How to Succeed in the Next Mortgage Iteration, 2022-2026

Adapt or Die: The Mortgage Technology Ecosystem Reimaged for the Digital Consumer

The reimaging of the mortgage markets has begun—driven by shrinking margins, rising rates, and inflationary pressures. Yet, for all the actions since 2010 involving data standards, digital transformations, and customer experiences, what is missing? Who will be left standing as the next cycle takes form and the mortgage industry is digitally reimaged?

MBA
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Written for the Annual Convention Nashville, TN

When the mortgage ecosystem is reimagined against digitally innovative models, what should leaders focus on as traditional operating rules are continually called into question?

-- *Mark Dangelo*

Note: the following irepresents the detailed baseline for the summary MBA Annual 2022 conference paper, "**Adapt or Die**: Customers for Life Demand a Comprehensive Digital Experience."

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Traditional Solutions are NOT Tomorrow

An “industry in transition” sounds as ominous as it does hopeful. Today, from the customer to origination to closing to servicing to securitization, the benchmarks and operating processes of what “is” a mortgage has moved away from the loan instruments into an end-to-end realization that the lifecycle of a loan is analogous to a manufacturing supply chain.

And like every supply chain, processes and products will continually change with data, advances in innovation, and shifts in consumer behaviors, which forces continuous transformation into every vendor, verification, investor, and regulator in how they satisfy demands and ensure conformance.

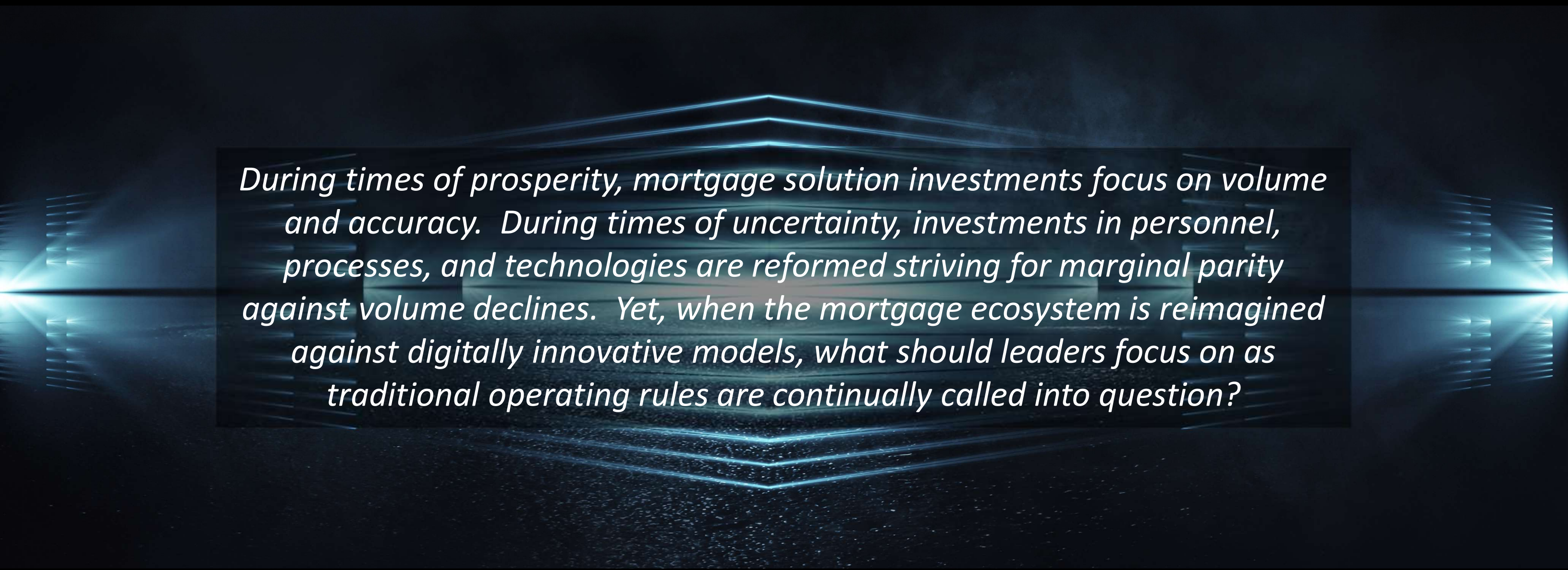
Traditional mortgage industry business-as-usual (BAU) lexicon is characterized by terms and phrases—trust, relationship, expectation, accountability, standards, and security. Increasingly, less familiar future industry BAU will be characterized by terms and capabilities—digital demands, data decentralized, data governance, digital sovereignty, and data stack orchestration.

Whereas the traditional terms and phrases are still applicable, consumers expect the traditional but demand it be delivered as part of how they conduct their lives—as part of a digital mortgage experience or “ecosystem” of solutions.

There are four questions to ask yourself, while challenging your organization:

1. With a decade of implementations surrounding FinTech and RegTech, who will have the cultural courage to adopt and adapt the growing digital demands between siloed products and vendors?
2. How will exploding data requirements and correlations impact customers, loan products, servicing solutions, and secondary markets all wrapped in sophisticated decisioning?
3. Why will consumers seek out bankers who can deliver end-to-end digital solutions with lower costs and shorter timeframes aligned to their digital lifestyles and behaviors—can we deliver?
4. What barriers need to be removed, what processes need to be adjusted, and how can the “manufacturing” of a loan be refocused from the asset core to the consumer for life?

In the beginning when it comes to risks and crisis financial and mortgage markets are like other industries—frequently seeking out a prescriptive model, unique software, or organizational design that mitigates the challenges while offering roadmaps for the future. The focus is on “action,” or doing something that demonstrates to customers and investors leadership has the plan to ensure profitability and survival. But, facing a galaxy of data, changing customers, and unscripted global conditions, will the traditional mindset of movement or copying the competition be enough to chart future viability?



The Ramifications of FinTech and RegTech

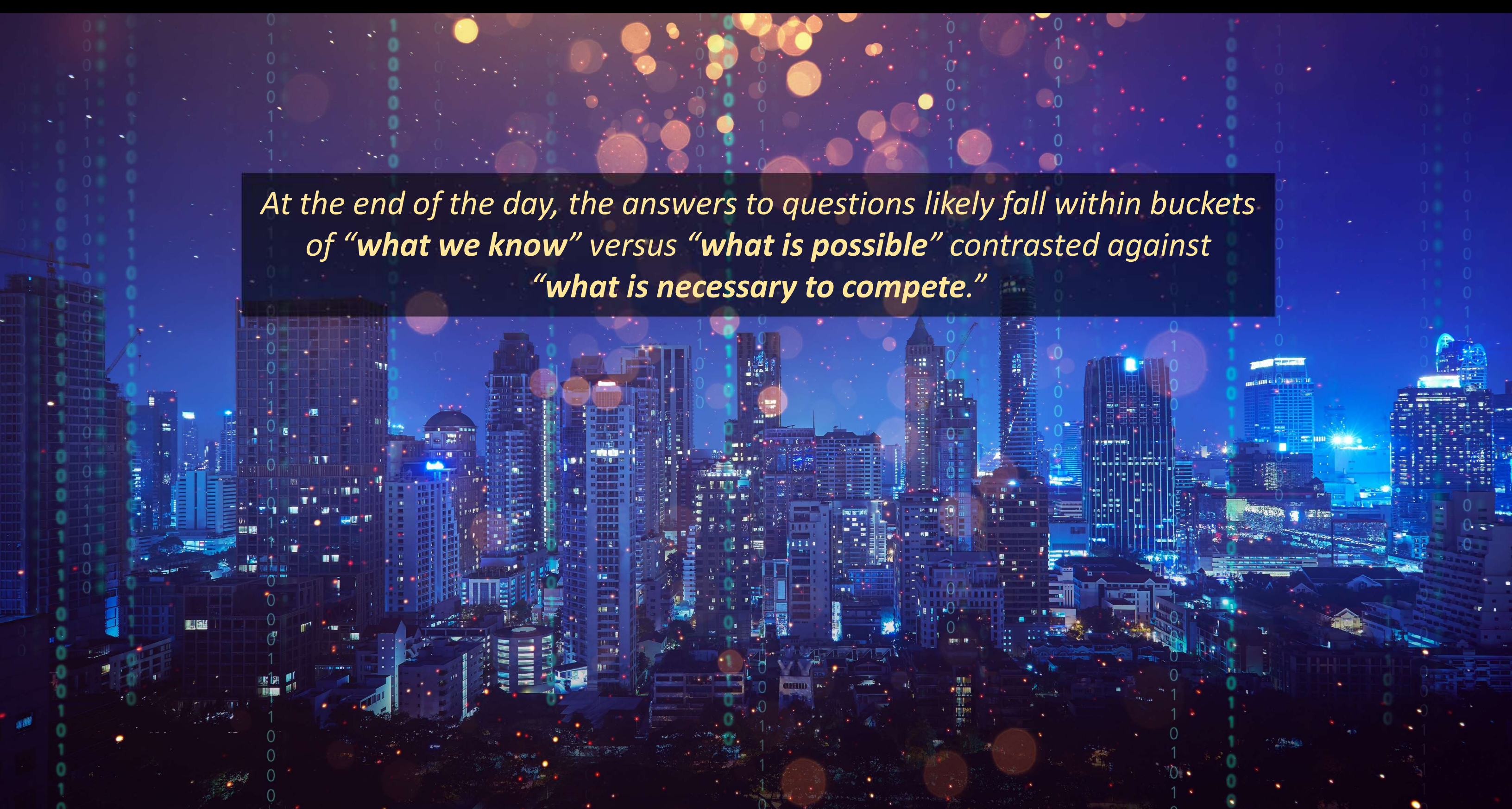
The embrace of digital innovation and automation (as characterized by the proliferation of FinTech and RegTech solutions and investments) was believed to be the path to shorter cycle times and improved quality of offerings. Indeed since 2010, loan quality rose at a time of accelerating demand and shrinking residential supply. Without the advancements of FinTech and RegTech, it is likely the post Great Recession boom would have plateaued well before Covid hit the markets over two years ago.

However, moving forward the "foreign language" of digital coupled with uncommon implementation methods and techniques will threaten mortgage bankers with unimagined challenges and adaptation risks. For many traditional and independent operators, it is as if the industry participants have taken leave of their senses, while constructing massive digital Towers of Babble.

Yet, the mortgage industry is not an island able to ignore the upstream and downstream touchpoints of their offerings. Investors and consumers, each with varied digital demands, expect industry participants to innovate their offerings, streamline their processes, and provide comprehensive digital integration of their products from start to finish.

Richard Hill, Vice President of Mortgage Technology believes, "*The opportunity for mortgage industry leaders will be their plan of attack to incorporate digital requirements into how the industry provides value to both customers and investors. The industry is expected to use technology to deliver customer experiences, but there is growing pressure from secondary market investors and servicing firms to deliver trusted, digital information end-to-end. The rise of digital capabilities and breadth have changed the expectations, value, and demands for everyone involved across the mortgage process.*"

Since the Great Recession, previous lessons learned coupled with continuous technological advances have digitally transformed how the mortgage industry operates. Beyond market access to loan products and services, what are the opportunities and challenges surrounding the value delivered to consumers and investors? Moreover, with a rebalancing of customer and investor demands underway, why is it important, how will the mortgage ecosystem evolve, and what future delivery models should be anticipated?



Why: A Digital Foundation for Everyone

As traditional players and their software vendors advocate for "simplicity" where one-size-fits-all, non-traditional firms are weaving together complex, correlated data using atypical algorithms, machine learning, and artificial intelligence.

For all the industry conferences and papers written, there appears to be a wide range of ideas of what constitutes a mortgage against growing "Amazonian" repositories of digital data—much of which is proprietary and of opaque systems of record. Furthermore, if we analyze the touchpoints across our mortgage ecosystem, we can bring into focus the upstream and downstream impacts of our role within a complex, layered offering.

Increasingly, discrete functions are made accessible or "open" by growing data standardization as processes are continually undergoing digital transformations to improve the traditional paper-based, transactional designs.

Ongoing shifts in BAU leads to questions about how distinctive mortgage solutions are assembled with evolving consumer actions and digital behaviors. If we were to examine the supply chain of ideas (e.g., notes, notary, data, POC, et al) surrounding digital mortgages, would we create a representation of current innovations that mirror traditional segmentations—or something else? What would we produce if we started from a different point of view, for example moving away from the asset or loan being the center of a transaction?

Additionally, what do we think our non-banking, mortgage competitors will create using their vast data repositories and cloud offerings, which originated outside of traditional mindsets and transactional solutions?

During periods of rapid and profitable growth, the drivers of industry and product transformational changes are discounted. Since 2010, the mortgage IT and vendor leaders have concentrated their efforts and investments on digital transformations using data standardization (e.g., MISMO coupled with the automation of traditional manual business processes) as profits rebounded, volumes rose, pricing escalated, and housing supplies declined.

However, during this last decade when it came to leveraging and utilizing data beyond internal and cloud offerings, the industry focus was on data replication as automation was concentrated in silos of innovation and analytical insight. Data standardization has greatly benefited the industry, but it also reduced the barriers to entry for non-traditional firms to participate in the most complex financial industry product a consumer can obtain.

The MBA (and MISMO) in concert with its member organizations, has enabled supply chain capabilities for digital information (e.g., SMART Doc®, e-Eligibility Exchange®), which empower a trusted, verifiable, and interconnected framework for organizations to seamlessly define and exchange data across the traditional mortgage market segments (see Figure 2).

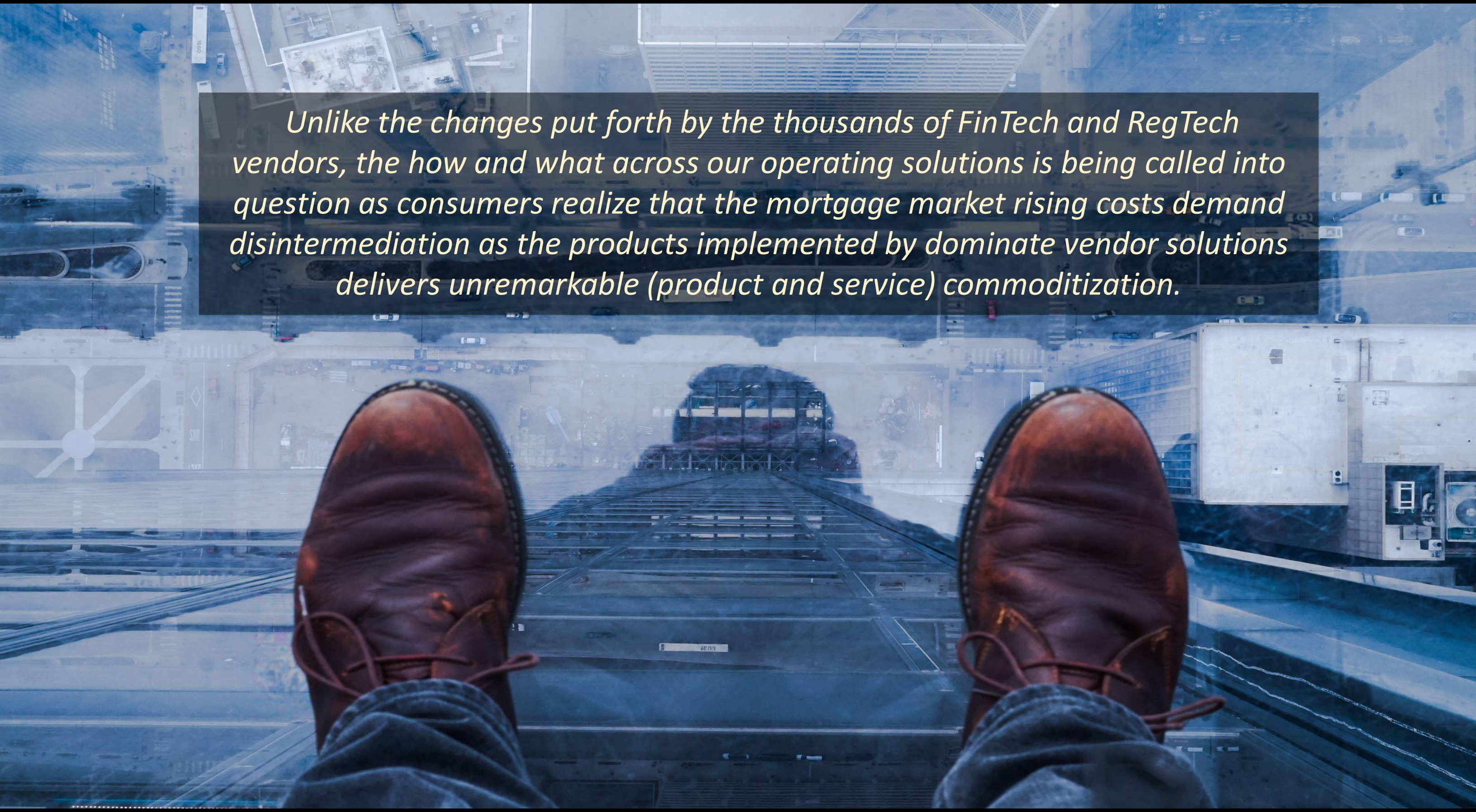
Why: Serving the Next Generation

"A major factor driving mortgage costs is that we continue to reenter, verify, and validate data at different checkpoints throughout the mortgage lifecycle. Even though this practice is highly inefficient, it happens because we have many parties involved in every transaction and each party has its own unique concerns and requirements. And nobody trusts the data they obtain from others." -- Seth Appleton, President of MISMO.

Often defined by industry culture and corporate business models, the rationale for change is understood, but the implications of adaptation have become secondary to delivering volume demands and meeting customer competitiveness. To accept the digital realities and pressures now facing mortgage professionals, the "breaks" from prior innovation strategies, operating models, profitability, and customer expectations represent a multi-faceted phase shift from the familiar to the unfamiliar. Yet, an industry in transition is only understood when a comparison of the traditional versus the "next-generation" (Next-Gen) is placed side by side as illustrated in Figure 1.

	Traditional Business-as-Usual	Next-Gen Business-as-Usual
Customer Sales POC	Physical, In-Person, Branch	Digital, Mobile, Omnichannel
Customer Segmentation Focus	Broad Demographics	Unlocked, Data-Driven Precision
Concentration of IT Solutions	Cloud, as a Service (aaS)	Hybrid, Layered, "Lego-Like"
Internal Culture	Siloed Functional Boundaries	Connected, Digitally Collaborative
Solution Focus	Point-Based, Industry Benchmarks	Cross-industry, Best-of-Breed
Innovation Outcome	Incrementally Disruptive	Process Destruction
Business Concentration	Geographical	Borderless
Operational Model	Centralized Clearing	Decentralized Finance
FinTech/ RegTech Utilizations	Encapsulated, Embedded	Building Blocks, Stacks
Digital Experience	Automation of Forms	End-to-End Integration
Standards Usage	Targeted, Data Exchange	Cross-Industry, Sovereignty, Federated

Figure 1—Traditional versus Next Gen BAU Characteristics



As shown in the Figure 1, the traditional BAU and Next-Gen BAU alter not only how a mortgage product is "produced," but also what the customer experience and expectations will be required. The rationale for many of our upcoming conference sessions and informational tracks are critically important, yet if we fail to grasp the "implications" (i.e., what must "WE" do to achieve the desired results) our change strategy driving transformation efforts will likely fail. The why of the mortgage technology ecosystem reimaged, while likely unfamiliar, is just the beginning of natively designed digital systems and oversight. Using the manufacturing supply chain mindset is critical to creating evaluation "filters" for not only actions, but also for sequencing of initiatives, delivery dependencies across partners, and how returns and progress will be measured.

A critical driver of why markets and mortgage firms will rebalance is that is pricing power and product differentiation using existing processes and technology solutions will grow increasingly limited. FinTech, RegTech, and data standardization have propelled the mortgage industry to the base of a new cycle and curve of opportunities.

The scale achieved with the accuracy of implementation has delivered the industry participants to a Next Gen set of markets and channels. These are all positive building blocks, but they represent the "entry fee" to participate in future markets—not a competitive advantage.

How: Participating in the Current Mortgage Supply Chain

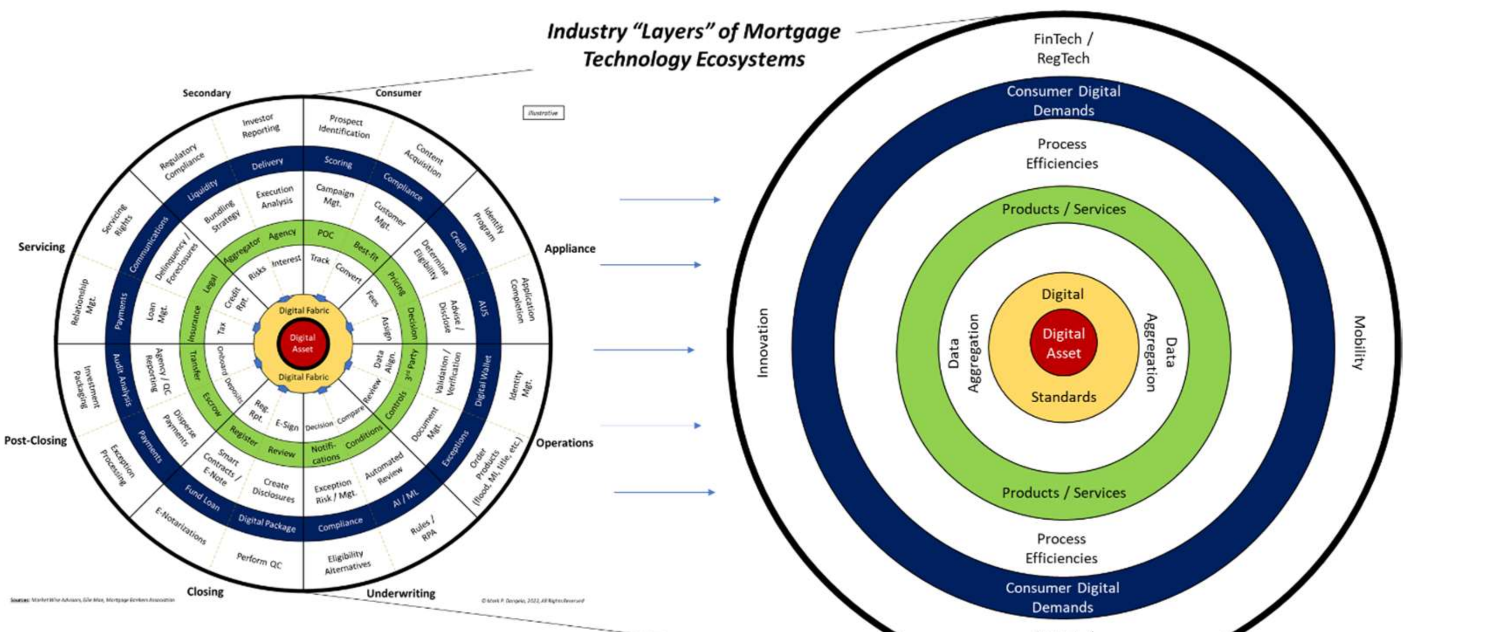
Incremental technology offerings of the last decade allowed us to keep up with competitors, but their innovative relevancy implementations were not high-return solutions which would have threatened competitor positioning or delivered "customer for life" relationships.

The rise of digital mortgage point solutions has been an enabler for reduced errors and processing greater volumes, while meeting rising regulatory compliance demands. During times of profitability and expansion, leadership initiatives are driven by minimization of implementation risks—that is, don't do anything "stupid" or too far away from organizational capabilities when incorporating new innovations, technologies, and partners.

Cloud migration was a good step for industry solutions as it used improved applications to reduce legacy limitations of infrastructure while enabling new architectural possibilities when it comes to data, API's (application programming interfaces), and time-to-market.

When these operating principles are applied to the 13,000+ FinTech and RegTech vendors, we arrive at point-based solutions that when applied to their intended use-cases (i.e., consumers, applications, operations, underwriting, closing, post-closing, servicing, and secondary), the landscape resembles a "dartboard" of options that when precisely targeted has led to operational efficiencies and customer satisfaction. Figure 2 represents the landscape realities of today and how mortgage firms and their vendors deliver traditional supply chain capabilities spanning organizations and across downstream and upstream participants.

Figure 2—The Mortgage Supply Chain Technology Ecosystem



Detailed Mortgage Supply Chain "Dartboard" (45 to 75 days)

Mortgage Supply Chain Traditional "Dartboard" Filters

Figure 2 while providing an illustrative view of the comprehensive mortgage supply chain on the left side, also addresses the "filtering" and layering of choices and options that govern leadership decisions to remain competitively relevant and consumer viable on the right side. These functional and operational filters when applied to the current thoughts surrounding a mortgage supply chain show the digital asset as the bullseye driving industry thoughts, standards, and innovative investments surround machine learning (ML), artificial intelligence (AI), and even next-gen potentials surrounding the Metaverse (a merging of physical and virtual) of financial offerings.

This holistic approach has directly and indirectly shaped industry participation, technology investments, and operating solutions for decades with the results providing incremental progression—while other industries (indeed, with less regulatory oversight) are radically disrupting their business models because of continuous digital transformations. These dartboard segments, when applied to traditional approaches, form the basis of innovation strategies which support existing cultures and operating models.

However, the next critical questions in this line of thought using a supply chain model is what should be adopted? What would we do, adjust, or discard if a non-traditional competitor leveraged their digital assets using a consumer centric supply chain model as contrasted to a digital mortgage asset design? What would be applicable and innovatively relevant moving forward?

As conceptually illustrated in Figure 2, the filters or layers surrounding the digital asset (which include data standards, digital products and services, process efficiencies, and consumer interfaces) comprise the accepted delivery and innovation model from both technical and a business model standpoint. These digital principles of operation and strategy govern our technology and application mindsets and limit our solution options in favor of "what we know" rather than "what is possible," and more importantly, "what is necessary to compete."

This inherent dilemma between what we know and what is necessary, will create a growing bifurcation of the mortgage supply chain capabilities. Those firms with the capital and leadership vision will embrace the unfamiliar digital, consumer demands, and those seeking to conduct traditional BAU will find themselves with vastly different opportunities, challenges, and margins depending upon the operational forking adopted.

Additionally, when process automation is viewed as part of a mortgage supply chain, these functional point-based solutions restrict the progression of tightly coupled, digital mortgage fabrics resulting in higher costs of operation, cascading systemic risks, and an inability to rapidly adapt beyond vendor dominated solutions.

A few additional thoughts envelops rethinking the **how** of utilizing supply chain designs and the **implications** of traditional implementations surrounding vendor software.

- **Value**: ROI and efficiencies reflect automation of current approaches and regulations mandated against a transactional, automated series of paper-envisioned processes. Moving forward, comprehensive disintermediation is warranted if digital assets are to achieve maximum consumer value against commodity products and services.
- **Risks**: the risks captured within digital silos are bounded, resulting in a loss of cross-functional mitigations, while creating additional costs for due diligence and trust verifications.
- **Innovation**: misplaced attention on deploying point-based technologies (e.g., blockchain) over cascading impacts on business goals, operational integrity, straight-though processing, digital fungibility, regulator guidelines, or consumer experiences.

When it comes to how we design our mortgage supply chain, tradition and history are constraining our rebalancing requirements, which are arriving from investors, regulators, and consumers all pressuring the industry into a redefinition of what is included within the mortgage ecosystem.

Indeed, consumer points-of-contact, mortgage origination, servicing, and secondary solutions are increasingly complex and have doubled consumer costs per loan over the last decade. However, are these origination costs (now averaging over $10,000 per loan) a result of innovation expense, regulatory burdens, greater due diligence, larger loan sizes, or the failure to apply advancements to disintermediate a commodity offering?

If we were to reimage the future mortgage supply chain using the lessons learned from cross industry rebalancings and applied against the expansion of non-traditional competitive approaches, what Next Gen approach would we design that aligns with what is possible? How can these innovative approaches be used to differentiate against competition when it comes to rapid behavioral changes of a digital only consumer?

What: Anticipating the "Next-Gen" Mortgage Ecosystem

Moreover, new research shows that by leveraging trusted data across the existing 82 loan processes (i.e., customer contact through secondary markets) which consume an average of 45 to 85 days, the digital streamlining incorporating trusted tasks (and their data) eliminates over 30 processes and shortens timeframes by up to 66%.

As we know change does not happen quickly. Every few years advocates pronounce the traditional approaches have ended and "within five years a new model of mortgage business with be adopted resulting in …" The detailed supply chain model illustrated in Figure 2 is complex and beyond the scope of this article. Yet, it represents the holistic foundation for everything that is transacted in the mortgage industry—we often don't realize this until something atypical happens or the industry goes through a negative cycle.

The vulnerability of mortgage professionals and their consumer products are firmly rooted in the current designs of how the supply chain begins and ends, which has been developed and refined since end of the Great Recession and the 2010 Dodd-Frank reforms. Now with rising interest rates, 40-year high inflation levels, and rapidly changing market conditions (e.g., a shortage of nearly 4+ million homes and apartments), the reimaging of what the mortgage supply chain demands is a rebalancing of the ecosystem with a different bullseye. With this reimagining changing margins and offerings, are we asking the right questions from our vendors and support staff to recognize and accept the changing digital supply chain demands?

Today, the future of what the mortgage ecosystem will deliver leveraging advancements in innovation and growing digital fabrics requires a reimaging of how the industry supply chain is defined, assembled, and executed. To understand what needs to be done, we will need to shift the supply chain focus (i.e., bullseye) from the digital asset as the core of how innovation and data are layered (see prior Figure 2), and place the customer needs comprehensively at the center of the dartboard.

To be clear, the mortgage industry is not dying. It is logically being rebalanced as the next iteration of how products and services are delivered. The future is comprehensively digital, which will likely destroy traditional brands and careers who embrace product designed complexity as a competitive barrier. A failure to adapt to investor and consumer digital demands will be supercharge the imperatives that revolutionize mortgage industry functions across its supply chain with both ends pushing towards the origination and servicing middle (see Figure 3).

For the mortgage industry, it has arrived at a cliff, a fork-in-the-road if you will, where the business-as-usual (BAU) practices of the past will be less effective and relevant as markets shift and favor those embracing E2E (end-to-end) digital solutions.

There will be firms who stay-the-course, and others that will move beyond today's practices by leveraging data and distributed cloud solutions to shorten mortgage costs and timeframes.

The siloed design of current digital mortgage assets (as shown in Figure 2) represents the automation of current processes and software solutions. Nonetheless, if the design of the digital asset were to start with a "fresh slate" of ideas and architectures, the traditional segmentations (i.e., consumer, application, servicing, et al) would utilize a common digital fabric surrounded by reusable layers that leverage data, investment, and technologies, while coupled with innovation strategies that deliver trust and reduce replication and human errors.

Figure 3 represents a step-shift for how the mortgage industry operates within and across its ecosystem, as represented by the detailed left side.
Let's examine what asking different questions and approaching the problem from a distinct perspective could produce.

- **Leverage**: the push for RPA has been driven by siloed decisioning and a demand for greater efficiencies. Yet, this logic, the algorithms, and the rules are contained across disparate designs requiring duplication and adjustments that create inconsistencies and additional checks-and-balances. How can the consistency of algorithms be leveraged, synced, and retired if tightly coupled layers was achieved?
- **Design**: the reimaging of how a digital asset is created can create common synergies, much like a data driven M&A event, leading to "stacking" of solutions that by design are auditable, meet regulatory compliance, and adapt to continuous changing business demands. Where are the systemic risks contained within the silos of vendor solutions and third-party offerings today?
- **Assemble**: when viewed as a reimaged supply chain, the once fragmented dartboard-(see Figure 2) solutions set become building blocks for growth and consistent measurements (see Figure 3). Where are the overlaps, the reductions, and synergies when a cohesive digital design is implemented? What are the timeframes and action sequences for stepwise success?

Based on forty years in financial services and 25 years working across the supply chains of the mortgage industry, the rationale and implications contained within Figure 3 represent an experiential transformation. The reimaged supply chain model represents a shift of strategic focus, investment filters, and product differentiation for a digitally native consumer.

The prescriptive, transactional mindset stamped out across software which is cloned from mortgage banker to mortgage banker will yield to digital building blocks that deliver adaptability and change across digital fabrics without expensive replacements.

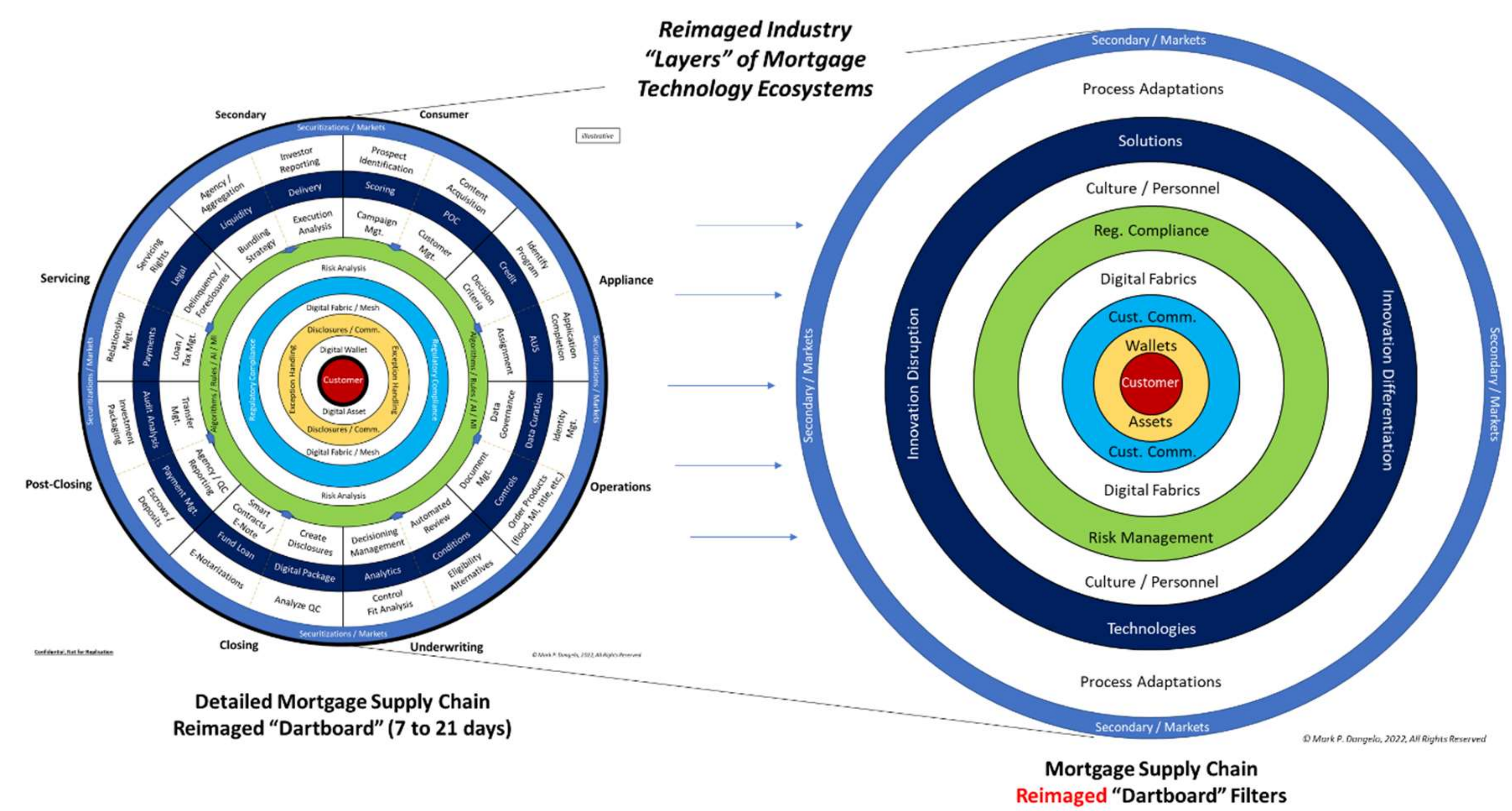


Figure 3—The Mortgage Supply Chain Technology Ecosystem **Reimaged**

Conclusion: Meeting Head on What is Coming

As you prepare for the future of industry changes, the acceptance of alternative delivery and business models are no longer an option. As we have briefly covered, the why, what, and how showcased in Figures 1 and 2 surrounding the changes in industry supply chains represents the shifting challenges, drivers, and mindsets for the future mortgage operating practices. Figure 3 portrays a shift of foci where the customer, not the asset, alters the current landscape of what our software vendors provide, how we use and encapsulate digital information, and what leverage (e.g., fungibility) will our digital data asset create.

Furthermore, the digital impacts and operational demands are influenced by shifting business drivers and expanding data sovereignty and scalability. For mortgage firms and workers to weather the growing confluence of risks, the composite illustrated in Figure 4 illustrates the mix of relationships, demands, and partnerships that will be altered moving forward.

The mortgage designs of today revolve around an automated, paper-originated transactional solution sets created as part of expensive digital automation initiatives undertaken over the last decade. The evolution and upcoming consolidation of FinTech and RegTech markets will push forward the implementation of digital fabrics and building block mortgage solutions, which will open more entry points and competition for non-traditional mortgage firms.

As consumer focused, digitally native processes become commonplace, the challenges on how to leverage continuous innovation across as-a-Service (aaS) solutions will increase. Moreover, the expectations for outsized investment returns rise with innovational advancements each with discrete business drivers and operating characteristics all during a time of economic uncertainty and industry rebalancing.

The common “glue” stitching these complex moving solutions together will be data and its designed digital fabrics. As showcased in Figure 3, new customer focused designs will mitigate the reoccurring upgrade and maintenance expenses that consume 80% to 85% of a mortgage bankers IT budget each year.

The memories of the Great Recession are approaching 15 years and the lessons learned—risks, data availability, consumer burdens, over-priced markets, wide speculation, and too-big-to-fail—have shifted. As we attend the MBA Annual sessions and reconnect with our industry colleagues, the mortgage industry’s ecosystem is being actively reimaged.

Ask yourself, “how long will it take before for non-traditional partnership linkages, data security and trust, and profitable digital business models are used to aggressively attack and rebalance the transactional mortgage industry designs?”

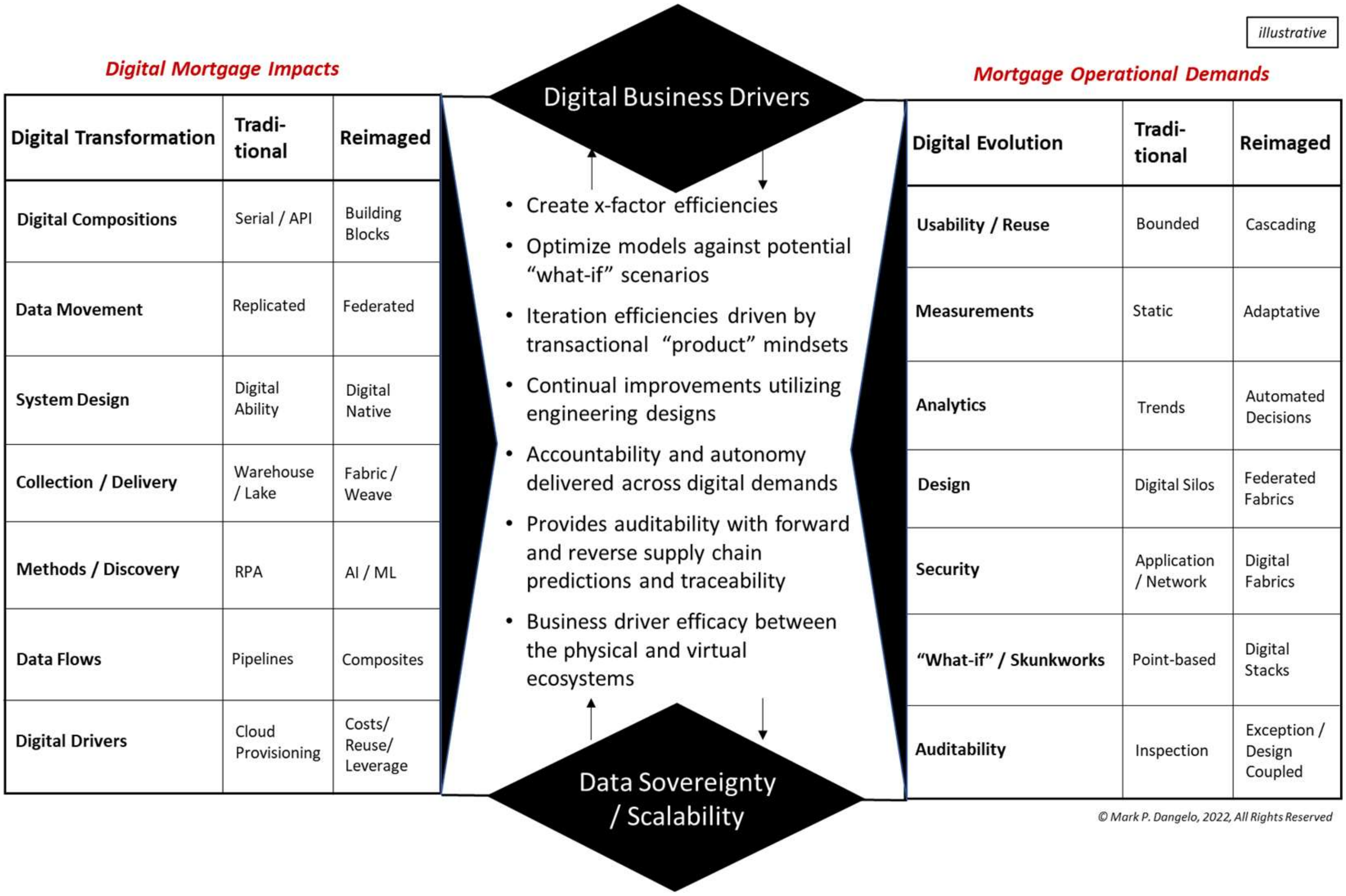


Figure 4—Composite Digital Impacts and Demands Influencing Future Mortgage Operations

When contrasted with previous downturns or corrections which were triggered rapid economic changes, the outcome of this rebalancing is one we still control. We have created the necessary building blocks. We have invested years in iterating common and evolving standards of data. We have consumers seeking out digitally innovative firms who deliver the greatest value-add. We have done all this and so much more.

Today, as mortgage leaders and professionals the path forward may be unfamiliar, but we already have the tools and insights needed to undertake the next cycle of sustained profitability. To compete tomorrow, the transformations demanded are built around the customer and supported by a supply chain approach that leverages trusted digital investments.

We can choose to adapt—or die—but the mortgage technology ecosystem is being reimagined regardless of the resistance offered. How will you, your organization, and your customers respond to the Next Gen technology ecosystem?

In 2022-2026, executive vision aligned with digital delivery results will be highly sought-after leadership and transformation skills. With digitization commonplace coupled across the design and deployment of multiplatform digital fabrics, financial and mortgage leaders are shifting their attention from incremental competitive advantages to reimaging the mortgage process to fit the changing realities of consumers, technologies, and investors.

Appendix A: Understanding the Existing Mortgage Supply Chain Supplemental Details

To put into perspective the substantial number of processes and functional capabilities performed by professionals within and across the mortgage industry, we segment them into categories. Before the explosion of digital fueled by the over 13,000+ FinTech and RegTech firms took place post Great Recession, there were approximately 64 distinct silos of expertise and data to create a loan beginning with customer contact through servicing and to the investor in the secondary markets. With the rise of digital and the demands of regulatory compliance, that number of unique "boxes" expanded to over 80.

And, depending upon where you were within the mortgage cycle or value-process, you perhaps performed your functions over 12 to 15 of the totals often spread over many weeks of duration. Today, the efficiencies driven by vendors and industry leaders has aided our products and services to be more accurate, more relevant. However, these efficiencies came at a price of reducing visibility by mortgage professionals with comprehending the comprehensive impacts their work has on downstream loan processing and upstream requirements.

It was a price of loan accuracy, volume demands, and risk management whereby expertise was coveted and groomed for replication. Introduced in this time were robotic process automation, MISMO standards, and cloud computing which improved data exchanges and time to provision new capabilities. IT personnel became conductors assembling a symphony of vendor solutions against business drivers. Their orchestration efforts spurred digital competitors who prior to the last mortgage correction of 2007-2010 did not exist.

A consequence of these application assemblies coupled with data exchanges was a realization that loan production on a large scale required a manufacturing mindset underpinned by manufacturing supply chains. Just as COVID broke the global supply chains, in the mid 2010's industry leaders recognized that the touchpoints across these informational data exchanges could reduce risks and bind innovative solutions to customer demographics while creating opportunities for end-to-end fulfillment of evolving digital homeowners.

Moreover, depending how IT and business leaders assembled these 80+ targeted loan segments, competitive differentiation could be achieve allowing for rapid time-to-market and adaptability to consumers whose behaviors were defined without the traditional approaches that were created around serial transactions and paper-based delivery. As consumer and industry mindsets shifted into alignment, the manufacturing supply chain fulfillment approach expanded drawing larger, well capitalized firms to invest in capabilities.

The benefits of compartmentalized digital mortgage solutions included its enabler for error reduction, processing greater volumes, and meeting expanding regulatory compliance demands. In Figure 5, it illustratively shows the placement of mortgage functionality across eight classifications—consumer, appliance, operations, underwriting, closing, post-closing, servicing, and secondary. Within each of these categories, an additional ten (10) functions are assembled often delivered by unique FinTech and RegTech solutions. Information is exchanged between each function—some digital, some scanned, and some manually coded. These functions surround the current premise of what a digital asset would comprehensively include by stitching together the packets of customer and property information which typically comprised the loan.

However, these dartboard segments were often defined within their functional boundaries delivering stove piped digital records and files that while conforming to element standards failed to create cross-platform capabilities without data replication or transformation. When process automation which has grown increasingly important and developed within each function is viewed as part of a mortgage supply chain, this creation of the dartboard point-based solutions restricted efficiencies and increased the costs and complexities of innovation and digital strategies.

What has been "bolted on" to the current rendering of the mortgage supply chain is an implied digital fabric overlay for the digital asset in question. Today this critical requirement for the digital data created across the asset life cycle, is exposing digital trust and sovereignty breakpoints. The result of these siloed designs across FinTech and RegTech solution segments materially contribute to higher costs of operation, cascading systemic risks, and an inability to innovatively adapt beyond locked-in vendor solutions.

In conclusion, the mortgage supply chain illustrated in Figure 5 are being practiced, but not widely recognized. Whereas no single vendor (ignoring recent ICE M&A actions) has fully implemented end-to-end supply chain solution capabilities—yet it is implemented already present and spread across many discrete vendors and their compartmentalized applications.

Figure 5—The Current Mortgage Supply Chain Dartboard

Appendix B: Anticipated Mortgage Supply Chain Supplemental Details

To guarantee customer fit while creating trust (which limits rework and data sourcing), E2E "fabrics" of digital information are being created utilizing proven techniques adapted from disciplines such as supply chain management and industries such as retail.

As defined in the previous section, the mortgage industry currently has a supply chain. When discrete functions are linked together, an end-to-end series of interconnected processes, data, and markets represent a working model of digital touchpoints.

The siloed design of current digital mortgage assets represents the automation of current processes and software solutions. Yet once this current supply chain is identified, a critical question to assess the existing supply chain model is what we should be adopting? What would we do, adjust, or discard if a non-traditional competitor leveraged their digital assets using a consumer centric supply chain model as contrasted to a digital mortgage asset design (being the center of the dartboard)? What would be applicable and innovatively relevant moving forward?

If the design of the digital asset were to start with a "cleaner slate" of constructs, the traditional categories (i.e., consumer, application, servicing, et al) would utilize a common digital fabric surrounded by reusable layers that leverage data, investment, and technologies while reducing replication and human errors.

Additionally, if the RPA mindset is replaced with machine learning / artificial intelligence layer on encapsulating consumer demands and digital fabrics, the adjustments move out from the center of the dartboard linked by leverageable, fungible digital data. Stated from a supply chain mindset, the focal point that begins with the customer moves out into the delivery rings of the mortgage processes.

If we examine the result of the consumer driven mortgage loan, we arrive at the secondary markets being the pressure from the outside towards the center of the dartboard. With these two pressure points redefining the beginning and end of the mortgage supply chain, we can now redefine and reassemble what takes place in between—the sequences, the digital reusability, and the trust demanded for all the actions. Additionally, by using common layers of capability and functionality—digital wallets, risk analytics, digital fabrics, and regulatory compliance—traditional functions comprising the 80-plus actions are now reduced to under 50.

The result of this reduction is not a loss of control, accuracy, or level of detail, but a reuse of digital information to take advantages of customer behaviors and mortgage market innovation capabilities. As digital information expands across the industry, the supply chain will continue to undergo pressures. With rising data sovereignty (e.g., EU Data Act) concerns and enforced requirements, the demands imposed by advancing FinTech and RegTech solutions will create supply chain needs that allow information to flow both forward and reverse as loan packets are digitally assembled, vetted, services, and securitized.

The reimaged supply chains shown in Figure 6 forms and prioritizes the core common features traditionally spread across silos of applications and platforms. Moving from the bullseye out, common layers using secure digital wallets (including coverage for assets and instruments) are linked using a digital fabric or mesh. This fabric is then

Now the shift has begun towards a Next-Gen ecosystem for firms who recognize that digital has comprehensively transformed customers and investors. The consumption of digital products will be all there is when it comes to financial services where the solutions are assembled as Baas, embedded finance, or as part of a mortgage digital supply chain. Make no mistake, the rise of digital is permanent. The consumer shift to digital is "so last year."

used to ensure regulatory compliance filings and conformance, conduct cross platform risk analysis all encased using compartmentalized and adaptable ML / AI consistently applied to all functions across the supply chain.

One additional and notable change to the why of the mortgage supply chain resides in a common communication layer that eliminates application specific scripts and messages in favor of a common, cross-purpose repository driven by the interconnected digital fabric surrounding the loan, customer, and their digital artifacts.

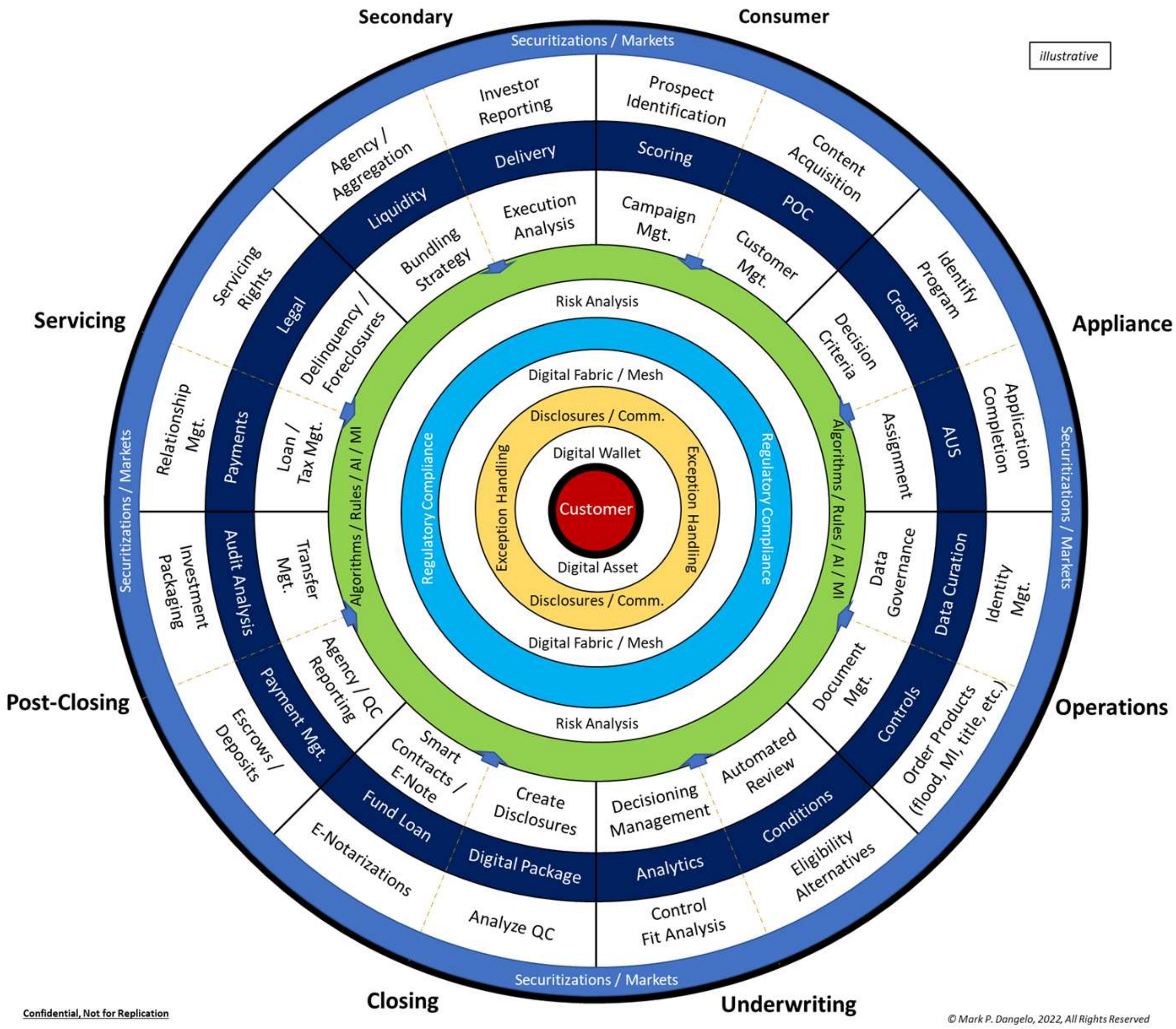


Figure 6—Mortgage Supply Chain **Reimaged**

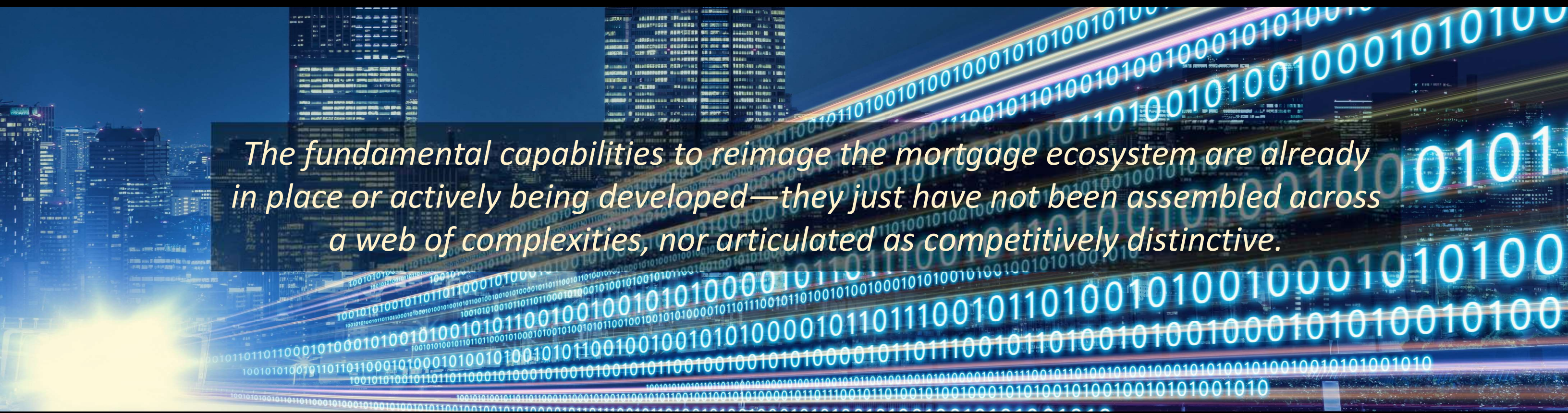
Even today, expansions of FinTech and RegTech solutions using a common customer communication are growing especially through M&A and joint venture solutions to eliminate missteps across the loan process and to ensure that regulatory compliance is being addressed not just to the letter of the law, but also the spirit of the requirements.

As Figure 6 illustrates and regardless of agency or aggregator secondary markets, the changing of mindset across shrinking volumes creates imperatives that will disintermediate the commoditized mortgage markets. As FinTech vendors undergo the loss of funding coupled with target market declines, their value proposition tied to siloed business models will force them into accepting partnerships and tie-ups moving them out of their siloes and into long-term solutions that revolve around common fabrics and innovations. The value for mortgage loan independent and large bankers are a reduction of costs and system conversion using common layers as well as meeting the experience demands of a maturing digital consumer base.

The fundamental change of today when compared to traditional forecasts is that the mainstreaming of FinTech offerings have changed the mindset of leaders seeking to remain viable, yet current economic conditions have created a perfect storm of rapid pullbacks, cascading risks, recessionary and inflationary pressures.

Moreover, the reality that non-traditional competitors are also able to alter the consumer value-proposition due to digital acceptance and corporate digital transformations, is creating a perfect storm for digital asset expansion all revolving around leverage of data (e.g., ICE acquisition of Blackknight, “Amazonian” data).

This evolving, new set of operating capabilities coupled with evolving market conditions delivers a next step growth model that is both adoptable and adaptable.



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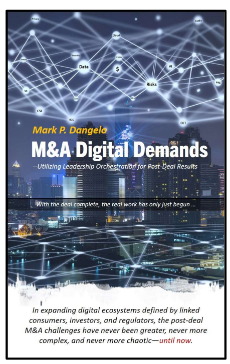
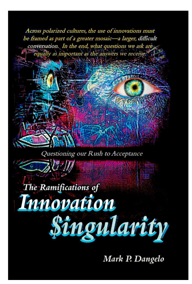
As a business leader and digital professional, Mark started his career as a computer scientist and innovator. He has worked globally advising hundreds of companies across the Fortune 50 to the Russell 3000 as well as privately owned enterprises, investment bankers, and private equity. His views on innovation, strategy, and M&A are a direct result of his years of practical experiences. He has worked in over 20 countries.

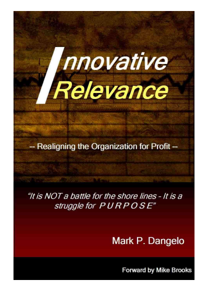
Currently, Mark is innovating the next generation mergers, acquisitions, and divestures (MAD) using advanced data sciences, ML, AI, and digital twin solutions. The automation at scale approach utilizes a customized engagement design to apply the repeatable, adaptable, and agile framework across M&A Digital Demands (see book below below).

Additionally, Mark's is actively collaborating with private equity firms, data sovereignty leaders, and high-net worth individuals to incorporate STP, blockchain, and process redesign for the residential and multifamily mortgage supply chains concentrated on Veteran housing.

He is a published author of five books, hundreds of business and innovation articles, a 20-year columnist for the national **Mortgage Bankers Association**, an Associate Director and Adjunct professor for **Case Western Reserve University** and their technology-transfer organization **xLab**.







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