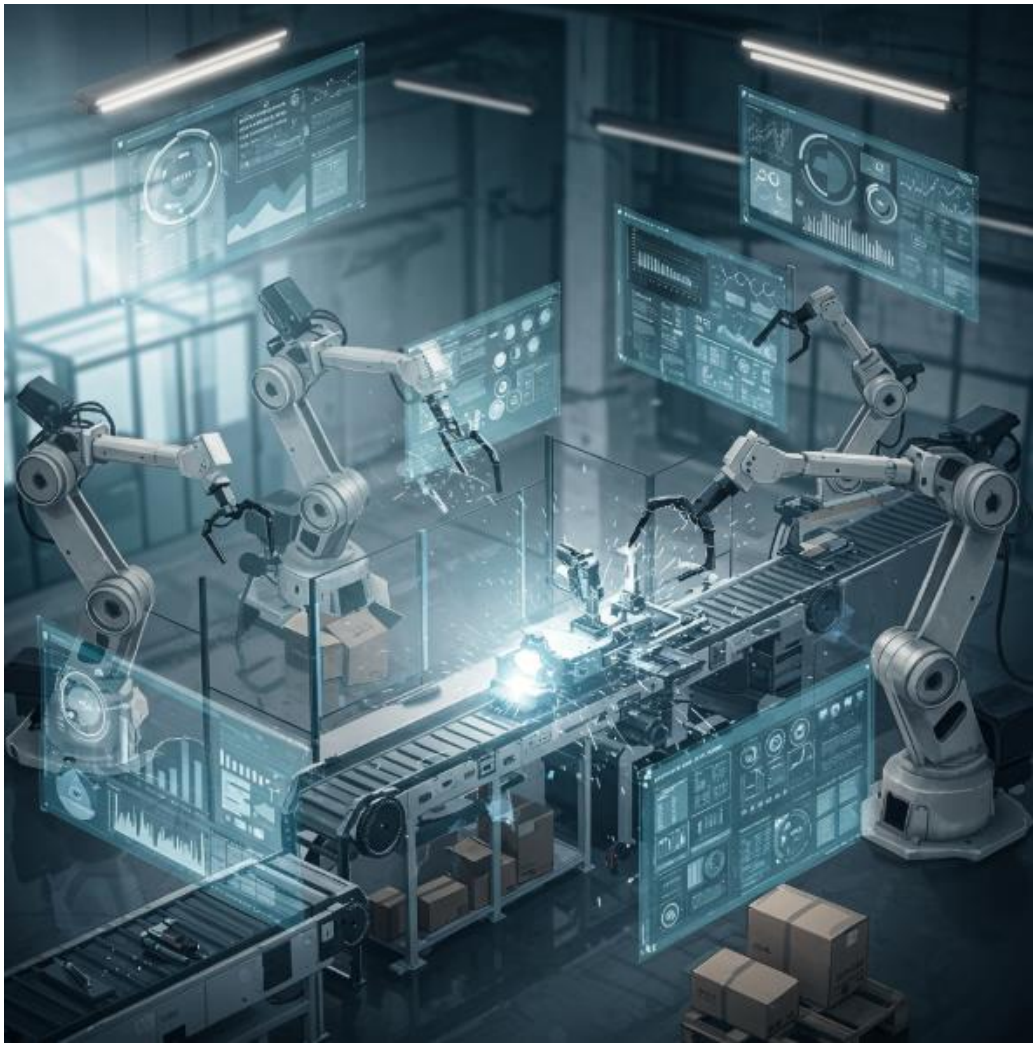

Fig 3 . 2 : Automation of Processes

Despite substantial progress and ongoing digital transformation across numerous parts of the end-to-end home loan process, the challenge facing established institutions is that a significant proportion of the core IT systems and processes supporting home loans across the end-to-end value chain remain aging and inflexible. Cumbersome legacy systems and myriad manual tasks included in the home loan process present a barrier to evolving high-street banks quickly enough to meet evolving customer demands for seamless experiences. Enterprises need to adopt a tested digital approach and modernize

their IT landscape, using scalable, auditable, and fast applicatory practices to minimize process intervention and release capital.

3.6. Challenges in Implementing Digital Infrastructure

Despite easy access to technology and the importance it plays in a competitive marketplace, many lending processes continue to rely on paper-based forms and manual underwriting. In addition to the resistance to change, some reasons for this control include the increased risk of cyberattacks and concerns about privacy and data control. Today, the mortgage lending process requires significant expertise, a person or team who can craft a unique package for each borrower, and who can then submit that package to a number of lenders and negotiate on behalf of the borrower to find a solution that offers the most appropriate cost and also gets approvals. It is a substantial cost for all concerned, and technology has the power to lend itself, provided there is a robust framework of digital infrastructure to help carry out the intricate work for everyone. However, there can also be a substantial cost because traditional banks have a technologically outdated ecosystem. Over time, it has been added by superimposed choice solutions that can interface with the world. The customer, too, receives checks that have the identifying marks of the supplier. These assortments ultimately account for the respective banks. But the cost of maintaining existing levels of infrastructure tends to increase, and banks have been unable or unwilling to invest so much of their main resources in these technology improvements.

3.6.1. Cost Considerations

A study of lender cost structure will be of great interest to those concerned with the ultimate distribution of gains and losses attributable to advances in computer technology. As a general proposition, corporate borrowers are often in a better position to identify productivity-enhancing investments and to capture some of the productivity gains than consumers. Upon making a loan, the lender has some assurance of recouping the basic cost of the loan from the borrower, since the terms of the loan can be structured to permit the lender to share in the productivity gains that the loan generates. It is indeed rare to be able to quantify the full gains the borrower has realized. Even rarer is the situation in which a lender returns some of these unrequited gains to the borrower. Generally, the loan application process is much more labor-intensive than the process used to evaluate an ongoing relationship with a corporate or commercial borrower. The result is that home mortgages are generated, marketed, risk-rated, and priced in a manner quite consistent with the tradition of arm's-length lending. The small unit of information has little control over the organization of their work, the amortization of volumes, or the way the lender

shares the gains from technology improvements. Lenders can acquire a greater degree of contact with their customers when the technology used to manufacture the products advances steadily and information absence decreases because advances in technology can eliminate the intermediaries involved in the production of credit. Advances in computer technology increase the possibility that regulatory restraints will have impeded the proper pricing of credit quality by restricting both the quality of the explicit information provided by borrowers to lenders and the communications facilities that lenders can employ to ascertain creditworthiness. The result, in broad terms, would be a price (and market) distortion that would dissuade safe borrowers from borrowing and encourage a few more marginal borrowers to take credit risks by offering credit to the world at better terms than would prevail in a free market. Advertising and informational barriers to the full and free exchange of credit information have created, wittingly or unwittingly, a specific market inefficiency that justifies a very cautious presumption against regulatory intervention in home lending. Moreover, as some of the analysis suggests, the apparently dispersed inefficiencies that exist in the lending process can best be corrected by the parties that are most directly responsible for them.

3.6.2. Integration with Legacy Systems

The quicker that the digital mortgage implementation can be up and running, the less cumbersome the implementation will be. Systems should be able to easily integrate with previously installed legacy systems, upload data for future use, and seamlessly integrate with departmental systems. In order to fully streamline every mortgage business, it is important for mortgage software to be integrated with the many legacy systems still used in particular businesses. Software vendors with APIs that are integrated into multiple systems are valued. With multiple touchpoints throughout the document lifecycle, smooth integrations permit seamless transitions and assure secure data sharing with multiple lending providers and other stakeholders. Also, configurable API-driven integrations enable customers to take ownership of these connections and develop or expand their integrations. Integration instructions can be customized, including detailed API endpoints. Mortgage technology needs to work with present technology to make it easier for originators to use the resources already at their disposal. It won't be widely embraced if this is not the case. The foundation of success in mortgage service lies at the intersection of electronic methods and transcendent methods. Systems should be able to integrate quickly and easily with previously installed legacy systems, internally upload data for future use, and utilize systems throughout every department.

3.6.3. Data Security Concerns

As we continue to move deeper into a world dominated by AI, ML, and all things digital, concerns regarding data security have come to the forefront. These concerns should not be lightly brushed aside. The amount of sensitive data that is relayed and needed to fully unroll the seamless, all things digital component cannot be overstated. To add more fuel to the security inferno, it is the consensus of most experts that the sharing and use of this data during mortgage workflows will only grow and expand in the coming years. This will be propelled by the increased demand for efficiencies, streamlined processes, and the ongoing reduction of non-digital capability tools. The great paradox here is that progress has shown that our most valuable asset - our home - our very financial future - is now easier than ever for bad players to pilfer. The argument that progress comes with a price is quickly rising to the top of the business podium. As a result, lenders are diligently toeing the line between a borrower's expectation for fast and seamless service and the harsh reality of data breach concerns. It's a line that, due to the proliferation of smart technology, is not easy to traverse. Given the growing concern over this paradox, it is no surprise that nearly 75% of lenders responding to a recent digital mortgage survey noted that security held great weight in determining which vendors to team with and which tech tools to embed.

3.7. Case Studies of Successful Implementation

Digital infrastructure and technologies like blockchain and RPA can contribute to broadening the scope of strategic activity in corporate home lending and streamlining components, like customer experience and data usage, to keep pace with rapidly evolving consumer behavior and expectations. This, in turn, could lead to increases in both revenue and operating efficiency. However, the implementation of those digital technologies is just beginning. A number of challenges remain. We talked to a middle-market commercial bank that successfully deployed RPA in its back office. We also talked to an investment bank that was in the process of implementing RPA. In this case, the technology was being used on the residential side to automate mortgage lending activities.

To understand the potential for RPA and the challenges involved, we will review different cases and the outcomes from this selection of early deployment of RPA case studies. Many assumed that a key benefit of RPA came from headcount reduction, yet few early adopters cited this as a primary driver for investing in RPA, nor did they realize those particular gains. The myth that robots would replace humans was of significant concern to employees close to the process. This belief had been used by one institution as a reason to keep the planned developments under wraps in the earlier stages of deployment. Few, as the results from this study suggest, had realized any direct

headcount saving from their RPA programs. Twelve months after installing or integrating RPA solutions, most were able to confirm the technology's benefits in terms of reducing process errors, improving data management, supporting process governance much more easily, and enhancing employee productivity either by returning time for more productive duties or reducing unproductive workload on key clerical roles. Many were able to show how the technology had enhanced employee morale by removing the frustration created by time-consuming repetitive tasks. The eight case studies presented offered only limited evidence that these technology-enabled improvements automatically led to headcount reductions in teams to maintain the existing output. In some, no staff were made redundant; in others, the new capability had enabled redeployment to other tasks or enabled staff to cover for colleagues who were occupied with compliance-related work. The emphasis on enhanced staff satisfaction and engagement was especially noteworthy. As RPA programs advanced and matured, most of the banks confirmed increased headcounts, indicating rapid growth in certain business areas of those institutions.

3.7.1. Case Study 1: Company A

The goal of this case study was to establish evidence of the impact of investment in digital infrastructure for streamlining mortgage business workflows. Company A is an existing customer that has digitized its entire mortgage lending process. Having gone through an extensive mortgage process redesign in parallel, the company has significantly reduced operating costs and is below current industry averages in growth. We measured the results in three areas: volume growth, operating productivity, and cost effectiveness. As a result, the company has been able to take market share in a high-growth region away from larger incumbents. Additionally, operating productivity gains have allowed it to maintain pricing that offers better margins than what it had before it invested.

With a full systems change, growing from a small to a mid-sized enterprise, and migrating mortgages from a sublicenser servicing model to servicing sales in an economy that has had declining sales volumes, shortening these times was a challenging program to design and a difficult one to execute. The data should show that the company is considerably more competitive than the industry on productivity and should be able to undercut industry pricing and still make better than industry average margins. We know only a few company financials, but we can see that the strategy gains some traction.

3.7.2. Case Study 2: Company B

Background: Company B offers a variety of technology solutions and services, including data analytics, performance management, business process automation, regulatory compliance, and other services for the US government, financial services, insurance, and other industries. Company B used Unity to expose services from Siebel CRM to Autonomy and construct end-to-end workflows for twelve operational and technical processes. These are rule-based and involve human interaction, orchestration, and system integration. The workflows range from document submission by the bank to the performance of risk assessments and obtaining reports. Unity's toolkit and monitoring application were also used to quickly create and edit service descriptions, verify message exchange, and monitor service processing. Application: Company B provides a centralized document submission and tracking system for eleven US banks or their mortgage lending subsidiaries. Each bank may use one or more different document preparation and delivery systems, and each system is capable of creating numerous document types. The bank manually separates and sorts submitted documents, creates cover sheets based on documents received, enters loan information, and scans and uploads documents to Siebel CRM. The ability to simultaneously process documents from multiple sources efficiently and within a reasonable time is foreign to Company B's other workflow software components. Unity's ability to coordinate simultaneous written and human service fully met these requirements. With Unity, Company B has expanded the documents serviced and is in an excellent position to offer additional documents and documents from additional sources in a just-in-time servicing model, quickly supporting emerging banks and growing volumes. After exposure as a business service, Siebel CRM became part of Company B's collection of reusable services.

3.8. Future Trends in Home Lending

Given the changing relaxation of digital banking, what are some things you envision for the long term—perhaps in the next five to ten years—around this space? Machine learning and artificial intelligence are hot topics today and will definitely start to influence the customer experience. Basic rules and processes will be managed via machine learning algorithms. However, AI-powered algorithms are getting better every day, and they are actually learning what they are doing, so they will be able to learn on the job, learn from customers using this technology right now, and feed the machine learning back and forth to maximize the usage of the technology. Of course, within mortgage lending, it is a bit more complex because this is high-risk lending, and both the borrower and the bank need to have some sort of trust that this lending, in a way, is non-discriminatory. The digitalization of banking is not a static process; it will continue. It is a matter of discussion in the market itself because banks today are not only lending

banks. They are partners of people buying and selling houses. They are also concerned with providing services to generate money. Their customer base is their market for the services in new construction, for instance. It is not just: are we going to do mortgages directly? No, we are influencing all of the customers they have to use as partners.

3.8.1. Artificial Intelligence in Lending

The concept of artificial intelligence in lending should be understood to encompass the technologies of artificial intelligence that are actually being deployed by banks, credit unions, and fintech in real-time mortgage lending situations. However, many claim to be using AI but are really deploying business rules. It is the ability of a system to capture business rules embedded in decision-making that provides an interface to support the credit union member or bank customer. Does the system require human intervention before a decision is made? If that is the case, then the system captures business rules that reflect human brains. Understanding the workings of the system, one learns whether they are using AI, human decision-making, or decision-based business rules.

We also observed two types of artificial intelligence claims. There are some lending systems which from A to Z do not use human or paper in every loan, regardless of whether traditional or digital. A second type of system claims to use AI, but it is part of a process that requires both human and paper decisions. If something goes wrong with the second system, they can say AI was still involved, just not perfect. They specifically designed the AI system not to be fully autonomous. All of a sudden, the system captures business rules that were not well understood. The system gave a good decision, but the lender kept a paper trail in case that needed examination. In the event of a loss, the lender wanted a human decision to override the system.

3.8.2. Blockchain Technology

Blockchain technology is used to provide distributed ledger technology and authenticate its transactions. In essence, it is made up of two kinds of data structures: block and chain. The chaining of the blocks serves to create a longer immutable record and verify the sequence of the transactions recorded. Altering any unforgeable intrachain and interconnecting chains requires consensus by the network majority. The combination of these various attributes of the blockchain establishes it as an intrinsically reliable data authority against fraud.

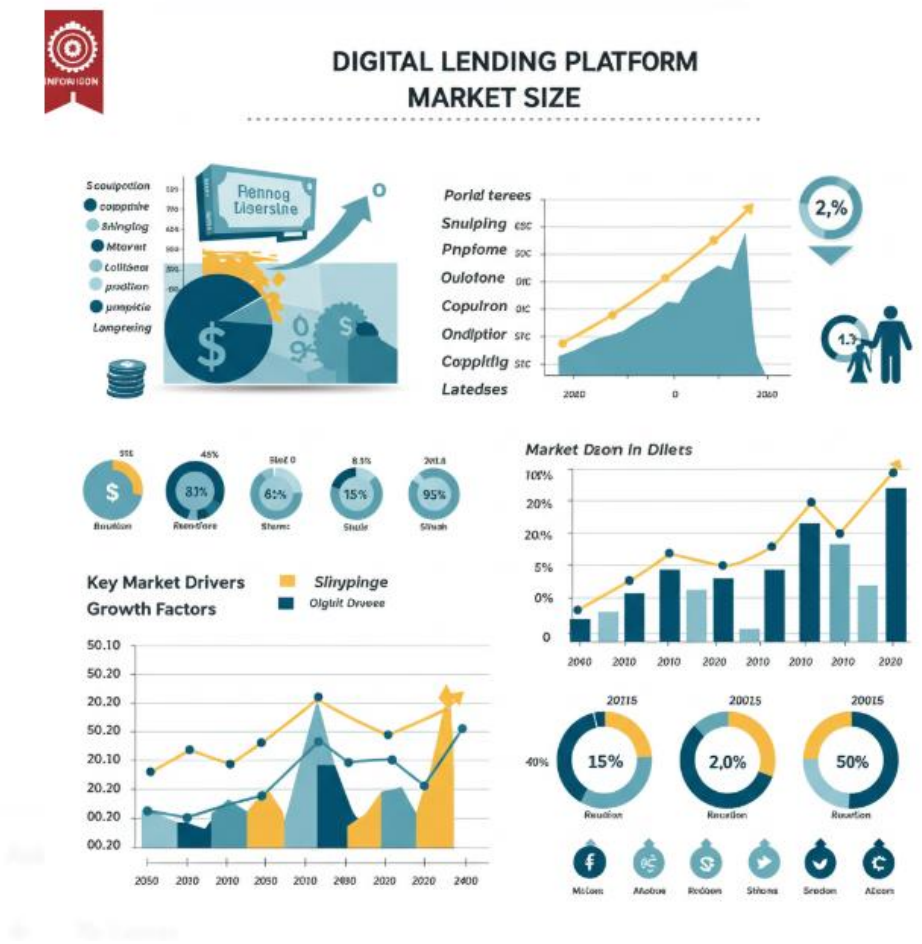

Fig 3 . 3 : Digital Lending Platform Market Size

Bitcoin and Ethereum are the most widely adopted public decentralized blockchain systems. Ethereum was developed for more general projects. Considerations of home lending identities and property/mortgage proofs in home-based lending scenarios proposed through Ethereum are allowed to achieve a balance between a smart contract and Ethereum DApps. Since the autonomous nature of Ethereum is involved, only a limited smart contract can be executed to prevent meeting certain complex real estate transaction requirements. For example, once a loan is approved, ownership rights are enforced to secure mortgage lending more than the loan forbids or does not want them.

3.9. Conclusion

There is much to appreciate in the discussion of digital infrastructure's influence on streamlining home lending workflows. This chapter aims to explore opportunities and challenges on the roadmap to offering loans more efficiently. We argue that blueprints and enablement templates could help by providing other competitors with assistance and options in crafting their loan production processes. On the one hand, better industry automation can allow originators to focus on more customer-centric activities. However, certain implementations of digital infrastructure could be a 'bridge too far' for many consumers. For those who serve homebuying consumers, particular types of services will continue to be in strong demand. Although homebuying consumers continue to be aspirational, a significant percentage expressed a desire to be able to work with a live representative, and a large portion reported wanting total handholding on the home search and home purchase. Consumers who believe the mortgage process is quite or extremely difficult want the most support. Homebuying remains an emotional, disruptive, and staggeringly large personal financial transaction that many consumers would prefer to avoid.

We close the chapter with a brief review of our arguments regarding the direction digital mortgage innovation is likely to take. Businesses in general benefit from focus on core business, customer orientation, and organizational flexibility. In the finance industry, that implies a balance between technology and the personal touch for expecting customers. Boosting origination capacity should reduce the sclerosis that is the growing cost of originating residential single-family loans. Leadership in all companies should consider ways of offering employment opportunities and educational resources that provide a future, enticing career option. The reduction in economic friction is a win for businesses that provide help at any stage of the consumer purchase. More choices, decreased time searching for solutions, simpler means to apply for and secure a mortgage, and expert advice ensure that consumers are less likely to be sidetracked, give up, and live in a smaller or rented home. Informatics solutions need to be developed around these consumers, or the sellers of the solutions may be doomed to fail.

3.9.1. Final Thoughts and Recommendations

In closing, our industry relies upon secure and consistent access to digital infrastructure supported, in part, by critical assets that have been built and opened up to others in accordance with our legislative mission. We invest in our core infrastructure and continue to evolve to meet the needs of our customers and partners in the market. We are always evaluating and learning from others participating in the digital infrastructure space, such as the development of blockchain to support title management, or software developments that better connect us to the borrowers and industry participants in the

loan origination process. No less important, you as market participants should be insisting on high-quality digital infrastructure, effectively delivered at scale to support your needs in the value chain. Leaders should help ensure that, as a community, we are good stewards of the data that we all have access to as an expansion and maturation of the digital infrastructure ecosystem unfolds. We must ensure that such platforms work to preserve privacy and cybersecurity while ensuring clear and consistent standards. The benefits of investing in digitization through improved data might also better help share risk in a streamlined home loan process that is also better supported by technology for an improved experience for customers. We continue to invest in technology to help make home lending faster, easier, and more efficient for our lenders and for the home buyers they serve. In doing so, we help to create a digital foundation to expand economic opportunity for all in housing. That is perhaps the best mission of all.

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