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Technology Disruption

5 tech-driven megatrends transforming modern society



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About Franklin Templeton Institute

Our mission is to provide our clients with research that meets their needs and concerns. We do this by listening, understanding, and then harnessing the resources of our firm to answer the challenge. We organize around areas of exploration to develop distinct insights and their practical applications.

Key findings



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Successive waves of new technologies have emerged since the commercialization of computers began in the 1960s. These innovations have become a foundation of the modern economy. Miniaturization allowed computers to shrink from the size of a factory floor to a laptop and then to smart devices. Computing power has grown even as the costs of processing and memory have declined. Network technologies and public key cryptography have fostered the emergence of the internet, the World Wide Web and the cloud. Mobile technologies have provided us smartphones and other smart devices that offer “anytime, anywhere” connectivity to access, upload and download content. Database design has progressed to allow for more robust inquiries on ever growing amounts of data at ever increasing speeds. Artificial intelligence (AI) algorithms predict our behaviors and personalize our displays to foster engagement, and machines can now learn and improve upon their own behaviors and outcomes through deep learning.

Part I¹ of this series explored the origins and milestones for each of these technologies and how the adoption of these innovations required institutions—governments, the military, commercial enterprises, service sectors, educational facilities, community groups, and more—to reimagine their capabilities and iteratively upgrade the infrastructure

upon which they ran their networks and enterprises. This paper—Part II of the series—looks at how these new abilities and technologies were deployed, how they impacted modern society and how those impacts built upon themselves, generating a set of five megatrends over time.

1. **Democratization of access to the commercial transaction rails**
2. **Growing reliance on intangible assets to drive business value**
3. **Expanding power of the crowd**
4. **Quantification of behaviors to shape commercial outcomes**
5. **Institutionalization of the individual participant**

Each megatrend represents a foundational shift in the way that modern society now operates. This type of profound change does not happen all at once, but rather incrementally. Each successive cycle of tech-driven innovation altered behaviors by a degree or transformed, creating unique capabilities and driving a shift in expectations. It is only with the distance of time that the collective impact of these changes can be appreciated. Many of these trends have been building for 60 or more years. Where we are today already marks a significant shift away from how modern society operated when the megatrend first emerged.

Part II of the series looks at how these new abilities and technologies were deployed, how they impacted modern society and how those impacts built upon themselves, generating a set of five megatrends over time.

Taking stock of where we are today is critical because a fourth tech-driven innovation cycle is beginning. New technologies are slowly gaining momentum. Digital currencies and crypto-currency-backed payment networks, layer 1 blockchain development platforms, programmable tokens with self-executing smart contracts, oracle networks, ZK (zero-knowledge) scaling solutions and even newer innovations are running 24/7/365 (24 hours a day, 7 days a week, 365 days a year) proofs-of-concept in an ecosystem already valued at more than US\$1.0 trillion.²

The capabilities that these new technologies can deliver are becoming better understood, and the ways that individual users and institutions might utilize the new offerings can be anticipated. Each megatrend can be extrapolated to frame how the next set of changes may alter modern society and behaviors. Indeed, based on the nature of both the emerging technologies and already-accomplished behavioral shifts, it is reasonable to expect that the unfolding fourth tech-driven innovation cycle may represent the realized fulfillment of each megatrend.

Megatrend 1: Democratization of access to the commercial transaction rails

The first megatrend traces how the platforms through which businesses pursue their commercial activities have progressed from proprietary systems to open multilateral networks. This allows for broadening participation for both individual participants and businesses to achieve their own commercial success by utilizing these rails and building upon them.

Resource providers that place their assets into the Web3 ecosystems and consumers who transact and help to build the network effect that ensures the ecosystem's success can receive token rewards. Such tokens recognize their contribution and, in many instances, can also offer them a voice in protocol governance.

The result of this transformation has been a widening concept of what constitutes “transactional engagement.” The first tech-driven innovation cycle began at a time when there was a one-way, direct business-to-consumer engagement model, but subsequent innovations have allowed for both individual participants and businesses to increasingly engage with each other. As a result, by today's third tech-driven innovation cycle, individual participants and every business within a networked ecosystem can have multiple roles, acting at times as a supplier or a consumer depending upon the nature of the transaction.

One impact of this new multilateral, multi-role engagement model is that it has placed disproportionate power into the hands of the virtual platforms that facilitate and orchestrate the networked ecosystem. Data being generated by social media and transactional interactions has become the fuel that advertising models and personalization algorithms rely upon to facilitate engagement. Having exclusive access to this information has driven the commercial success of these platforms.

Tensions with the current model are already building, however. To generate the required network effects that create value, platforms rely on a broad universe of resource providers and consumers, whether that is a social media platform, shopping platform, asset-sharing platform or services platform. As the ecosystem

becomes evermore successful, many platform sponsors have opted to become publicly traded companies. This sets up conflicts between the various constituents. It is becoming more common for platform sponsors to make economic decisions to benefit the stock shareholders at the expense of the ecosystem participants.

Emerging technologies that are part of the fourth tech-driven innovation cycle are collectively referred to as Web3. Like Web2 businesses, Web3 protocols also rely on network effects to build out the desired commercial ecosystem. New offerings, however, were designed by technologists who emerged from the open-source community as compared to today's corporate enterprises. Web3 designers have devised an economic model that attempts to more fairly incentivize participants in the ecosystem.

Resource providers that place their assets into the Web3 ecosystems and consumers who transact and help to build the network effect that ensures the ecosystem's success can receive token rewards. Such tokens recognize their contribution and, in many instances, can also offer them a voice in protocol governance. Moreover, the programmable nature of tokens can allow those who contribute resources to contractually offer and guarantee participants' platform economic rights in a manner that is not possible in traditional finance today.

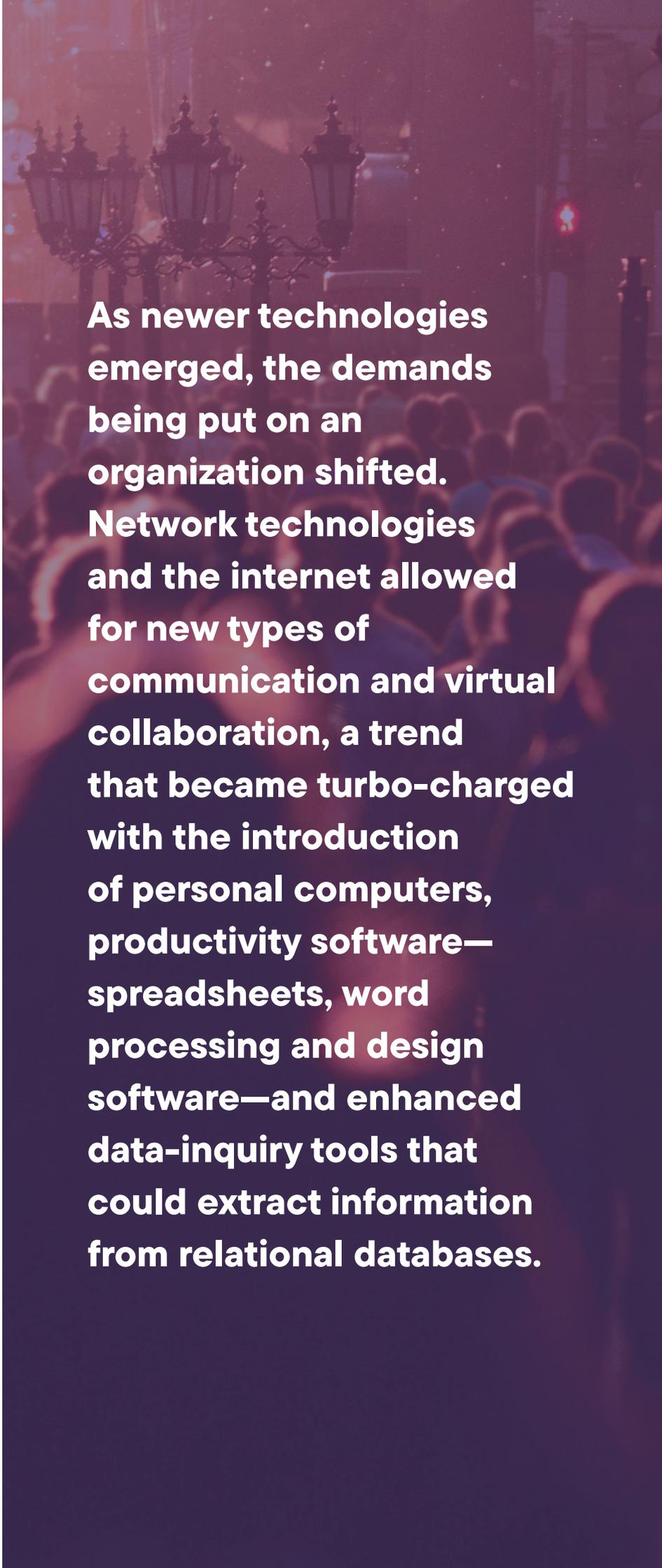
This creates new options for the ever-broadening creator community and new models that allow individual participants to conceivably keep more of the revenues or realize more of the possible collateral value generated through the sharing of their assets.

As such, the new rails will possibly become a favored source for commercial pursuits, drawing increasing amounts of transactional volume away from today's centralized platforms and/or forcing today's market leaders to shift course and rethink their economic model to better or more fairly reward ecosystem participants.

Megatrend 2: Growing reliance on intangible assets to drive business values

The second megatrend examines how the competitive differentiators that businesses rely upon to succeed have shifted in line with each tech-driven innovation cycle, moving from tangible to intangible assets and then seeing the nature of what constitutes an intangible asset become increasingly diffuse. This trajectory reflects the shifting nature of human relationship with the machines we are creating. Whereas technology offerings started as tools to be used by individual users and institutions—humans using machines—the technology itself has now become the enabler of new business models—human plus machine. This has forced organizations to compete not just on their own capabilities, but on their strategies to integrate with and leverage external abilities provided by new technologies.

The start of the modern-day computer age focused on the automation of production-related tasks, eliminating frictions within the dominant manufacturing-focused economy. State-of-the-art



As newer technologies emerged, the demands being put on an organization shifted. Network technologies and the internet allowed for new types of communication and virtual collaboration, a trend that became turbo-charged with the introduction of personal computers, productivity software—spreadsheets, word processing and design software—and enhanced data-inquiry tools that could extract information from relational databases.

factories were able to use computing to enhance the assembly line, improve the speed and accuracy of raw material procurement, streamline the creation and analysis of financial and sales reports, and support a surge in productivity. Service-oriented businesses were able to realize huge gains in throughput and recordkeeping. Tangible capital assets related to machinery, “knowledge services” that encompassed new computers and information technology, and balance sheet holdings provided the core of business value.

As newer technologies emerged, the demands being put on an organization shifted. Network technologies and the internet allowed for new types of communication and virtual collaboration, a trend that became turbo-charged with the introduction of personal computers, productivity software—spreadsheets, word processing and design software—and enhanced data-inquiry tools that could extract information from relational databases. The knowledge and innovation of workforces became their own assets. The creation of intellectual property surged. To retain its human talent, many enterprises fostered strong brands and people-focused cultures.

Concurrently, the emergence of the World Wide Web and the introduction of public key encryption that allowed for secure online transactions created a new channel

for enterprises to navigate. Businesses and organizations were forced to expose processes and systems designed to meet internal demand to a new set of public users who were able to access websites and transactional offerings 24/7/365. Moreover, new nontraditional web-first competitors were emerging to disrupt distribution and customer acquisition. Navigating the increasingly complex technology and business landscape required specialized knowledge and advice.

Businesses pivoted their focus, building out knowledge-based services to support their products and altering their engagement model to focus on their customer relationships. By the late 1990s, intangible business assets related to human and intellectual capital began overtaking tangible assets as the main driver of business value. However, accounting for such intangible value became an issue due to how such assets were treated on balance sheets.

Assigning a value to intangible assets has become even more difficult in today’s third tech-driven innovation cycle. Connectivity itself has become an asset, moving a key determinant of a business’s value beyond the perimeter of the business itself. Cloud-based technologies and application programming interfaces (APIs) allow businesses to plug in “services” to create new processes without having to recode or redeploy new

systems. This flexibility has allowed for relationships across ecosystems to thrive. The breadth of external services that can be accessed, however, are limited by the ability of in-house business and technology teams to maintain and orchestrate all the points of connectivity.

Emerging ecosystems in the fourth tech-driven innovation cycle adopt a different approach. These ecosystems are being developed on common platforms with a single programming language and shared templates for commonly used processes. This uniformity in the creation of technology and business logic is helping to progress the way that processes can be combined and reducing the need for oversight.

Rather than using APIs and orchestrating various system calls, the Web3 approach makes the business processes themselves composable. Certain bits of code can be reused and inserted into another protocol’s process flows just like a puzzle piece. The instructions in such code are self-executing, which reduces operational frictions and allows for many more possible configurations.

The impact of these new technologies is likely to expand the notion of what being connected means. Rather than simply accessing a network or ecosystem, business value in the future may be focused on decentralizing and embedding offerings into another business’s process flow and on having complimentary business offerings be embedded into one’s processes. Such a landscape would require businesses to place more emphasis on interoperability. Rather than ensuring their own end-to-end process, a business’s competitive differentiation in the future may be found through building a brand new workflow constructed entirely around the customer needs or by joining into a multi business workflow designed around the customer.

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Megatrend 3: Expanding power of the crowd

The third megatrend explains why future processes are likely to be built around and personalized for the individual customer, user, and participant. Technology innovations have advanced the ability of individual users to have a “voice” in their commercial transactions and give power to their “exit” when they are dissatisfied with a business’s conduct. This has resulted in a significant shift in the power dynamics between businesses and their consumers.

Individuals were given little consideration when the modern computer age began. In the 1960s (generally seen as the golden age of advertising), enterprises could craft and promote carefully curated brand images designed to evoke certain emotions and reactions out of their current and potential client base. The goal was to acquire customers by making them want to affiliate with the image and lifestyle that the brand represented by buying the enterprise’s products or services. Enterprises gave little thought to the customer’s actual experience with their offerings. Their introduction of call centers and dedicated customer service representatives provided some client engagement, but these channels did little to elevate the concerns and feedback of individuals within the organization or influence the firm’s business or product strategy. The second tech-driven innovation cycle expanded the ability of individual users to engage with each other through dial-up bulletin board communities at first, and later websites. Discussion forums with topical threads allowed for asynchronous back-and-forth dialog about various topics, including the experience a customer was having with a specific product or service. Weblogs or “blogs” gave a forum for individual users to share their own views and read

about other peoples’ experiences. These forums offered individual users an internet social “voice,” via the internet, but one with only a limited reach and impact that was confined to participants and users with access to the forums.

Using that voice to coordinate an “exit” was still limited with the second tech-driven innovation cycle. Rather than just choosing to stop doing business with a company—the only readily available option in the earlier period—a customer could at least search for and find a community of users or a blogger discussing a topic that seemed relevant to their concern and use that forum to engage and try to influence other individual consumers. These forums were generally moderated, however, or run by individual users with no or little institutional, business, or organizational power. Feedback might bubble up to a company’s leadership, but fears of a “mass exit” could likely be controlled. Companies could curtail engagement by suppressing or demoting negative comments.

The emergence of the user-centric internet in today’s third tech-driven innovation cycle removed many gateways that a company might erect to limit the impact of customer commentary and allowed individual consumers with similar interests or concerns to not just find each other, but to build a community that often has synchronous discussion. Users can post images, comment, describe their experiences, award ratings and share other people’s views nearly instantaneously. Companies can only choose to join in this web of communications and address, not limit or suppress, negative commentary. This has resulted in a real-time feedback loop between individual consumers and brands.

Within that dialog, enterprises are losing the position of trust that their advertising once earned them. Consumers are looking to each other for trusted advice and looking past the messages that

The ability of consumers to engineer an “exit” has also been strengthened. Certain posts go viral and can create “outrage cascades” that result in an exponential surge of engagement around a company. Calls to rescue a meme stock or boycott a company can result.

enterprises are seeking to shape. The elevated importance placed on consumer testimonials and experiences over corporate marketing and advertising; statistics showing that most consumers now check user reviews before choosing to make a purchase; the dedicated resources that most organizations now assign to monitor social media and marketing channels and respond to comments being posted online; and the teams that organizations charge with mining social media and trends data for signals to influence their product and business strategy, all reinforce the power that individual users have achieved by banding together to give voice to the “crowd.”

The ability of consumers to engineer an “exit” has also been strengthened. Certain posts go viral and can create “outrage cascades” that result in an exponential surge of engagement around a company. Calls to rescue a meme stock or boycott a company can result. Media coverage of these events—rather than the calls themselves—further amplify crowd opinion and can cause others to join the action. A study of this phenomenon found that for every day the media covers a call to boycott a company, its share price can fall by as



Keeping the crowd incentivized and engaged has become the key to generating and maintaining network effects in the emerging ecosystem. Proprietary data are no longer a revenue driver in these models, as most of these ventures run on public blockchains where transactional data are transparent and individual users' data are protected and private.

much as 1%, prompting targeted organizations to alter their practices and give in to crowd demands in at least 25% of the cases.³

The nature of the emerging fourth tech-driven innovation cycle is likely to further elevate the influence of the crowd. New models not only give individual participants a voice by allowing them to provide feedback; the mechanics of Web3 provide new tools that can allow consumers to play a more direct role in determining the value of goods and services.

Keeping the crowd incentivized and engaged has become the key to generating and maintaining network effects in the emerging ecosystem. Proprietary data are no longer a revenue driver in these models, as most of these ventures run on public blockchains where transactional data are transparent and individual users' data are protected and private. Rather than using proprietary data to generate revenue, new Web3 models may use publicly viewable data to create enhanced offerings with crowd appeal.

Product and service delivery might move from being solely transactional to being packaged as an "experience." The auto-execution ability of smart contract code makes it possible to structure all sorts of privileges and benefits around a product or service at scale. New offerings are likely to be designed around a set of "crowd factors" that deliver status and emotional payouts to individual participants. Examples include an ability to augment a transaction with rights or privileges that provide convenience, rewards, access, influence, exclusivity or prestige. The greater the set of crowd factors delivered, the greater the likely value of the transactional experience.

For example, a buyer might purchase tickets to a concert and receive a digital ticket (convenience), but for a little more money they can also join the band's royalty pool and earn an income stream (convenience + reward + access), and for a yet higher sum, they can join private video chats with band members and obtain premium seats for future shows (convenience + reward + access + exclusivity + prestige). Packaging together multiple products and services that each offer status or emotional payouts can create a higher value transaction and more valuable experience.

This realized vision for the future would represent a 180-degree reversal that would have taken place over the past 60 years—from enterprises putting out standard messaging and offering a generic set of products and services to a voiceless set of consumers to organizations being forced to not only listen to customers, but to design and deliver goods, services and experiences specifically geared to stimulate and appeal to customer demands and needs.

Megatrend 4: Quantification of behaviors to shape commercial outcomes

The fourth megatrend explores the emergence and growing importance of data analytics and how the application of business intelligence has changed the way enterprises and organizations operate. New quantitative insights initially offered important lenses to enhance business and network operations, but as individual users began to utilize commercial transaction rails, contribute feedback about their experiences and create, post and share content, the focus of intelligence gathering pivoted to better understanding the customer and enhancing customer engagement.

The role of business and customer intelligence has become so foundational that it is easy to overlook how rapidly these intelligence capabilities have evolved and how impactful they have been. These insights have shifted the timeframe in which a business operates—from backward looking to real time in less than 50 years.

The role of business and customer intelligence has become so foundational that it is easy to overlook how rapidly these intelligence capabilities have evolved and how impactful they have been. These insights have shifted the timeframe in which a business operates—from backward looking to real time in less than 50 years. Developing capabilities may reframe that timeframe even further, creating personal intelligence to forecast future actions and the needs of a specific individual consumer.

When the modern computer age began, programming a computer inquiry was a task that often took 20 or more hours of work to prepare and several more hours to complete once the program was loaded. Running inquiries to attempt to identify actionable insights and trends was impractical. It was not until the 1970s when timeshare service bureaus began to develop specialized financial spreadsheet applications that the concept of mining an organization's data to better understand trends and make forecasts took hold. These applications created the template for the spreadsheet software that remains the primary tool used for business analysis and forecasting today.

Early financial applications required business users to submit desired inquiries to dedicated coders—often located hundreds of miles away—who created and returned the desired results over the

course of a few business days. Exploring, extrapolating and modeling data to identify relevant patterns and insights were difficult and slow as a result. The introduction of the personal computer, icon-based navigation and spreadsheet software in the late 1970s democratized the ability to create and run business inquiries.

These developments coincided with the introduction of the relational database, which made extracting data easier and timelier. Enterprise intelligence systems and new data analytic programs that could extract, model and slice-and-dice data were created, giving the C-suite (i.e., executive-level managers) and divisional leaders the ability to monitor the status of their enterprise and make forecasts in a more actionable timeframe.

The deployment of specialized systems during the second tech-driven innovation cycle in the 1980s and 1990s began to significantly boost the amount of data being collected inside organizations. Enterprise resource systems, customer relationship management systems and other specialized applications created user and transaction logs that monitored stroke-by-stroke activities taking place on these platforms. This allowed for a new type of process intelligence where analytics were created to assess end-to-end workflows in order to locate points of friction and identify opportunities to optimize and enhance the outcomes of these operations.

The introduction of websites and web-based transactional options that allowed users to engage directly with corporate offerings in the mid-to-late 1990s expanded the sources of data that could be analyzed to include customer activities—how customers accessed, engaged with and utilized corporate websites, transactional apps and discussion forums. The multitude of client data exploded as the current third tech-driven innovation cycle began and static Web1 offerings gave way to more user-centric, interactive Web2 platforms in the 2000s.

Multiple types of new data became available through social media platforms—demographic data, behavioral data, transactional data, and psychographic data that describe a user's personal traits and preferences. Other types of data became available as mobile devices and wireless networks expanded exponentially and adopted, even in remote places, geolocation data, sensor data and machine data from the internet of things. The speed of data creation in recent years has been unprecedented. In 2010, there were two zettabytes of data available globally. By 2020, that figure had risen to 64 zettabytes, and forecasts are for at least 181 zettabytes by 2025.⁴

Multiple types of new data became available through social media platforms—demographic data, behavioral data, transactional data, and psychographic data that describe a user's personal traits and preferences. Other types of data became available as mobile devices and wireless networks expanded exponentially and adopted, even in remote places, geolocation data, sensor data and machine data from the internet of things.

Advancements in how data inquiries are processed—based on a blueprint provided by Google in 2003—provided a pathway to utilize all this data without having to normalize and structure each input. Milestones in the advancement of AI allowed for machines to learn from these vast pools of data and extract insights from language, images, interactions and more. Together, these technologies have been used to develop smart algorithms that can analyze and insert intelligence into a consumer process to prompt a specific action at the moment, across both physical and digital media. This approach now looks to create seamlessness across a set of micro experiences to engage customer attention and prompt customers to transact.

Insights have thus far been primarily based on how an individual participant aligns to a specific cohort and assesses what behaviors might optimally be expected of the individual participant based on how others in their cohort behave. Enhancements already emerging in the fourth tech-driven innovation cycle could soon see those models become individualized to the point that intelligence can provide insights on a specific person and forecast that individual's future actions.

Emerging algorithms predict what series of next steps an individual might take based on the local time and that individual's current location and activity. They look at the individual's historical preferences and transactional patterns. Commercial options can then be proactively determined and displayed to the customer to shape their demand. As such personal intelligence is increasingly developed, deployed and improved upon, the timeframe for commercial engagement may shift yet again—from real time to future focused.

These types of analytics could prove critical for commercial enterprises as they seek to redesign how they engage with a customer to integrate into the individual customer's ongoing activities, embed their offerings alongside other complementary providers and structure a transactional experience that could offer the most appeal to the user and possibly obtain the highest valuation.

Megatrend 5: **Institutionalization of the individual participant**

The fifth megatrend looks at how the power of individual participants has been seemingly elevated through the use of digital asset platforms, to possibly match the power historically enjoyed by institutional investors and participants. This megatrend has occurred as the set of cumulative changes enabled by the tech-driven innovation cycles slowly reduces the gaps between privileges extended to institutional participants and potential opportunities available to individual participants.

Individual investors and consumers had little access to such opportunities prior to the modern computer age. Advances in recordkeeping and transaction processing enabled by commercial

computing during the first tech-driven innovation cycle allowed for the development of new credit models that bestowed financial trust on individual borrowers. Up until the 1960s, installment loans had been the sole credit arrangement that individual borrowers could access to extend their buying power; but these one-off structures bestowed little financial trust as they were typically tied to only one manufacturer or retailer. The introduction of the revolving credit card and the rapid build-out of a global credit card processing network allowed any participating merchant to confidently extend financial trust to an individual card holder and allowed a cardholder to use their credit line opportunistically according to their own needs and desires.

Self-service models enabled by the emergence of the websites in the 1990s and early 2000s created new pathways for individual consumers to transact autonomously. Individual consumers were able to initiate and direct their own transactions across a whole range of new models—online shopping, banking, investing, buying groceries, traveling, purchasing music, and more. Additionally, individual consumers could utilize the expertise being shared over the web to build their own knowledge and skills in diverse areas—from investing to home improvement to decorating to cooking to playing an instrument and more. This created a do-it-yourself mindset that transformed entire industries and empowered individual consumers to act autonomously and rely less on third parties.

New technologies had been used as a tool to achieve individual user goals in these early tech-driven innovation cycles, but the emergence of social media and sharing platforms in the early to mid-2000s changed the nature of the relationship between an individual user and the internet world. Each user had always had a social identity, but new offerings extended the perimeter of that identity to the global town square.

Curating their online brand to reflect a certain self-image has become commonplace for many individual consumers. Affiliating with certain communities and experts amplifies these personal brand messages and connects individual consumers to like-minded peers and sympathetic networks. The plethora of information available through targeted communities allows individual users to solicit advice, feedback and support, as well as engage with experts who can help them achieve their goals and objectives. New online capital-raising options—from crowd-funding platforms to peer-to-peer lending apps—are providing options for individual entrepreneurs to attract capital to fund their ventures.

Capabilities emerging as part of the fourth tech-driven innovation cycle could close the remaining gaps that favored institutional investors with more pathways to financial independence. Tokenized limited-partnership shares in private funds and new categories of tokenized assets, such as digital art and royalty pools, can provide individual investors access to alternative assets—a key source of institutional investors' returns over the past 20 years. Decentralized financial models

allow many individual investors to activate sophisticated investment techniques to potentially enhance their returns, including borrowing and lending assets, utilizing derivatives, and using their holdings as collateral.

Digital token issuance platforms can allow individual investors to raise their own capital by minting non-fungible tokens and distributing them, as well as providing a forum for many individual investors to access issuances from other creators. New passive income models are emerging that can allow individual investors to leverage their own assets in new arrangements, including an ability to monetize personal data, stake assets to earn rewards, contribute assets to liquidity pools and share new types of assets that can have value in the digital landscape, such as their network bandwidth.

Collectively, these innovations beginning with the introduction of revolving credit cards in the 1960s have come together to offer many individual investors and consumers a set of privileges and opportunities that had previously only been available to institutions. This has empowered many individual participants to act and organize their lives to achieve their own long-term goals and missions, as well as to rely on other individual participants to possibly support them, just as institutions rely on other institutions to achieve their goals. Empowering individual participants in this way has helped to elevate their importance as an audience and can justify the gradual reorientation of commercial enterprises to cater to individual consumers' and investors' needs and preferences.

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Conclusion

While each megatrend has developed along a unique trajectory and worked slowly over time to alter behaviors and expectations, one common thread runs through them all: The role of the individual participant has been strengthened and modern society's institutions and enterprises have been forced to rethink their value proposition and their engagement model to remain competitive and relevant. The gaps that used to favor institutions—including commercial enterprises—over individual participants are reducing, and the ability of many individual participants to use tech channels to band together and pursue long-term goals are allowing them to amplify their own voices and powers.

Web3 technologies are ideally suited to put a financial model into place that could provide power and voice for the economic interests of individual participants. This possibility likely puts more burden on businesses to reorient the delivery of their goods and services to better cater to individual consumers' needs.

Understanding that these shifts in behaviors and expectations have been building for 60 years helps to underscore the likely inevitability of where the next tech-driven innovation cycle may take us.

Web3 technologies are ideally suited to put a financial model into place that could provide power and voice for the economic interests of individual participants. This possibility likely puts more burden on businesses to reorient the delivery of their goods and services to better cater to individual consumers' needs. Increasingly, the experience that a transaction offers and the influence and status payoffs it can provide may inform the value of a product or service. Engineering the optimal offering may require a new type of multi business cooperation made possible by the

composable and interoperable nature of Web3 development and by the advancement of AI algorithms that are moving toward being able to build personal intelligence about a specific individual.

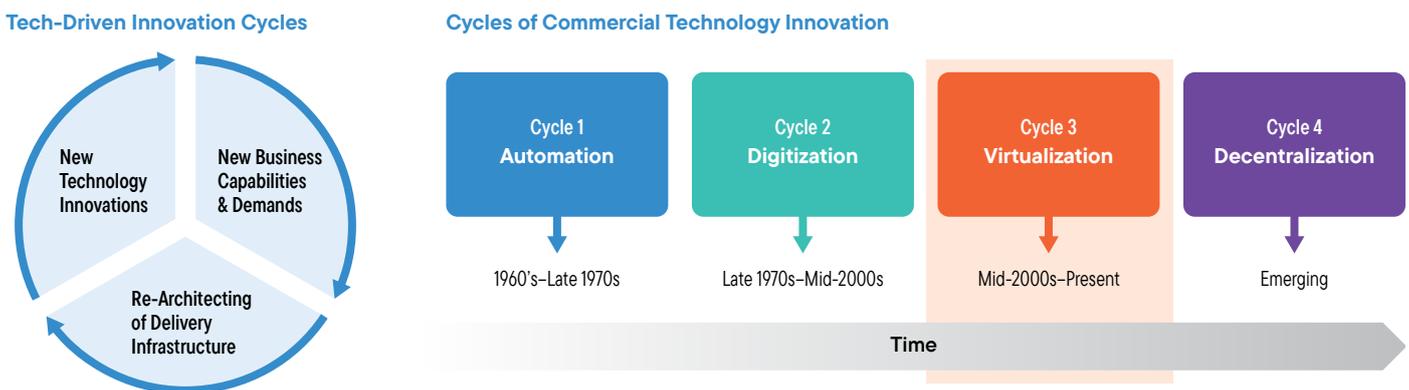
As has been the case with other institutions, the wealth and investment management industries have been reshaped by the megatrends and reoriented over the years to offer more individual investors access to a more fair playing field. The range of monetizable assets and new passive income opportunities that could be directly accessed and controlled by individual investors in emerging Web3 models—together with options to utilize sophisticated, permissionless investment techniques to augment portfolio returns—are likely to further transform financial opportunities and blur the lines between investment management, wealth management and banking in the future.

The brief introduction to new financial models provided at the end of this paper will be explored in more depth in the final part of this series, which will be released later in 2023. With that work, we will have completed our examination of how disruptive technologies have transformed modern societies and our industry and laid out a vision that can inform our partners and customers, as well as Franklin Templeton itself, on how to evolve our offerings for the future.

Introduction

In Part I of this series, *Evolution of commercial technologies and impact on business delivery*, we explored how three distinct tech-driven innovation cycles—automation, digitization and virtualization—have already transformed businesses since the commercialization of computing began in the 1960s. Each of these cycles featured the introduction of new technologies, which in turn allowed enterprises to enhance their transactional abilities and create new business models that resulted in the re-architecting of the enterprise infrastructure and new competitive pressures to evolve an organization’s delivery capabilities. We outlined how the introduction of blockchain, smart contracts, oracle networks and other Web3 technologies are now initiating a fourth tech-driven innovation cycle. These cycles are highlighted below in Exhibit 1.

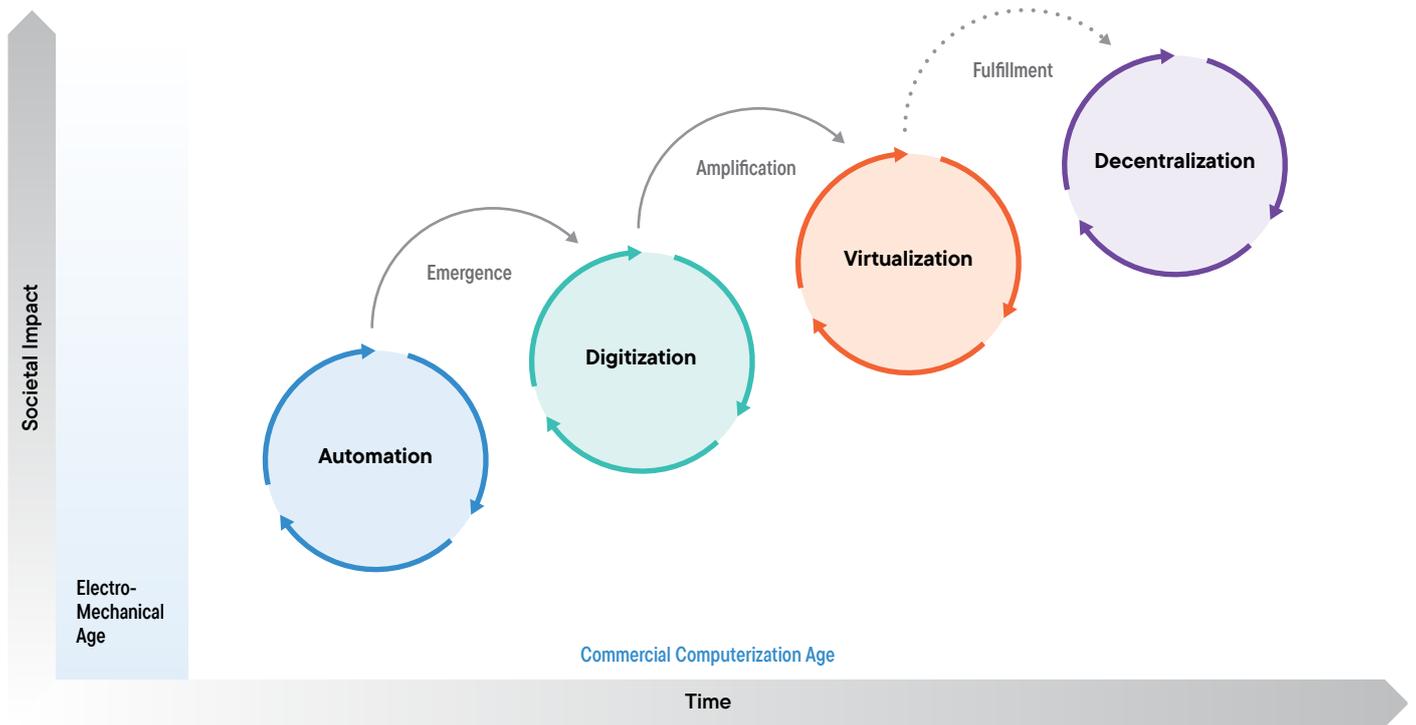
Exhibit 1: Tech-Driven Innovation Cycles and Cycles of Commercial Technology Innovation



Source: Franklin Templeton Industry Advisory Services. For illustrative purposes only.

The second piece of this series will now explore how the changes in commerce enabled by new technologies have in turn altered the way that modern society works. Indeed, looking across the three innovation cycles—automation, digitization, and virtualization—it is possible to see first the emergence and then, more significantly, the amplification of a set of modern megatrends that have become more transformational and impactful over time. Understanding the trajectory and influence of these megatrends is critical because the emerging fourth wave of tech-driven innovation—decentralization—is likely to see the fulfillment of these megatrends and mark a profound reengineering of the way that modern society operates. This is illustrated in Exhibit 2.

Exhibit 2: Progression of the Megatrends Across Tech-Driven Innovation Cycles



Source: Franklin Templeton Industry Advisory Services. For illustrative purposes only.

Viewed from a long-term perspective, it is possible to see that new technologies have been deployed by enterprises in a manner that has worked to increasingly empower individual users and offer them a growing set of information, capabilities and options. In turn, commercial enterprises and institutions have become increasingly reliant on their ability to connect with, activate and network with individual users to achieve critical mass and sustain viability.

Extrapolating these trends against the backdrop of the emerging fourth tech-driven innovation cycle shows a future when a growing share of commercial pursuits will be geared around individual users’ activities, interests and workflows and when commercial enterprises increasingly must use financial incentivization to attract and align their interests with those of their potential consumers. If the extrapolation is correct, this pathway for modern society marks almost a complete reversal of the corporate-centric power structures that epitomized the early years of tech-driven innovation.



Megatrend 1

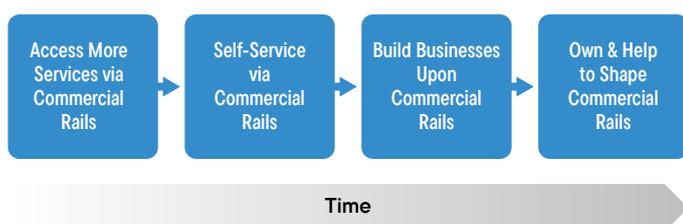
Democratization of access to the commercial transaction rails

As the computer age took hold, businesses used the ability to automate workflows and to collect, tabulate and analyze large amounts of data to transform the way in which they performed business tasks. This allowed enterprises to pull together their various affiliates and constituents in a more efficient manner. They extended their offerings to a larger and more widespread group of consumers.

Over subsequent technology waves, this transformation of the commercial transaction rails progressed. Activities that were formerly performed solely over proprietary networks opened up to include a broadening set of participants. More constituents obtained the opportunity to initiate and perform transactional activities. This not only benefited suppliers and distributors allied with commercial enterprises but allowed for a democratization of access that transformed the options available to individual participants.

Individual users moved from being able to access more services to being able to self-service to, today, being able to build their own businesses on commercially provided transaction rails. Looking ahead to the emerging fourth wave of tech-driven innovation, current trends would indicate that individuals and groups will be able to elevate their participation or influence even further over the commercial rails they utilize by sharing in the ownership and governance of this infrastructure. This progression is illustrated in Exhibit 3.

Exhibit 3: Impacts of Individuals Being Able to Access Commercial Rails



Source: Franklin Templeton Industry Advisory Services. For illustrative purposes only.

Proprietary networks emerge to ignite commercial activities

As discussed in Part I of this series, computational abilities progressed rapidly in the latter part of the 19th century and during the early part of the 20th century. Mechanical calculators gave way to electro-mechanical calculators and eventually to electro-mechanical mainframe computers. World War II provided a backdrop of urgency to such innovation as speedier computational abilities were required to coordinate air-to-ground defensive and offensive capabilities, coordinate massive multiteam research projects to develop weaponry such as the atomic bomb, and to decipher enemy codes and glean critical intelligence.

Even after the war ended, the size and complexity of computers rendered them suitable only for the military, government and large research universities. The first

programmable, electronic, general-purpose computer was the Electronic Numerical Integrator and Computer (ENIAC) that was created in the mid-1940s. ENIAC had roughly 18,000 vacuum tubes to hold memory. Furthermore, storing the vacuum tubes and the machinery to cool them required a floor space of more than 1,800 square feet.⁵

Technological innovations driving change in automation

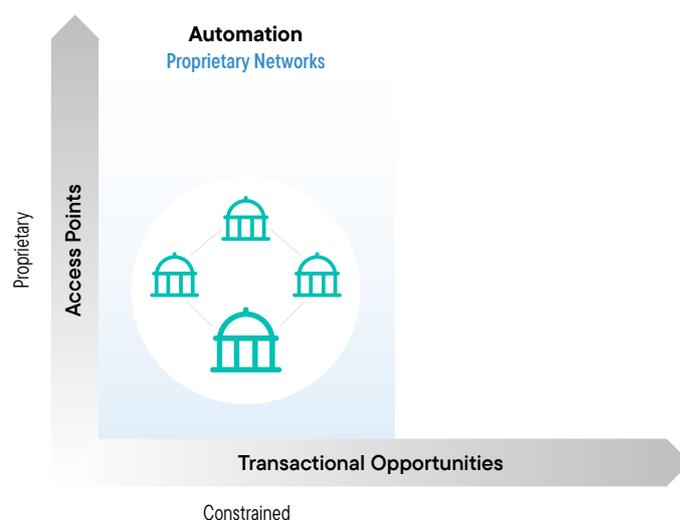
The invention of the transistor in the late 1940s, disk drives and instantly accessible core memory in the early-mid 1950s and the microchip in the late 1950s set the stage for more commercially viable computers and the first tech-driven innovation cycle: automation.

“By the 1960s, the new technology of miniaturized circuitry made possible the advent of the minicomputer, a refrigerator-size machine powerful enough to take over some of the mainframe’s tasks.”⁶ The IBM 1401 Data Processing System became the first commercially successful computer and was the world’s most popular computer during much of the 1960s. By 1965, global installations of the 1401 and its family of machines represented half of all the computers being used, with 15,000 deployments as of 1967.⁷

Evolution of commercial transaction rails in automation

These early computers provided the foundation upon which electronic commerce, now simply called e-commerce, was conceived. For the first time, computers could instantly handle transactions and keep track of inventory, prices and customers. Businesses used their computing capabilities to create powerful proprietary networks, as shown in Exhibit 4.

Exhibit 4: Early Commercial Transaction Rails



Source: Franklin Templeton Industry Advisory Services. For illustrative purposes only.

In 1986, SABRE launched the airline industry’s first revenue management system that aided airlines to maximize the fare for every seat it sold. American Airlines spun off SABRE as an independent publicly traded company in 2000. Today, SABRE remains the leading provider of travel technology products and services around the globe. The system is available 24/7. It is used by more than 57,000 travel agencies globally and handles over 42,000 transactions per second. 98 million trips are active through SABRE.

These networks were developed in an industry-specific manner. The most famous example from this period was by far the SABRE (semi-automatic business research environment) airline reservation system. SABRE was a venture started by American Airlines as an easy way for travelers and eventually travel agents to make airline reservations. Developed after four years of research and deployed on early IBM computers in 1960, the SABRE system was able to handle 84,000 telephone calls/day when it launched. By 1964, it was processing 7,500 reservations per hour. This compared to the old manual system used by American Airlines that took 90 minutes to process a single reservation.⁸

Having the SABRE system gave American Airlines a distinct competitive advantage. The company’s flights were always suggested first on the SABRE system and other airlines that sold tickets on the system paid a fee for each sale, earning American Airlines revenue.⁹ By 1976, SABRE was installed in a travel agency for the first time, sparking a wave of travel automation that featured more than 130 location deployments in that first year alone. These deployments allowed travel agents to make their own inquiries and book their own trips without having to go directly to the airline. By 1978, SABRE could store the histories of one million fares in an average day.¹⁰

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Another early proprietary network that proved transformational was the Analytics Systems Automatic Purchasing (ASAP) offering, created by the American Hospital Supply Corporation (ASHC).

“Traditionally, AHSC’s products” were “sold by its field salespeople, who worked from their homes and called directly on hospitals and other organizations. Until 1964, orders were generally taken in person by the salesperson, who would then mail the orders to company headquarters.” “Paperwork could be formidable: an 800-bed hospital might easily stock 30,000 items and generate 50,000 purchase orders per year—at an estimated cost of \$25–\$30 each. Within a hospital, there may be as many as 10 different” buying centers and “the price of each item was negotiated by the customer and sales representative, making billing a difficult and complex process.”¹³

Initially, the automation of these purchasing arrangements proceeded slowly. “In the early 1960s, one of AHSC’s West Coast offices” put a dataphone connection in one of its large hospital client’s purchasing departments and attached it to a punch card reader in AHSC’s distribution center through a telephone line. “The hospital was given a box of pre-punched cards—one for each item purchased.” “The cards were placed on the shelves of the hospital’s storeroom...between the boxes of supplies at the point where more should be ordered.” Each card was fed through the hospital’s computers, “causing a duplicate card to be punched” at AHSC’s distribution center and then hand-fed through the company’s central mainframe.

The approach was very successful, speeding up communications, reducing inventory and making orders timelier and more accurate. AHSC offered a similar service to other customers. “More than 200 agreed immediately.” By the mid-1970s, AHSC had improved upon this multistep process and had developed ASAP, its proprietary mainframe-based system to keep track of orders and inventory, connecting the card reader directly to this host. Company “sales more than tripled from 1975 to 1984, with little increase in sales staff and no increase in the sales support staff.”¹⁴

Other benefits also accrued. The ability for customers to enter their own orders, check their order status and inquire about pricing and availability “saved AHSC time and money.” “Customers using ASAP tended to be more disciplined buyers who got more items on each order, thus lowering the costs of packing, shipping, billing, and collecting. Finally, AHSC received important but difficult-to-measure benefits from analyzing ASAP data.”¹⁵

In both of these examples, the introduction of new technology allowed for an exponential increase in the productivity of these companies and industries. Transactions took less time and the salespeople performing the task could service a far larger number of customers. Some of the tasks that a salesperson would typically perform were off-loaded to the consumer or the consumer’s agent, allowing for the first instances of self-service. The types of transactions that could be initiated, however, were limited. As the next tech-driven wave of innovation took hold, both the variety of transactions that could occur and the expanse of self-service options increased significantly.

Virtual destinations expand transactional opportunities and self-serve options

By the late 1970s through the early 2000s, another set of technology innovations emerged that transformed commerce through digitization.

Technological innovations driving change in digitization

This transformation was spurred by a dramatic drop in the price of microprocessors, which allowed personal computers to progress from being a hobbyist pursuit to a booming industry by the late 1970s–early 1980s. It was during this period that Bill Gates, the chief executive officer (CEO) of Microsoft at the time, along with co-founder Paul Allen, set the goal that someday there would be “a computer on every desk and in every home.”¹⁶ This vision was further boosted by IBM, which chose an open architecture and interoperable approach to its personal computer business that helped to drive massive business uptake.

Advances in database design also played a role. Until the 1960s, databases stored information in a tree-like parent-child structure. Data was implicitly joined together in this approach, like a folder system for storing files. In the 1970s, relational databases introduced a new method for storing data in tables with columns and rows. This allowed for schemas of the data to be published and for computers to search for required information without having to navigate the entire

Together, these three technology innovations—personal computers, relational databases, and the emergence of the web—set the stage for the second tech-driven innovation cycle: digitization.

tree, thus making it much easier and faster for people to extract specific bits of information from their databases and join them together.

Finally, the development of network technologies and the creation of network communication protocols such as the transfer control protocol/internet protocol (TCP/IP) allowed for the creation of the internet and set the stage for the emergence and growth of the World Wide Web. These efforts, begun in the Cold War era under the auspices of the US government’s Defense Advanced Research Projects Agency (DARPA), were built upon by many researchers and programmers, including Tim Berners-Lee, a scientist at CERN, the European Organization for Nuclear Research. In 1989, Berners-Lee launched hypertext mark-up language (HTML), the uniform resource identifier (URL) and the hypertext transfer protocol (HTTP), the three foundational protocols that allowed for the development of websites. These protocols were put into common use by 1993 when CERN agreed “to make the underlying code available on a royalty-free basis.”¹⁷

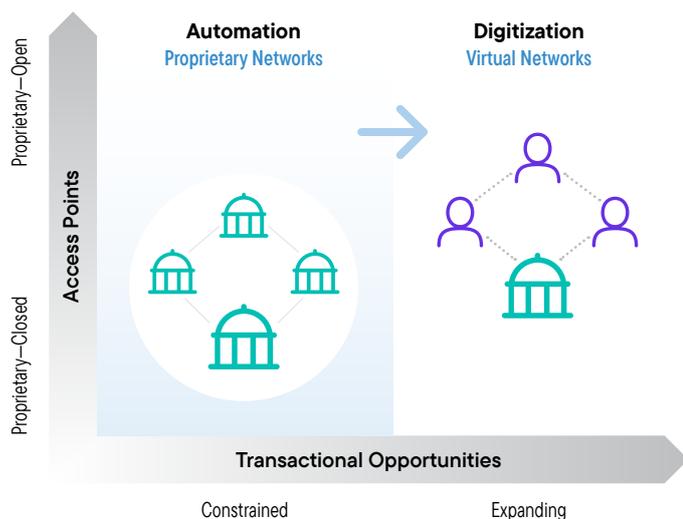
Together, these three technology innovations—personal computers, relational databases, and the emergence of the web—set the stage for the second tech-driven innovation cycle: digitization.

Evolution of commercial transaction rails in digitization

For the first time, organizations began to open their proprietary networks directly to individual users and closed groups. Proprietary networks and systems built during the Automation era evolved as enterprises launched their own websites. This is illustrated in Exhibit 5 on the next page.

The impacts of this act were far-reaching. Initially, the ability to launch websites on the World Wide Web allowed traditional business organizations to post customer-focused information—service information such as hours, phone numbers and contacts, user manuals and branding materials. Once marketing departments realized that websites were viewable by millions of people, however, the focus changed.

Exhibit 5: Opening Up of Commercial Rails



Source: Franklin Templeton Industry Advisory Services. For illustrative purposes only.

Businesses began using websites for marketing of their products shortly after graphical-based web design became available in the early 1990s. Selling products through the web was initially prohibited in the United States, however, by the US National Science Foundation (NSF) because of fears of credit card theft. Online sales did not begin until after 1994, when Netscape introduced the Secured Socket Layer (SSL) to encrypt the connection between a company's server and the client's computer—allowing credit card data to be masked so that the information could not be intercepted by a third party.¹⁸ This made the ability to use a credit card over the web safer, prompting the NSF to lift its prohibition of commercial enterprises on the web in 1995, and changing the nature of how companies might use the new offering.

For traditional business organizations that relied on catalog sales, the ability to secure transactions through the web opened a whole new sales vector, allowing them to offer products for sale through the web. The amount of reengineering required to enable online sales was significant, however, as most organizations had built systems designed to service their own employee base. Exposing certain functions to the public at large and making those services available 24/7 was a technological hurdle. The pressure to do so, however, was significant.

Improvements in server technology in 1995, including the ability to build websites from product databases, resulted in the creation of large, internet-only businesses like eBay and Amazon.com. Prior to these advancements, product sales through a website required that each product be manually

posted on a web page. Database-driven sites allowed companies to use web-page templates to display tens of thousands of products on the fly.¹⁹

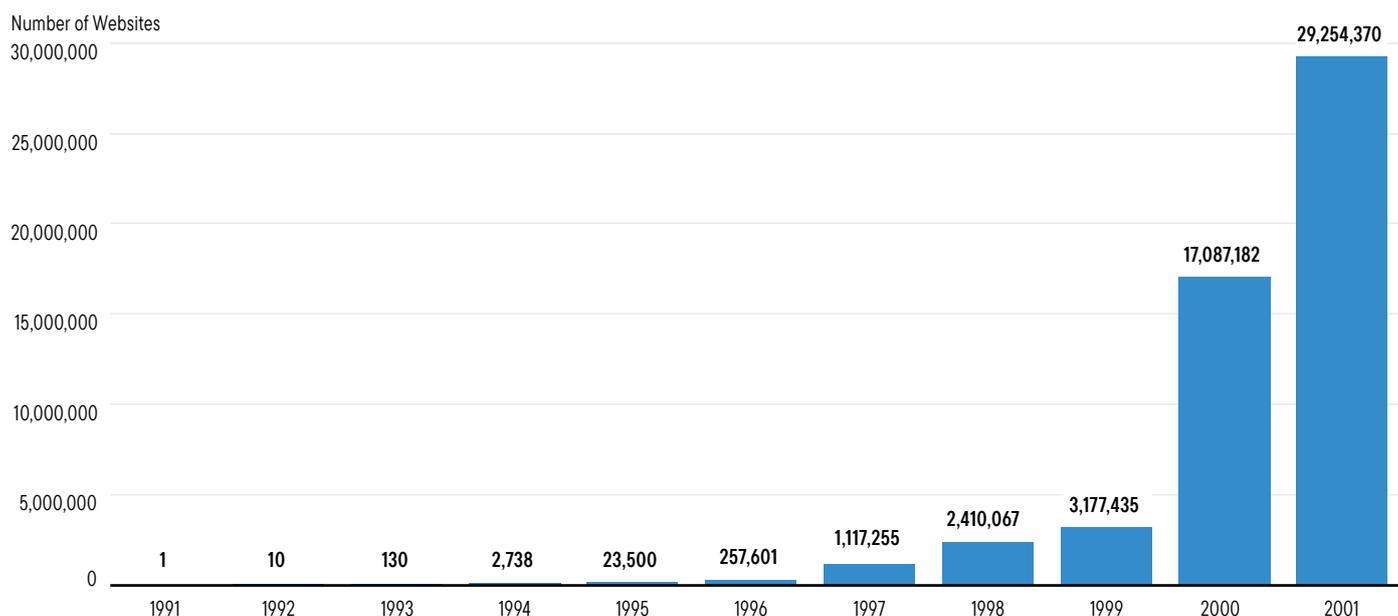
These developments—the lifting of restrictions on internet commerce in the United States in 1995, the ability to perform secure credit card transactions and the launch of new internet-only retailers able to build database-driven sites—resulted in an explosion in web launches. Exhibit 6 on the next page shows that there was more than a 10x increase in the number of websites between 1995 and 1996 and another 100x increase in the number of sites between 1996 and 2001.

In 2000, the first full year that the US Department of Commerce reported online sales, e-commerce retail sales hit roughly US\$27.6 billion, about 0.93% of the total retail sales of US\$2.98 trillion. Growth continued mostly uninterrupted over the following 20 years. By 2021, US e-commerce sales were US\$870.8 billion, accounting for 13.2% of total sales.²⁰

Other types of self-service capabilities emerged during this period that went beyond the ability to perform online shopping. These included:

- Online brokerage:** E*TRADE launched in 1992 as a pioneering online brokerage service provider offering back-office online processing services to discount brokerage firms such as Quick & Reilly, Charles Schwab and Fidelity. The firm moved in 1995 to a direct-to-consumer strategy, becoming the first online brokerage firm and deriving over 80% of its revenues from trading commissions in that year alone. Other discount providers quickly emerged. By mid-1999, a report from the Massachusetts Institute of Technology estimated that there were four million Americans with active online stock trading accounts, representing 25% of all retail stock trades and approximately 15% of the volume on the New York Stock Exchange and the NASDAQ. The number of online trading brokerage firms grew from 12 in 1995 to approximately 100 in that same period.²¹ By 2023, the global online trading market is expected to grow to US\$10.96 billion with a CAGR (compound annual growth rate) of 6.7%.²²
- Online travel:** The first electronic airline ticket, a digital representation of a paper ticket stored in an airline's reservation system, emerged in 1994, allowing airlines to make the ticketing process cheaper and easier. SABRE,

Exhibit 6: Growth of Websites in the First Decade of the Internet



Source: Austin, Ben. "The growth of the Internet: from 1990 to 2019." Absolute web site. May 13, 2019.

the airline booking system discussed previously, founded its own online travel agency in 1996—Travelocity (acquired by Expedia in 2015)²³—the first website to allow consumers to reserve and purchase tickets directly. Microsoft quickly followed, launching Expedia.com (Microsoft Expedia Travel Services)²⁴ in 1996. By 2000, Priceline.com (which acquired various brands and changed its name to Priceline Group in 2014 and to Booking Holdings in 2018)²⁵ was founded to offer discount tickets, and five of the largest US airlines at the time (American Airlines Group, Northwest Airlines [merged with Delta Air Lines in 2008],²⁶ Delta, United Airlines Holdings and Continental Airlines [merged with United in 2010])²⁷ founded Hotwire—a full-service travel website offering airline tickets, hotel bookings and rental cars for discount prices. During 2003–2005, Expedia.com, Hotwire, TripAdvisor and Hotels.com were acquired by IAC (Interactive Corporation),²⁸ which in 2005 spun off its travel segment into publicly traded Expedia, Inc.,²⁹ which in 2018 changed its name to Expedia Group in recognition of its vast travel brands.³⁰ By the early 2000s, online booking became a reliable alternative to phone sales for nearly all airlines and travel agencies. By 2018, “82% of all travel bookings around the world took place without human interaction” and it is estimated that “700 million people will make a booking online in 2023.”³¹

Online music distribution: “In September 1997, Capitol Records made history by releasing Duran Duran’s ‘Electric Barbarella’ on the internet as the first-ever digital single.”³² In June 1999, a new piece of computer software—Napster—was released that changed the trajectory of the music industry. At the time of Napster’s release, physical music industry sales had been experiencing a prolonged period of growth. Global record sales tripled from roughly one billion in 1974 to more than three billion in 1999.³³ US recorded music revenues hit an all-time high in 1999 of US\$14.6 billion—a figure not surpassed until 2021.³⁴

From 2000 to 2010, sales of physical records decreased by more than 76%.³⁵ Napster set the stage for that prolonged reversal. It was a new way for peers to share their music for free with other individual users. Recording companies and some artists saw this as piracy and copyright infringement. Legal actions were taken against Napster and then a slew of other music-sharing services in subsequent years, but just as one sharing service was shut down, another would launch.

This laid the groundwork for a new music distribution model initiated by Apple in 2003 with the launch of the iTunes Music Store. Apple was able to provide the cataloging and downloading capabilities of the music sharing sites but did so while preserving the digital rights of the underlying companies and artists. Moreover,

Apple changed the way that people bought music. Steve Jobs convinced the heads of the “big five” record labels at the time—BMG, EMI, Sony Music Entertainment, Universal Music Group and Warner Music Group—to break down albums into individual tracks costing US\$0.99 each.

The iTunes Music Store launched in April 2003 with more than 200,000 tracks on offer—a figure that doubled within six months.³⁶ The iTunes Music Store “sold 1 million downloads in its first week, and the next month Apple sold its 1 millionth iPod.”³⁷ By the end of 2003, the iTunes store “celebrated its 25 millionth download” and by July 2004, “Apple sold its 100 millionth song.”³⁸ By 2011, “online music sales surpassed physical music sales” globally.³⁹ By 2022, Apple itself had sold more than 40 billion songs.⁴⁰

In addition to transforming existing businesses, the digitization era also introduced some completely new models—the foremost of which was the ability to “search” online. Search engines enabled content creators to find software or inspiration to build web presences and online indexing for the same so others could find and use the content.

Early search engines simply listed the URLs for different websites, not any information about their content. In 1993, JumpStation offered a “linear search which showed a page’s title and header in the same results.” In 1994, Yahoo! Search was launched. It “was the first collection of web pages across the internet.” It allowed website owners to add their informational sites into the collection for free or pay US\$300 per year to add a commercial use. Yahoo! Search also featured a new capability called a web crawler, allowing for “the first search engine to index entire pages.” In 1996, Google (now Alphabet, which includes Google and YouTube) founders Larry Page and Sergey Brin created BackRub—the predecessor to the Google search engine—the first service to model backlinks from one website to another and rank each site based on the number of associated links. This approach was also the foundation for Google, which launched in 1998.⁴¹

Together with the growth of search was the rise of internet advertising. In 2000, Google launched AdWords—a “proprietary and automated digital auction system that let advertisers instantaneously bid on top sponsored spots on its search results page every single time a user typed in a selection of keywords into the search bar.” This was followed in 2007 by the launch of AdSense—a “product that

let website owners place contextualized and targeted ads.” That same year, Google also purchased DoubleClick—a company specializing “in display ads and ran its own exchange.”⁴² McKinsey & Company estimated that by 2009, the worldwide internet search had an aggregate gross value of US\$780 billion.⁴³

The tech-driven innovations of the digitization era thus went far to open the commercial rails for individual users to be able to manage their own activities—from shopping to travel to trading to listening to music and more. New business models, like search and digital advertising, helped individual users navigate, understand and access these new transactional options. As transformational as this seemed at the time, however, it was still only a bilateral engagement between the individual user and the sponsoring enterprise. Users could access websites to initiate and fulfill their own actions, but such fulfillment was done exclusively with the provider of the service.

This period in history is now deemed to be “Web1”—the first incarnation of the internet. The next tech-driven innovation changed the nature of engagement. New technology innovations allowed for individual and group users not only to participate, but also to create commercial opportunities, enabling a new multilateral approach to commerce.

Virtual platforms enable multilateral approach to commerce

Key technological advances set the stage for the current tech-driven innovation cycle: virtualization. This era began in the mid-2000s, fed by major advances in utility computing or cloud computing, the growth in mobile devices and smartphones, and by the emerging science of big data and its accompanying AI toolkits.

These innovations changed the nature of the internet—making it more user-centric and communal as businesses, institutions, and individual users gained the ability not only to access, but also to post to, integrate with and access data from other entities’ websites. These capabilities marked the progression from Web1 websites to Web2 platforms.

Technological innovations driving change in virtualization

The roots of cloud computing stretch back to the initial creation of large mainframes in the World War II and post-war eras. Large universities, research groups, and government entities were the main consumers of mainframe technology and offered time-sharing arrangements that allowed researchers to schedule time to run inquiries.

One of the first companies to take advantage of this new ecosystem was Google. To obtain the processing power required to run its search algorithms, it ran a distributed network of thousands of low-cost computer servers that used the idle capacity of the always-on phone and cable lines. This demonstrated the potential of “on-demand” computing.

These mainframes required each request to be programmed uniquely and each program to run as a single batch. There were often long periods of time when computers sat idle as programs were being input. Efforts to enable multiprogramming were begun to allow processing capacity to be optimized.

This concept evolved over the following decades—first to being able to store multiple “states”—the requests and activities of each user—in core memory and then to running virtual machines within the same computer. It set the stage to offering computing or storage as a utility that allowed the same hardware to be effectively shared. Initially, this utility concept was done around a single mainframe, but as networking technologies and the internet developed, it became possible to offer utility computing or storage through the web.

Facilitating this networked version of utility computing were major advances in telecommunications. Only limited amounts of data could be exchanged using analog telephone lines and modems—the early iteration of connecting to the internet—but a massive upgrade of the global telecommunications ecosystem occurred in the late 1990s and the world shifted to broadband technologies—enabling two-way data exchanges through fiber optic lines. Internet service providers contracted with local phone companies to utilize these new and faster network lines, which allowed more business and personal computers to connect to the internet and have “always-on” access.

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Soon thereafter, Amazon rebuilt its infrastructure to enable other retailers to build online shopping sites on top of its platform, providing partners a set of APIs—pipes that allow servers, applications and databases from different organizations to talk to each other. This work became the foundation for Amazon Web Services (AWS)—the first cloud computing platform—which launched in 2006. AWS marked the innovation that brought this full set of concepts together—a network-accessible, always-on, on-demand platform that allowed for the sharing of computing capabilities and storage. Other similar offerings followed, including Microsoft Azure and Google Cloud.

Another beneficiary of the upgrade in telecommunication lines was the mobile phone industry, where efforts to ensure global communication standards allowed for a world-wide set of innovators to quickly enhance the utility of mobile devices. Within a decade of the first mass-produced mobile phone coming out of Japan, devices began to incorporate creative elements—cameras, video and recording options, web browsers, and the ability to download applications such as word processing, video editing and picture editing. The launch of the Apple iPhone in 2007 introduced touchscreen to the smartphone and created a compelling and intuitive user experience.

These mobile devices and smartphones freed users from having to be at a computer terminal to access the internet and allowed for information and services to be available anytime, anywhere. They also provided mobile phone users the ability to capture their thoughts and images with ease and share them over the same telecommunication and wireless channels running the mobile networks and internet.

Social media sites emerged to facilitate this desire for sharing and online community. MySpace launched in 2003; by 2006, it became the most visited website on the planet.⁴⁴ Strategic missteps stalled growth of the platform and left an opening for another competitor—Facebook—to emerge. The company changed its name to Meta Platforms in 2021, with the Facebook platform among one of several platforms in its portfolio. Other social media giants soon followed—Twitter, Instagram (now owned by Meta), Pinterest, Snapchat and, ultimately, TikTok. Hundreds of millions of users joined these networks, generating unprecedented

amounts of data—a resource that platforms quickly began to exploit to increase user engagement and drive powerful personalization algorithms.

To use the data being generated by these platforms and the plethora of geolocation data coming from satellites and sensor data from smart devices (internet of things), new data processing techniques were required. Much of these new data inputs were unstructured or at best semi-structured and were thus not easily mapped into the tables and rows utilized by relational databases. Technical papers published by Google in 2003–2004 provided the blueprint for a new approach for using and storing data, which came to be dubbed “big data.”

Up until the emergence of big data, applications queried and exported data from a relational database into the application itself to be utilized by the business logic stored in the application. Google’s approach reversed this process, essentially sending the application’s business logic to where the data resided and allowing that business logic to utilize the data in whatever form it had been received—structured, semi-structured or unstructured.

The Apache Software Foundation—the world’s largest open-source group of developers—came out with the Hadoop project in 2006 that offered “a framework that allows for the distributed processing of large datasets across clusters of computers using simple programming models designed to scale up from single servers to thousands of machines, each offering local computation and storage.”⁴⁵ The new data processing approach delivered on the three Vs of data utilization—providing an ability to process larger data inquiries (volume) across a broader set of inputs (variety) at a faster speed (velocity).

Now armed with the ability to access and utilize large datasets, AI tools were then developed to help sift through the data, parse it to be machine readable, and analyze it to improve decision-making. Advances in AI had been building slowly over preceding years, but the computers of the time could not store or process enough data to truly allow these tools to reach maturity. Big data solved that problem.

Deep learning emerged as a new approach for developing AI tools. Deep learning is a type of machine learning based on artificial neural networks in which multiple layers of processing are used to extract progressively higher-level features from the data. In essence, the processors keep finding results and then use those results to continue looking for more

patterns in the data. In 2009, a massive visual database of labeled images called ImageNet was launched to help train these AI networks. By 2014, a group of scientists had created generative adversarial network frameworks that teach AI how to generate new data based on the training set.

The result of these efforts has been the development and deployment of AI tools into nearly all aspects of daily life—allowing individual users to use facial recognition to open their phones, ask Siri or Alexa for directions or to make calls while they are driving, get new streaming recommendations based on their personal viewing patterns, run their homes through smart devices, see items they browsed show up in the ads of their search and web pages, receive targeted content in their social media feeds and, in some instances, even allow their car to drive itself. Businesses, governments and universities are using AI tools such as natural language processing, machine learning, predictive analytics and interactive voice to improve commerce. AI is powering the sensors that are collecting data on weather, shipping, carbon emissions, traffic patterns and countless other items.

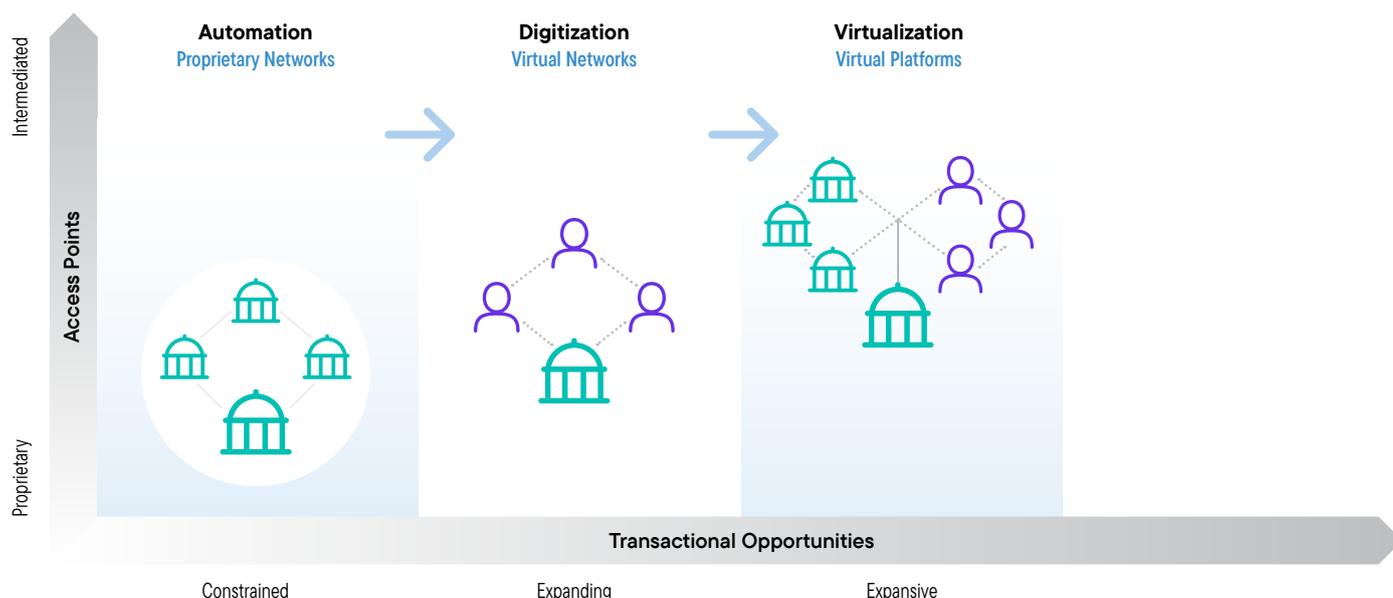
These innovations—the ability to perform on-demand computing and storage in the cloud, the anytime-anywhere ability to access and contribute to the internet through mobile devices and smartphones, and the ability to utilize all of the data emerging from these interactions and apply AI tools to help make sense of the information—have set the stage for the advancement from virtual destinations that ruled the digitization era to virtual platforms that are the current powerhouses of commerce. This progression is illustrated in Exhibit 7 on the next page.

Evolution of commercial transaction rails in virtualization

The virtual networks of the digitization era opened up some of the proprietary offerings used by individual enterprises to a broader set of users through the web. Today’s virtual platforms offer a different value proposition. They succeed by becoming an intermediary—allowing both providers and users of products and services to engage with each other through their offerings. As explained by Bain & Company, whereas a traditional approach to selling products or services “follows a linear path from supplier to customer, a platform is multisided, with [the platform] owners orchestrating interactions between two or more parties.”⁴⁶

This shift from a linear to a multilateral approach has far-reaching implications for commerce. Value linked to creating supply chains is giving way to value based on

Exhibit 7: Broadening Access to Commercial Transaction Rails



Source: Franklin Templeton Industry Advisory Services. For illustrative purposes only.

the strength of the community that the platform can attract. As more producers and consumers join a platform, the marginal acquisition costs decline and typically, the value for the platform and its participants increase. The more successful a platform is at building its community, the more likely other participants are to join. This “network effect” generates “winner takes most” market dynamics, raising the barrier to entry after a segment’s platforms reach a certain level of scale and success.⁴⁷

Platforms that utilize network effects place producers and consumers together to cocreate value. Collaboration and strategic partnerships take on increasing importance and the need to offer not only business-to-consumer but also business-to-business products and services, which together become key enablers to the creation of a platform ecosystem. Such ecosystems can expand the platform’s offerings far beyond the original segment. For example, Amazon.com and Alibaba Group Holding, two of the biggest e-commerce platform providers, have acquired businesses in a range of industries, from entertainment to finance to news to supermarkets and others.⁴⁸

Another example is Grab—a platform that began as an app for hailing taxis in Malaysia and then went on to become an on-demand ride-hailing app to access private drivers, and then the company, Grab Holdings, began to add cash payments and wallets to better support the many customers and drivers in Malaysia who did not have bank accounts. It subsequently began to expand into other Southeast Asian

countries and, over time, added food delivery, travel planning, advertising, digital payments and financial services. Growth happened both organically and through dealmaking, with Grab Holdings acquiring Uber Technologies’ Southeast Asian operations and also forming a joint venture with Singtel (Singapore Telecommunications), now called GXS, to offer “digital banking services across the region.”⁴⁹

As these platforms increase in size and their ecosystems expand, large enterprises (i.e., platform providers) often create strategic affiliations to connect to each other’s networks and amplify their branding and customer reach. Examples include the joint venture between Nike and Apple announced in 2006. First designed to connect Nike’s products to Apple’s iPod, the partnership expanded over time to the iPhone and the iWatch. Nike created fitness trackers, sneakers and clothing that connect athletes to branded iTunes channels and then to apps on their Apple devices that provided information on workouts such as “time, distance, heart rate, and calories burned.” Another example is the affiliation between Starbucks and Spotify whereby Starbucks employees get a Spotify premium subscription with which they can curate music playlists that customers can access through the Starbucks app and which employees can play in the store “to enhance the coffeehouse environment.”⁵⁰

As these types of partnerships extend and virtual platforms add increasing sets of services to their offerings, it becomes increasingly difficult for small and mid-size enterprises (SMEs) to access their target markets without a platform affiliation.

Having access to these platforms allows SMEs to achieve “scale without mass”—they can become global players and access potentially millions of users without the need to scale up in size. Indeed, there is an “extremely low marginal cost of processing, storing, replicating and transmitting data for additional users once the initial fixed costs incurred for hardware and software development have been covered/paid.”

These organizations are forced to join into the platform ecosystems and build their businesses on top of these platforms to enjoy the benefits such platforms offer, including “lower operation costs, access to business intelligence services,” access to an “increased client/supplier base and greater market outreach,” and “outsourcing logistics.”⁵¹

Having access to these platforms allows SMEs to achieve “scale without mass”—they can become global players and access potentially millions of users without the need to scale up in size. Indeed, there is an “extremely low marginal cost of processing, storing, replicating and transmitting data for additional users once the initial fixed costs incurred for hardware and software development have been covered/paid.”⁵² WhatsApp offers a telling example of this phenomenon. The messaging app was launched in 2009 and bought by Facebook (the company is now Meta) in 2014. The “app had 450 million monthly users, 70% of whom were active on any given day.” “These volumes were reached by an SME with only 55 employees.”⁵³

Individuals as well are finding ways to build businesses or supplement their income by utilizing virtual platforms.

- **Gig workers:** Platform-linked gig work has grown significantly as many individual workers are now pursuing multiple income streams to cobble together living wages. Such independently contracted or freelance work involves driving for a ride-hailing app; shopping for or delivering groceries or household items; performing household tasks, such as cleaning someone’s home or assembling furniture; running errands, such as picking

up dry cleaning; making deliveries for a restaurant or a store-delivery app or using a personal vehicle to deliver packages through a mobile app or website.

A Pew Survey from 2021⁵⁴ found that 16% of adults in the US have earned money by doing jobs on these platforms, and “adults under 30, Hispanic adults, and those with lower household incomes are⁵⁵ particularly likely to have earned money in this way.” The Pew Survey also found that only about three out of 10 adults in the US who have worked through such gig platforms in the previous year indicated that it had been their primary job.⁵⁶

New models for platform-based gig work are also emerging. Staffing agencies that have long supplied temporary workers are now offering one-off, no-commitment shifts in workplaces that rarely used temp labor before, such as restaurants, hotels and retailers. Snagajob, an hourly work platform, said that hourly work “shifts tripled from 2020 to 2021” and were expected to “quintuple in 2022—mostly as side income.”⁵⁷

- **Influencers/creators:** Individual users who post their content onto social media sites and draw enough followers from their communities to earn money from the platform represent another type of business being built on top of virtual platforms. As of December 2022, a snapshot of the “creator economy” shows that out of the more than 200 million creators earning money from their postings, just 10% earn US\$100,000 or more each year and only two million have more than one million followers. Nearly half (46.7%) of creators consider the pursuit to be their full-time job.⁵⁸

Creators who are seen as especially effective with certain demographic audiences are often offered marketing deals from brands looking to use their influence to raise awareness and interest in the companies’ products—thus becoming not just creators but influencers. The global influencer market is expected to have reached US\$16.4 billion in value in 2022—up 19% over 2021 valuations and up 10x since 2016.⁵⁹

Further growth is likely. 90% of marketing professionals believe that influencer marketing is effective. New marketing platforms are being designed specifically for influencers to help them run their businesses by giving them brand connections, cross-channel posting tools, key metrics and analytics. In 2021, the capital raised through these types of marketing platforms totaled more than US\$800 million.⁶⁰

- **Asset sharers:** Alongside the creator economy has been the growth of the sharing economy—another model in which asset owners use virtual platforms to connect with individual investors, organizations, or businesses interested in using those assets for a fee. A report from PwC’s Consumer Intelligence Series estimates that the value of the sharing economy across “five key sharing sectors—travel, car sharing, finance, staffing, and music and video streaming”—is projected to grow from about US\$15 billion in 2014 to approximately US\$335 billion by 2025.⁶¹ The types of assets targeted in sharing arrangements are also growing, with dedicated platforms looking to match capacity with demand in homes, jets, cars, bikes, scooters, fashion items, camera gear, office equipment and more.

Growth in the sharing economy is expected to come from both monetizing underutilized assets and/or forgoing purchases of those assets altogether. According to PwC’s survey, collectively, these business models are changing the way that consumers think about value. In the wake of the global financial crisis in 2008, a survey showed that 66% of consumers (and 77% of millennials) preferred a pared down lifestyle with fewer possessions. Four in five consumers agree that there are sometimes real advantages to renting over owning, and adults aged 18 to 24 years old are nearly twice as likely as those ages 25 years and older to say that access is the new ownership. Of US adults familiar with the sharing economy, “76% agree it’s better for the environment,” “83% agree it makes life more convenient and efficient,” and “86% agree it makes life more affordable.”⁶²

These new models—large enterprises and organizations forming co-branding affiliations to reach each other’s communities, SMEs and organizations building businesses within platform ecosystems, and individual participants coming up with new ways to earn a living or supplement their income by using these platforms—are all possible because of the growing democratization of access to commercial rails and the shift to a user-centric delivery of the internet, which has been the hallmark of Web2. We remain firmly anchored in this tech-driven innovation cycle at present. Yet pressures and fault lines with the current approach are emerging.

Emerging issues with the current Web2 approach

While commercial virtual platforms emerged by playing an intermediating and orchestrating role between suppliers and consumers of products and services, over time many providers have become publicly traded companies and their interests have tilted toward shareholders. Platform providers

Creators are often working for very little return and have no voice in their economics. On many platforms, the payouts are extremely low—as little as US\$0.02 per 1,000 views on TikTok, a platform with one billion users, or US\$0.03 per 1,000 streams on Spotify, a platform with 162 million streaming subscribers.

have near-total control over the operations of their offering and, increasingly, decisions are being made to maximize revenues, reduce costs and satisfy the needs of investors over participants. Economic math already skews strongly in favor of the platform providers and against the platform participants, and the situation continues to worsen.

Contracts are unilaterally determined. Commission fees charged by platform providers to business users can vary considerably and providers can increase rates arbitrarily without any negotiation. “During the first months of the COVID-19 pandemic, when many restaurants were largely dependent on delivery platforms to continue their business operations, the commission fees” spiked up to between 15%–35% of the order value in the United States, while those same platforms gave discounts to consumers, reducing the value of the overall order.⁶³

Creators are often working for very little return and have no voice in their economics. On many platforms, the payouts are extremely low—as little as US\$0.02 per 1,000 views on TikTok, a platform with one billion users, or US\$0.03 per 1,000 streams on Spotify, a platform with 162 million streaming subscribers. If things go wrong, many platform providers do not even have a person for creators to speak with—instead directing them to emails or links to generic FAQs.⁶⁴

Platform providers often make unilateral decisions regarding existing pay arrangements without consultation or even advisement. Meta-owned “Instagram previously let creators make money through in-stream video ads, earning a 55% share of the revenue.” It decided in February 2022 to stop supporting this venture.⁶⁵ Instagram also cut payments by as much as 70% and increased the threshold number of views required to earn revenue for makers of short videos called Reels.⁶⁶ Twitch decided in September 2022 to change

its revenue share split for subscriptions. Beginning in June 2023, Twitch's top performers will continue to earn a 70/30 premium rate, but only on the first US\$100,000 of revenues. Everything after this point was reduced to a 50/50 split.⁶⁷ In the fourth quarter of 2022, Snapchat announced that it would once again change the way it paid creators on its TikTok clone, Spotlight. In 2020, when the service launched, Snapchat indicated that it would pay top creators US\$1.0 million per day. In 2021, that was reduced to “millions per week,” and now that figure has fallen to “millions per year.” In 2021, Snapchat paid “\$250 million to over 12,000 creators.”⁶⁸

The algorithms used by sites to display creator content or products and services can also be altered without warning or input. These algorithms organize search results and social media feeds. Creators are often ranked down if they take time off from posting as the algorithms reward creators “who release new content every day or every week.” Platforms, too, may perform A/B testing on their feeds—deliberately changing their results display by sorting subsets of users into an A-group and a B-group—to compare behaviors without warning, causing business users and creators to potentially see their view counts or order volumes change with no explanation.⁶⁹

Collectively, these issues are beginning to prompt a shift in behavior. For many years, the allure of platforms like Facebook and Instagram for creators has been the instant ability to plug into those platforms' networks. Recent data suggest creators are beginning instead to build up their own networks, using their own tools. The idea is not to just serve up content to an array of social media sites, but to build a primary online hub that followers will come back to repeatedly and engage with because of its community atmosphere. In the new approach, creators are looking to new platforms like Substack and Gumroad, where they can own their content and earn revenues through subscriptions, memberships and tips.

The algorithms used by sites to display creator content or products and services can also be altered without warning or input. These algorithms organize search results and social media feeds. Creators are often ranked down if they take time off from posting as the algorithms reward creators “who release new content every day or every week.”

According to a report commissioned by Mighty Networks, the goal is to “put their brand front and center, where they can mix and match content, community, events, and subscription features, and where they can own the relationship with their fans, followers, and members.” Across the survey audience of 1,624 creators, the report found that 57% “see direct revenue through features like subscriptions as more crucial to their future than social media platform revenue.”⁷⁰

The following illustrates the reason for this shifting view. According to the Mighty Networks report, for a creator to earn US\$1,000 per month, they need “229 Substack subscribers, 224 Patreon supporters, 100,000 Instagram followers, or 2 million monthly YouTube views.” The takeaway from the report was that smaller, more targeted audiences who are looking to join a community as much as they are looking to follow an individual are ultimately more valuable to creators.⁷¹

This thinking aligns with both the ethos and abilities offered in the new Web3 space—the next iteration of the internet that is being driven by a new set of emerging technologies, which in turn are fostering the creation of a fourth innovation cycle.

Commercial protocols offer a pathway to communal ownership of transaction rails

While virtual platforms continue to flourish, there are growing concerns about access, equity, privacy, moderation, censorship, governance, and platform economics. Tensions are building between the participants that drive the network effects—contributors and consumers—and the shareholders that own the company and its platform.

In a sense, these tensions are a by-product of the democratization of access to the commercial transaction rails that have already occurred. So many individual participants, organizations, and SMEs now rely on these offerings that they are economically staked in the model and looking to obtain a fairer distribution of revenues and stronger voice in platform decisions.

Unlike earlier periods of tech innovation where specific corporations drove research and development and owned the resulting offerings, the sponsors of these emerging technologies hail from the open-source community. This creates a different pathway to a target market. These open-source enthusiasts are building their own ecosystem and as it matures, more and more proponents are being drawn into the emerging landscape.

Interestingly, these sentiments are emerging just as a new set of technologies built to deliver a more democratic outcome is coming of age. Unlike earlier periods of tech innovation where specific corporations drove research and development and owned the resulting offerings, the sponsors of these emerging technologies hail from the open-source community. This creates a different pathway to a target market. These open-source enthusiasts are building their own ecosystem and as it matures, more and more proponents are being drawn into the emerging landscape.

Technological innovations driving change in decentralization

The roots of today's innovations date back to the 1980s. Unlike other World War II-era tech projects, advances in cryptography remained classified intellectual property controlled by the government until 1975. Once this knowledge was released into the public domain, researchers began to add to the body of knowledge and to figure out ways to use public key encryption to prevent the "unauthorized extraction of information from communications over an insecure channel." Early versions of the internet were just emerging at this time and more data was being exchanged over computer networks. This led to growing concerns about how these networks might impact an individual user's privacy.

A group of researchers and computer experts banded together in the early 1980s to create a group called the cypherpunks. A full explanation of this movement and how its work laid the pathway for the creation of bitcoin in 2009 is provided in Part I of this series.

Understanding the concerns and goals espoused by the cypherpunks is critical, however, since they defined the vision that today's emerging technologies have been built to achieve. The core concern of these individuals was privacy. As noted in *A Cypherpunk's Manifesto*, "privacy is necessary for an open society in the electronic age. Privacy is not secrecy. A private matter is something one doesn't want the whole world to know, but a secret matter is something one doesn't want anyone to know. Privacy is the power to selectively reveal oneself to the world."⁷²

Their goal was to create a system in which "two persons may exchange messages, conduct business, and negotiate electronic contracts without ever knowing the true name, or legal identity, of the other."⁷³

The cypherpunks dedicated themselves to building anonymous systems that defended their privacy by using cryptography, blinded digital signatures and electronic money.

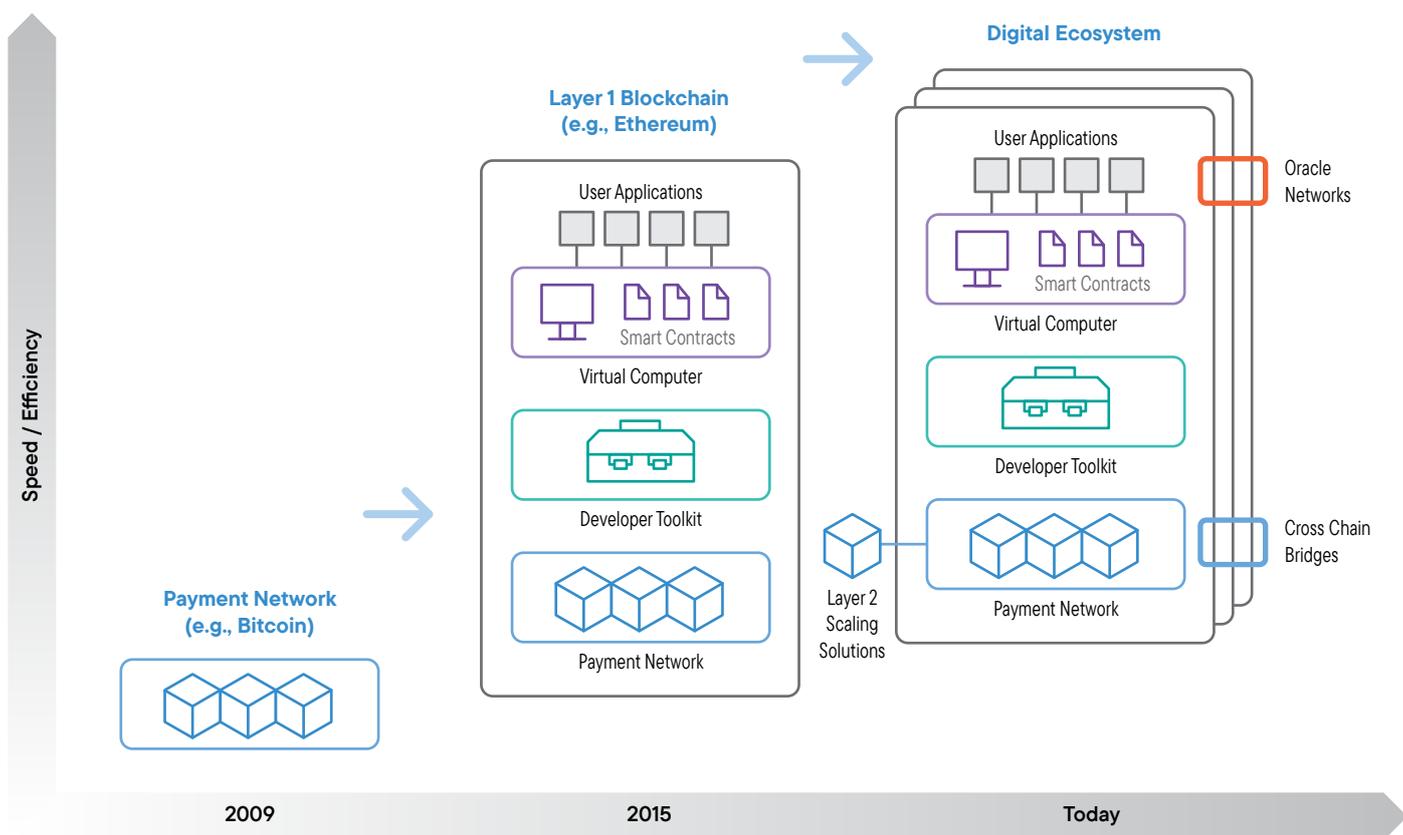
Bitcoin was the first such anonymous system delivered into the market—allowing for the anonymous exchange of electronic payments and the use of digital money. The actual creator (or creators) of bitcoin is unknown, going solely by Satoshi Nakamoto—the pseudonym that stopped being used and was never heard from again shortly after bitcoin was released in 2009.

Ethereum, launched in 2015, marked a significant expansion in functionality, laying the foundation for the new economic system and helping to fulfill the broader cypherpunk vision. Ethereum offers a combined software development and app hosting platform with its own built-in payment network and native payment coin—basically a self-encapsulated economic ecosystem that allows for pseudo-anonymous transactions.

This model has since come to be known as a layer 1 (L1) blockchain. The Ethereum model has propagated and there are now a growing number of L1 blockchains and an emerging set of peripheral offerings being created to enable the scaling and growth of the ecosystem. The maturation of this new digital ecosystem is highlighted in Exhibit 8 on the next page.

New technologies are powering this increasingly complex and varied landscape. While this innovation is currently occurring within a pocket economy, the uptake of these offerings in the broader economy is likely to be the trigger that moves us out of today's third tech-driven innovation cycle into the fourth cycle: decentralization. The technologies that are likely to be instrumental in this progression are the following:

Exhibit 8: Maturation of the Crypto Ecosystem



Source: Franklin Templeton Industry Advisory Services. For illustrative purposes only.

- Blockchain ledgers:** Like any ledger, blockchain creates a transaction record and updates the account balances of both buyer and seller. What differentiates blockchain from other ledgers is that the record is distributed across a computer network. A copy of the ledger—its entire transaction record and all underlying accounts and balances—is shared with every participant that chooses to be a node in the network that operates the blockchain. A revised copy of the blockchain is broadcast simultaneously to all participants in the network each time a block of new transactions is added to the chain. Data on every transaction ever done is contained on the blockchain, and the historical transaction chain can be traced all the way back to the original genesis trade.

Because of these traits, blockchain ledgers are considered immutable—none of the transaction records can be altered, deleted or destroyed because the change would not only have to be made simultaneously on every copy of the blockchain held by every node in the network, but the alteration would also have to be applied backwards—to every transaction ever made all the way back to

the genesis trade. In this way, blockchains provide an unprecedented level of transparency, allowing for a trusted record of transactions without the need for a trusted third party.

- Digital currency:** Bitcoin was the first broadly adopted form of digital currency. The innovation that allowed for this uptake was that the bitcoin token was designed to operate like cash. It can be broken down into fractions of the original bitcoin just like a dollar can be broken down into cents. When a transaction occurs, the bitcoin is digitally removed from the seller's possession and digitally placed into the buyer's possession—just like the transfer that occurs when someone gives a dollar bill in payment to another person. Bitcoin's approach to digitally removing the currency from the spender's account and adding it to the buyer's account prevents double spending and allows for a new concept called digital scarcity—"a credibly maintained limitation, imposed through software" on digital goods "that may be accessed and used entirely digitally."⁷⁴

The template laid out by the Bitcoin network for bitcoin (BTC) has been adopted by other L1 blockchains, each of which has built its own native payment network and sponsored its own payment coin. For example, the Ethereum blockchain uses a payment coin called ether (ETH). Central banks around the world are now experimenting with their own versions of digital currencies.

- **Programmable tokens:** Cryptocurrencies like bitcoin and ether have one purpose—to operate as payment coins. There are, however, a far larger variety of programmable tokens that are being created to serve a broad array of purposes. This is possible because of smart contract technology. Smart contracts are self-executing bits of programmable code that can be embedded into a token. They set up the terms and conditions to govern the operation of that token. For example, an individual investor that loans their currency to a digital exchange can be issued a token that represents both the value and the terms of that loan, since the smart contract embedded in the token can define the dollar amount, duration, interest rate and payment schedule associated with the loan.

The power of programmable tokens is that the rights and obligations provided by the smart contract are both self-executing and transferrable. Investor A may have been the original provider of currency for the loan token described above and may have been receiving interest payments into their account since initiating the loan, but if they choose to sell the token to Investor B, that new owner could immediately begin receiving interest and have all the same rights and obligations up until the time that the loan is paid back or until they choose to sell the token to another individual. The changes in ownership and the redirection of payments could happen automatically without any need for a human to issue instructions or input data.

- **Digital wallets:** All digital tokens—whether payment coins or programmed tokens—are held in a digital wallet. This wallet account, owned by an individual investor, requires a cryptographically protected digital key to access its holdings. Many liken a digital wallet to a lockbox in a bank vault. Digital wallets are identified by their internet address rather than by customer names or personal information. When an individual digital wallet owner transacts in the new ecosystem, they submit a digital signature that contains the internet address of their wallet and the portion of their digital key required to

provide a view into their wallet. This allows the L1 blockchain facilitating the transaction to 1) find the wallet, 2) examine its holdings and confirm that the tokens are available in the seller's wallet and 3) remove the token from the seller's wallet and transfer it to the buyer's wallet.

A wallet is said to be “hot” when it is connected to the internet and “cold” when it is not connected. Because the cryptographically protected digital key is the asset that is required to open a digital wallet, it is the key—not the assets held in the wallet—that is custodied in a digital custody arrangement.

These four innovations—blockchain ledgers, digital currencies, programmable tokens and digital wallets—are the building blocks of the emerging fourth tech-driven innovation cycle: decentralization. They are also the enablers of yet another iteration in how the internet works and are thus also sometimes collectively referred to as Web3 technologies.

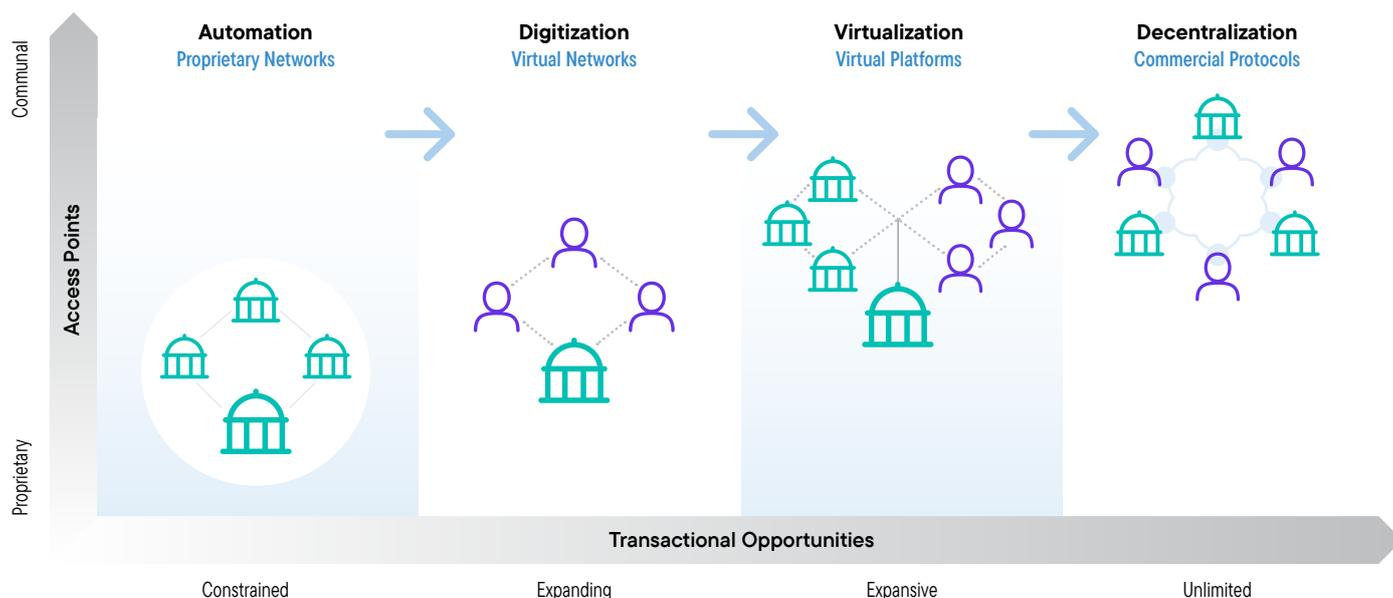
The Web3 landscape is being developed in a way that operationalizes the idea that contributors and consumers can also be owners and shape the governance of the platforms they use. It also attempts to balance the playing field in terms of who gets to participate, receive compensation, and act as a stakeholder, in the new Web3 economy. In the emerging model, software and network nodes replace the company as the intermediary/orchestrator of transactions and a communal model of ownership replaces corporate ownership, allowing any individual, institution or enterprise user to participate. This is illustrated in Exhibit 9 on the next page.

Evolution of commercial transaction rails in decentralization

In some ways, the emerging Web3 world will feel very familiar to end users. Today, when a user wants to schedule a ride from a ride-hailing app, order groceries from a shopping app, listen to music on a streaming app or take a loan through a peer-to-peer lending app, they must first download the app, provide their personal information and set up a payment method. The data they provide becomes the property and asset of the company that hosts and runs the app. Every time the user wants to use the app, they need to sign in. In the new digital ecosystem, users could still access and use an app to do each of those activities, but the app could be decentralized and provided as a commercial protocol.

Basically, these protocols are a new way to perform a commercial activity. They can be initiated by accessing the app on a mobile device or computer. Users do not need to provide

Exhibit 9: Communal Ownership and Access to Commercial Transaction Rails



Source: Franklin Templeton Industry Advisory Services. For illustrative purposes only.

their personal information or payment information. They do not need to sign in to use the app. Just about any individual in the world can call up the app and access its functionality. It is basically an open-source business process.

This is because these apps are hosted on L1 blockchains, and users can transact simply by providing their digital signature. Having this information allows the payment network on the blockchain to identify and check the user's digital wallet to see if there are enough tokens in their wallet to pay for the transaction. It does not matter who the user is—if they have enough tokens, the transaction can go through.

While this sounds radically different from how commerce operates today, it is important to note that pseudo-anonymity is not complete anonymity. The wallet address is public and information on the transactions that flow in and out of the wallet is public. Because the record of every transaction ever done on a blockchain is kept and is publicly available, it is possible to reconstruct where assets in a wallet came from and where they have gone. This is how regulators and security agencies around the world can identify suspect wallets that may be linked to money laundering or illicit activities.

A growing number of L1 blockchains are also beginning to verify and “whitelist” the wallet addresses on their network to help ensure that transactors can operate in good faith, knowing that they will not be interacting with entities whose wallets are on watchlists or derived from suspicious origins.

By shifting the way in which a transaction works, there are several other dynamics that become possible and are worth considering.

- Data become a personal asset:** Since a user's wallet address is the only data that the L1 blockchain hosting an app knows about a transactor, the individual user's personally identifiable information remains private. Even more importantly, the decision to share any personally identifiable information now sits with the wallet owner who can manage access to their personal data and obtain value for sharing it. Utilizing a user's profile information to feed behavioral and advertising algorithms is a key source of value for today's virtual platforms. Under the new Web3 approach, more of the value for this information could accrue to the individual user.
- Participation is incentivized with potential financial benefit:** Transactional data are publicly available on L1 blockchains. App sponsors can see the wallet addresses of those participants that are transacting the most and helping to build their network. Many have begun to create special types of programmable tokens to reward these users. Tokens that directly pay users for their participation, offer discounts on future transactions or enable holders to vote on proposed strategic enhancements to the app are the most common types of rewards. The tokens that provide these rewards are “dropped” or deposited directly into a user's wallet by the protocol. Token exchanges often

list these reward tokens, and their value can potentially increase over time if the platform is seen as becoming increasingly successful.

- **More permissionless activities are enabled:** The business functions enabled by commercial protocols are available to any user. This includes many activities that today are limited to only select transactors—qualified individuals, institutions or enterprises—and, even then, are only possible after their applications to pursue those activities have been reviewed, assessed and approved.

In the new system, any entity can use certain apps to embed an asset into a token, define the contract terms that will govern the ongoing use and ownership of that asset, and issue the token on an exchange that allows it to be freely bought and sold. Any user can earmark their tokens as collateral and loan them out to receive an interest payment or stake them to earn a reward. Any participant can borrow assets from lending apps. Any individual investor can choose to directly buy or sell their tokens without having to work through a centralized exchange. This can enable a far wider range of actions that can financially benefit an individual investor, allow them to better optimize the allocation and use of their assets, and offer them more freedom to manage their own activities.

This shift from cycle 3 intermediated virtual platforms to cycle 4 communal commercial protocols would thus enable the most democratized access to and use of commercial transaction rails yet. If these innovations begin to be adopted more widely, modern society would have witnessed a 180-degree reversal in the way that commerce works in a 60-year to 70-year period. Commercial transaction rails that started as proprietary networks owned by individual companies will have given way to shared protocols owned by all participants in the community that use the offerings. Given the shifts in how commerce operates already, it is not a far stretch to expect this last iteration in the not-too-distant future.

As this megatrend has been unfolding, a corollary trend has also been occurring. Business enterprises have had to rethink the delivery of their products, goods and services and adjust their business strategy to adapt to changing delivery models and utilization of commercial transaction rails. This has mandated significant changes in what constitutes business value and how such value is measured.

Megatrend 2

Growing reliance on intangible assets to drive business value

As progressive waves of new technology emerged and began to be utilized by commercial enterprises, it changed not only their approach to transacting business, but also what differentiated their business pursuits and how they should best direct their investment capital. Those responsible for business strategy at these organizations had to rethink what it was about their model that drove value and how they could ensure that such value was optimally delivered and recognized.

With the benefit of time, it becomes clear that the answer to these questions evolved in line with each tech-driven innovation cycle and that there was an inverse relationship at play that helped to guide these decisions. Ironically, expansion in distribution opportunities due to the evolution of commercial transaction rails resulted in a narrower set of differentiators that businesses could rely upon and a continual reassessment about what assets made their organization unique. Commercial enterprises have been continually forced to strip away commoditized elements of their business and get down to those core capabilities and offerings that make them truly effective and unique.

The most obvious impact of this megatrend has been the dramatic decline in the importance of tangible business value and the corresponding ascent of intangible value drivers. This is illustrated in Exhibit 10 below.

As seen in Exhibit 10, in 1975, 83% of the value for companies that made up the S&P 500 could be attributed to tangible assets and only 17% of such value was derived from intangible assets, according to Ocean Tomo’s Intangible Asset Market Value Study. This marked a high point for tangible assets, however, and the importance of these measures has been eroding since. The year that the internet really began to surge in terms of website deployments—1995—was also the year that intangible assets began to account for more of the value (68%) of S&P 500 components than tangible assets (32%).

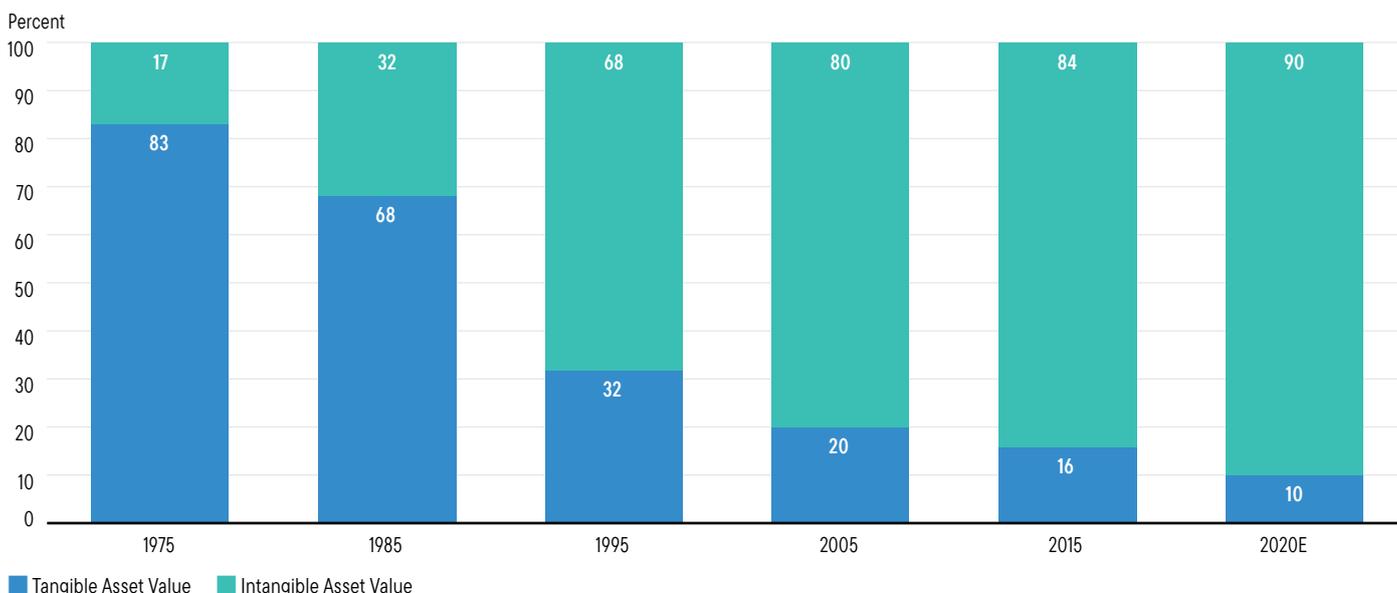
Intangible assets have become ever more important since that time, contributing 84% of the value to S&P 500 companies in 2015 and as much as 90% of the value by 2020.

This shift from tangible to intangible asset value can be linked to the impacts of unfolding tech-innovation cycles. As the technology options and the evolution of commercial transaction rails progressed, the types of intangible assets and the attributes they delivered expanded, requiring an ever-broadening portfolio of intangible assets to remain competitive. Understanding this progression is important because the emerging fourth cycle of tech-driven innovation—decentralization—is likely to require commercial enterprises to re-strategize their approach yet again to maintain their business value.

Industrial revolution and World War II drive a global manufacturing economy

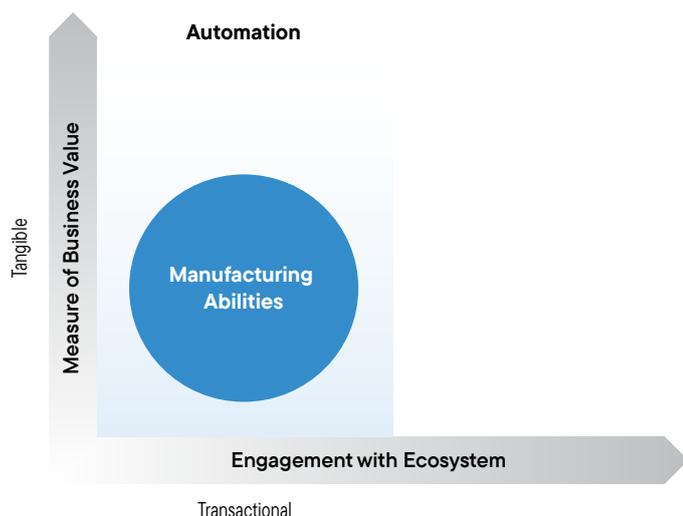
Through the first six decades of the 20th century, manufacturing played an outsized role in the economies of developed nations, resulting in extensive portfolios of real capital—tangible assets including raw materials, equipment, land and real estate. When the commercialization of computing technology began in the 1960s, spending on information technologies and infrastructure became yet another tangible asset and category for capital expenditures. This is illustrated in Exhibit 11 on the next page.

Exhibit 10: Asset Value Drivers of the Standard & Poor’s® 500 Index (S&P 500®) Components



Source: "Intangible Asset Market Value Study," Ocean Tomo web site, 2020. There is no assurance any forecast, projection or estimate will be realized.

Exhibit 11: Focus on Tangible Business Value



Source: Franklin Templeton Industry Advisory Services. For illustrative purposes only.

Manufacturing's importance was the result of nearly a century of technological and corporate innovation as well as demographic and migration trends. The Industrial Revolution introduced many of the innovations and population shifts that positioned manufacturing at the heart of many economies. Increases in large-scale mechanized agriculture in the mid-1800s—stimulated by the need to feed a rapidly rising population in the United Kingdom and other European countries—soon began to overtake the kinds of subsistence farming practiced for generations. Much of the population began to migrate to towns and cities to find employment. “In 1800, about 20 percent of the British population lived in urban areas. By the middle of the nineteenth century, that proportion had risen to 50 percent. Other Western European lands” experienced a similar, albeit slower increase.⁷⁵

The United States underwent a similar transformation. “After the US broke from England in the 1770s, an embargo on foreign imports during the presidency of Thomas Jefferson, and a British blockade of the Atlantic seaboard during the War of 1812, spurred domestic production.” By the 1830s, “the United States became one of the world’s leading economic powers.”⁷⁶

Factory-based industry boomed, helped by three areas of advancement. The shift from water-powered to coal-fired engines freed manufacturers to locate their plants away from waterways and nearer to markets and suppliers. Transportation options expanded with the reach of railroads, and firms were able to distribute their products to regional or national markets. New financial institutions—the stock markets, commercial banks and investment houses—increased the

availability of investment capital.⁷⁷ “Between 1869 and 1910, the value of American manufacturing rose from \$3 billion to \$13 billion. The steel industry produced just 68,000 tons in 1870, but 4.2 million tons in 1890.”⁷⁸

Through mechanization, standardization and economies of scale, economic productivity soared. “Between 1890 and 1929, the average urban worker put in one less day of work a week and brought home three times as much in pay.” “By 1929, nine out of ten Americans had electricity and indoor plumbing; four-fifths had automobiles; two-thirds had radios; and nearly half refrigerators and phonographs.”⁷⁹

The emergence of the modern corporation helped to drive this surge. By the beginning of the 20th century, the major sectors of the US economy—banking, manufacturing, meat packing, oil refining, railroads, and steel—were dominated by a small number of giant corporations. These corporations transformed the way in which enterprise worked. By 1904, the United States’ 2,000 largest companies made up under 1% of US businesses but manufactured 40% of the country’s goods.⁸⁰

“The typical business establishment before the 1870s was financed,” owned and managed “by a single person or by several people bound together in a partnership.”

“Most firms operated in a single town or from a single office or factory.” Capitalization was limited. The average factory by 1880 typically represented less than US\$1,800 in investment.⁸¹ “Most sales were made to customers in the immediate area.”

The emergence of the corporation changed this dynamic. In the new corporate enterprises that emerged in the late 19th century, oversight was increasingly turned over to professional managers. Businesses grew larger and began to expand geographically. By “1900, General Electric had plants in 23 cities.”⁸² Bureaucratic hierarchies became necessary. Formal administrative structures emerged, such as purchasing and accounting departments. Clear lines of authority were devised, and formal rules were created to govern company operations. While still overseen by central leadership, divisional corporate executives were given more responsibilities for business decisions and leadership.

Advances in mechanical engineering, transportation and corporate governance set the stage for an era of mass production. A machine-driven version of the “factory system”—an approach that broke an item’s production into phases—resulted in the creation of the assembly line.

World War II marked an important turning point, however. Commercial factories were recruited into the war effort. American manufacturers produced massive amounts of supplies for the US military and US allies. One example was the “Ford Motor Company that produced a bomber plane every hour” during the war effort. Indeed, at the peak of World War II, “the United States was manufacturing almost as many munitions as all of its allies and enemies combined.”

This interconnected set of specialized production processes could work around the clock. Productivity soared and brought down the costs of goods. In 1913, Henry Ford’s introduction of the assembly line “reduced the time required to produce a single car from twelve hours to just over ninety minutes. As a result, the cost of Ford’s cars fell from today’s equivalent of \$23,585 to \$4,000.”⁸³

Limitations on trade curtailed how strongly manufacturing could grow, however, in the period between World War I and World War II. Following World War I, the US Congress passed “economic policies aimed at shielding domestic industries from” non-US competitors. By the early 1930s, the US Congress had “raised tariffs on hundreds of items through the Smoot-Hawley Tariff Act,” and “other countries responded with their own tariffs, making American products less competitive in non-US markets, reducing the total amount of international trade”—factors that helped to deepen the Great Depression.⁸⁴

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Unemployment in the United States, “which had reached 25 percent during the Great Depression and hovered at 14.6 percent in 1939, had dropped to 1.2 percent by 1944—still a record low.”⁸⁶

After the war, factories made the switch from wartime to peacetime production. Whereas other countries were left trying to rebuild war-ravaged infrastructure, US factories were able to pivot immediately. Consumer demand for goods surged. By the summer of 1945, Americans had been living under wartime rationing policies for more than three years. The government had been encouraging the public to save their money for a brighter future. “By 1945, Americans were saving 21 percent of their personal disposable income, compared to just 3 percent in the 1920s.”⁸⁷

Pent-up demand fueled a surge in consumer buying—a fact helped by rising prosperity. US median “incomes doubled between 1947 and 1965.”⁸⁸ Government loans helped returning veterans buy new homes, and a baby boom ensued. New homeowners sought big-ticket items for their expanding families. “New car sales quadrupled between 1945 and 1955.” Frigidaire—a division of General Motors—redirected their factories that had been “building machine guns and B-29 propeller assemblies” to home appliances, “introducing revolutionary products like clothes washers and dryers, dishwashers, and garbage disposals.”⁸⁹

Demand from a rebounding and exploding population was not limited to the United States. By 1951, industrial output in Western Europe was more than 70% greater than the level prior to World War II.⁹⁰ “Between 1945 and 2000, nearly all people living in developed economies experienced rising incomes, making it possible for families to buy previously cost-prohibitive goods.”⁹¹

Loosening trade practices also helped to spur the post-war rise in consumerism. After World War II, 23 countries promoted “international economic cooperation” by signing “the General Agreement on Tariffs and Trade (GATT), which established a new rules-based trading system that sought to lower trade barriers and create rules for how countries should trade freely.” GATT and its successor—the World Trade Organization—helped to lower average tariffs from over 20% in 1947 to less than 3% today.⁹²

Decreased tariffs enabled companies to globalize their supply chains. Innovations like the 1956 invention of the container ship allowed for more cargo to be transported across the world at cheaper prices. Whereas common cargo carriers

in 1944 spanned between seven to 37 twenty-foot equivalent units (TEUs), early container ships increased that figure to between 500 to 800 TEUs.⁹³

Capital expenditures across all sectors began to increase as businesses sought to enhance their manufacturing abilities. As shown in Exhibit 12 below, US capital expenditures grew at a 7.2% CAGR between 1947 and 1962 and then accelerated to 8.1% CAGR between 1962 and 1972. In US dollar terms, capital expenditures across sectors rose from just over US\$63 billion annually in 1947 to nearly US\$396 billion by 1972—an increase of almost 6.3x.

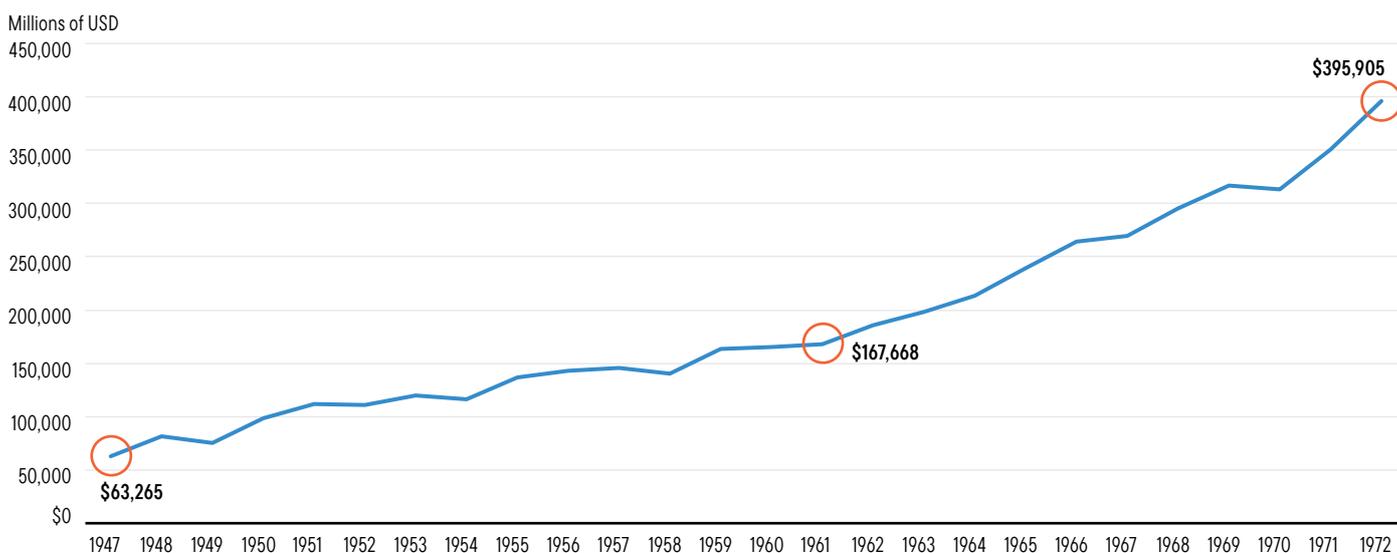
Investments in new technologies helped to drive this surge. Replacing old equipment with new offerings helped to enhance the output of workers. Between 1950 and 1973, “all the G-7 countries [the United States, Canada, Japan, France, Germany, Italy and the United Kingdom] recorded growth in manufacturing output, labor productivity, and employment.”⁹⁴ “Almost ninety percent of the growth in real output in the US from the end of World War II through 1967 was due to increased productivity.” Analysis by Edward Dennison of the Brookings Institution shows that the factor most supportive of increased productivity was “advances in knowledge.” Such advances included the incorporation of new knowledge—“the way knowledge is transmitted to those who can use it,” and “the way it is incorporated into production.”⁹⁵

Rising uptake of mainframe computers underpinned these advances in knowledge. In 1951, Lyons Bakery in the United Kingdom became the first commercial enterprise to use a computer to run a regular office job—“bakery valuations.”⁹⁶ General Electric was one of the first corporations in the United States to deploy a computer in 1954, using the first mass produced computer (universal automatic computer; also known as UNIVAC) to process payrolls and apply manufacturing controls and planning functions in its state-of-the-art appliance factory in Louisville, Kentucky, where the new technologies helped to manage the production of “washers and dryers, dishwashers and disposers, refrigerators and freezers and electric ovens and ranges.”⁹⁷

By the mid-1960s, corporate America began using computers in earnest as executives sought the cost savings and productivity gains. IBM’s introduction of its mainframe in 1965 helped the company achieve a 65% market share in the late 1960s, causing many at the time to describe the mainframe computing industry as “Snow White (IBM) and the Seven Dwarfs” (Sperry Rand, Control Data, Honeywell, Burroughs, General Electric, RCA and NCR).⁹⁸

Growth in manufacturing post-World War II marked a peak, however. By the mid-1970s, investment spending on new technologies began to decline (as did spending on research and development), adversely affecting manufacturing output per unit of input. The impacts were significant, as shown in Exhibit 13 on the next page.

Exhibit 12: Total US Capital Expenditures—All Sectors from 1947 to 1972



Source: Federal Reserve Economic Data. St. Louis Fed.

Exhibit 13: Sources of Growth—National Income Per Person Employed (Non-Residential Business Sector)

	1948–1969	1969–1973	1973–1978
Adjusted Growth Rate	2.7%	2.1%	–0.6%
Factors Affecting Output Per Unit of Input			
Improved Allocation of Resources	0.4%	0.1%	0.0%
Changes in Legal and Human Environment	0.0%	–0.2%	–0.4%
Economies of Scale from Larger Markets	0.4%	–0.2%	–0.4%
Advances in Knowledge*	1.4%	1.6%	–0.7%

*And inputs not elsewhere categorized.

Source: Edward F. Denison, Accounting for United States Economic Growth. Brookings Institution as reported in Productivity in the U.S. Economy: Trends and Implications.

Between 1948–1969, the overall productivity growth rate averaged 2.7%, with 1.4% coming from spending on advances in knowledge, which incorporated the impacts of new technology. Similarly, between 1969–1973, productivity grew at an adjusted average rate of 2.1%, with expenditures on advances in knowledge accounting for 1.6% of the total. By 1973–1976, however, overall productivity growth fell to an average of –0.6%. Advances in knowledge as a factor fell even more significantly, to an average of only –0.7%.⁹⁹ “Manufacturing employment peaked in June 1979” and has never recovered those levels in the United States.¹⁰⁰ This set the stage for the first major shift in how business value was measured.

Emergence of the knowledge-based economy

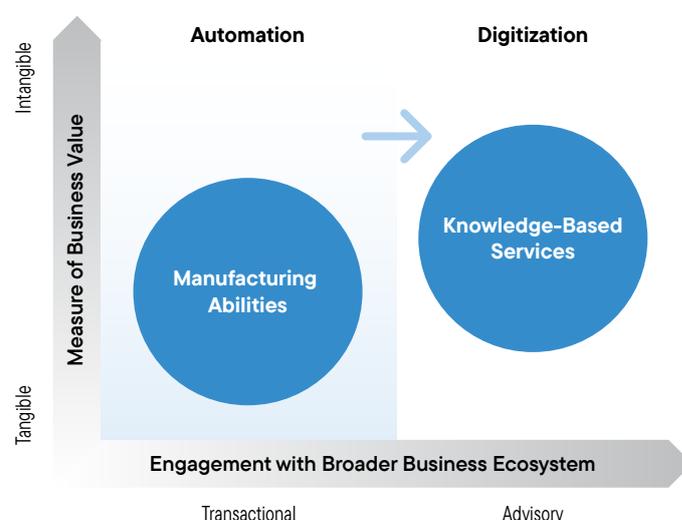
Since the 1970s, the US economy and those of other developed nations saw business value move increasingly away from the production of manufactured goods toward providing knowledge-based services. Manufacturing’s share of total employment has fallen dramatically in the world’s most advanced economies—a phenomenon the International Monetary Fund terms “deindustrialization.” “The trend, particularly evident in the United States and Europe, is also apparent in Japan and has been observed more recently in the Four Asian Tigers, the East Asian economies of Hong Kong, [South] Korea, Singapore, and Taiwan.” “In the 23 most advanced economies, employment in manufacturing declined from about 28 percent of the workforce in 1970 to about 18 percent in 1994”—starting “earliest in the United States.”¹⁰¹

In 1970, there were 48.8 million service-providing employees in the United States and 22.2 million individual goods-producing workers, resulting in a “service-to-goods [employment] ratio of 2.2 to one.” In 2000, there were 107.1 million service-providing employees, compared to 24.6 million goods-producing workers for a ratio of 4.4:1.0.

Those employed in the service sector more than doubled, while those producing goods increased by only 10.8%. By 2005, the service-to-goods employment ratio increased even further, reaching roughly five service workers to every one individual employee producing goods. In total, US manufacturing jobs fell from 30.6% of nonfarm private sector employment in 1955 to only 10.7% in 2005.¹⁰²

As shown in Exhibit 14, this shift from manufacturing abilities to the provision of knowledge-based services has had important implications for the creation of business value.

Exhibit 14: Sharing of Intellectual Property and Insights Enhances Business Value



Source: Franklin Templeton Industry Advisory Services. For illustrative purposes only.

The nature of business interactions shifted. Organizations focused increasingly on advisory—using a knowledge-based, consultative approach to guide and plan with clients, often being compensated through a follow-on transaction made in recognition of their service engagement. This contrasts with the more straightforward transactional relationships that dominated commerce during the manufacturing era.

Collectively, “finance, real estate, and professional services and business services”—the latter “includes accounting, engineering, consulting, and legal services”—make up most of the service sector growth in the United States in the early 2010s. The professional and business services industry is the largest contributor, increasing its “share of total employment by 9.2 percentage points” between the mid-1950s and early 2010s—accounting for approximately 40% of the total service sector growth. Indeed, analysis from the Centre for

In knowledge-based economies, economic value is captured through IP and the rights it confers which transform intangibles into tradable economic assets. In a 2012 research publication, the US Patent and Trademarks Office noted that “the entire US economy relies on some form of IP, because virtually every industry either produces or uses it.”

Economic Policy Research (CEPR) indicates that outsourcing of professional and business services accounted for 36% of the United States’ services employment increase and for 25% of the nation’s manufacturing employment decline.¹⁰³

As advisory became a more significant aspect of business engagement, the measure of business value shifted from tangible to intangible assets. Intangible assets are those that result from human intellect and work as opposed to mechanized output. In the earlier cycles, capital assets were the primary measure of value. This included real capital (plants, equipment, machinery), financial capital (cash, stock, bonds) and natural resources. These sources of value have since expanded to include new types of capital—human capital, intellectual capital, and social and relational capital. The knowledge and skills of employees, a firm’s reputation, brand recognition and customer relationships all became important sources of intangible assets. Among the most important forms of intangible assets, however, was intellectual property—IP.

In knowledge-based economies, economic value is captured through IP and the rights it confers which transform intangibles into tradable economic assets. In a 2012 research publication, the US Patent and Trademarks Office noted that “the entire US economy relies on some form of IP, because virtually every industry either produces or uses it.”¹⁰⁴

“In the mid-1990s, spending by companies on intangible capital...began outpacing spending on tangible capital assets in the United States. Companies started investing more in research, development, and the commercialization of

intangible assets than in existing sources of capital to spur growth.” By 2019, US industries that actively use IP made up 41% of US economic activity, accounting for “63 million jobs, or 44% of all US employment.”¹⁰⁵

Similar results were found in the United Kingdom. A report by the UK IP Office found a wide gap between investments into intangible assets and IP rights (GBP 137.5 billion) versus investments into tangible assets (GBP 89.8 billion).¹⁰⁶ IP rights in the United Kingdom supported 48% of knowledge-based investments (GBP 65.6 billion) split out between copyrights (46% of that total); trademarks and designs (21% each); patents (9%) and registered designs (3%).¹⁰⁷ “The true value of UK IP-related investment, however, is likely to be higher as the study does not include the value of trade secrets” or “combination assets’ like brands.”¹⁰⁸

The transformation of IBM, the manufacturing age’s “Snow White,” was emblematic of this shift from a manufacturing to knowledge-based services mindset. From its emerging dominance in the 1960s through the late 1980s, “IBM sought to bind customers to its Big Blue computers and the related software and services that it alone could supply.” But this strategy shifted. IBM’s chairman and CEO from 1993 to 2002, Louis V. Gerstner, Jr., facilitated the change—“the strategy of ‘build a better mousetrap and the world will beat a path to your door’” was “replaced by ‘find a customer with mice and sell knowledge of mouse behavior, trapping methods and the efficiency of cats.’”¹⁰⁹

In the new approach, companies rely on information links with customers and suppliers as much as financial links with bankers and investors. For IBM, it meant that “integrating new computer-communication systems with older systems... preparing companies for Internet commerce—devising capabilities, training personnel, assuring system security” became key offerings. By the end of 1999, IBM generated 57% of its “\$90 billion in annual revenues from software and services, and only 43% from the sale of hardware—computers and components—that used to be its mainstay.”¹¹⁰

Despite the increase in the importance of knowledge-based services, it has been difficult to adequately value these assets. Measuring tangible capital assets was easily handled by traditional accounting methodologies. The same does not hold true for intangible assets.

“Valuable intangible assets that have ongoing use in the business, and that will contribute to future profits, are essentially ignored in financial reporting and any amount spent on

creating or enhancing these assets is immediately expensed.” “Intangibles that are separately purchased are reported as an asset at their purchase price and amortized over their estimated useful lives.” Assets acquired through a business combination must “be valued at the time of the acquisition to determine their cost.” “Past investment in unrecognized intangibles that was expensed in prior periods” and which “may now be contributing to higher profits,” lack an “amortization charge to reflect ‘consumption’ of the asset.” This “lack of accrual accounting for most intangibles can make profit difficult to interpret and compare.”¹¹¹

These accounting issues become even more concerning as the type of intangible assets driving business value expand, incorporating not only an enterprise’s own intangible assets, but increasingly new types of intangibles such as an enterprise’s connectivity to other businesses and the value they derive by being a part of a network.

Intangible business value moves beyond the company’s perimeter

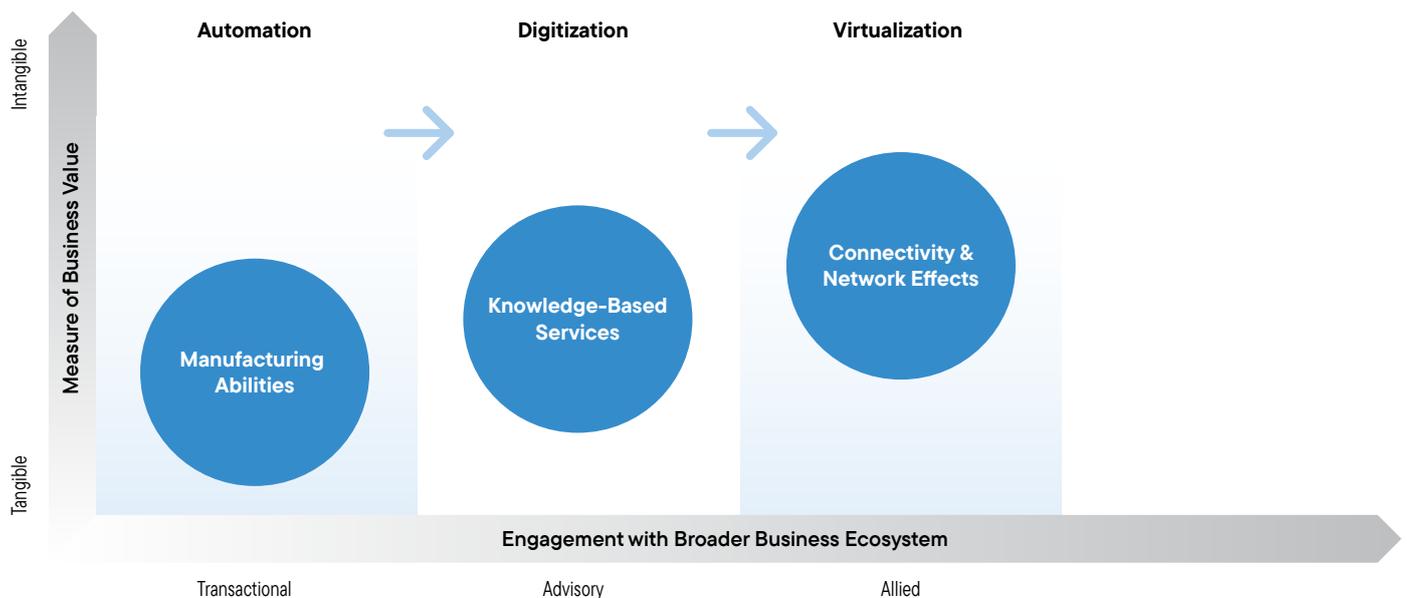
For the first time, an organization’s business value is moving beyond the company’s perimeter and is being derived from not only their own set of tangible and intangible assets, but also from a new type of intangible asset—their level of connectivity and ability to create or access network effects. This is illustrated in Exhibit 15.

The term “network effect” was originally “coined in the early 1970s as academics began to study the growth of the telephone network” that was being deployed globally during those years. “A product displays positive network effects when more usage of the product by any user increases the product’s value for other users (and sometimes all users).”¹¹² This mutually assured benefit positions network participants as natural allies—each participant’s utilization of the network helps to increase the value of the network for them and for other users.

The advent of the internet, online commerce, social media and the internet of things has turbocharged the importance of networks. Increasingly, the assets and capabilities required for a business to succeed and its ability to create and monetize new products and services is being facilitated by resources provided by entities outside the organization. More and more businesses are becoming parts of “ecosystems” to compete.

This can be traced to several factors. According to the Boston Consulting Group (BCG), “Boundaries between industries are dissolving as ecosystems span sectors and incumbents are attacked by tech players and platforms that they had never considered as competitors before. Boundaries between companies are also dissolving, too, as the value the ecosystem creates must be shared among multiple partners.” Thus “being successful in such a world requires a new mindset.” BCG notes that “organizations need to move from

Exhibit 15: Collaborative Pursuit of Business Value



Source: Franklin Templeton Industry Advisory Services. For illustrative purposes only.

A recent Deloitte report describes the resulting commercial landscape as a “networked economy.” Participation in the emerging construct requires a broader vision of what constitutes an enterprise—“all the connections that a company has with third parties, all the distribution channels—everywhere a company does business” becomes part of the extended enterprise.

controlling internal resources to orchestrating external resources, from erecting competitive barriers to engaging vibrant communities, and from hierarchical control to collaboration and persuasion.”¹¹³

A recent Deloitte report describes the resulting commercial landscape as a “networked economy.” Participation in the emerging construct requires a broader vision of what constitutes an enterprise—“all the connections that a company has with third parties, all the distribution channels—everywhere a company does business” becomes part of the extended enterprise.¹¹⁴

There are several types of benefits that can be obtained by building a business’s strategy around this extended enterprise concept to capture new forms of business value. Many of these benefits relate to online commercial interactions, particularly for SMEs that lack the financial resources and/or skills to develop the internal digital infrastructure required to compete. Instead, these entities can join the network ecosystem that virtual platforms offer to access the following benefits:

- **Customer targeting:** Leveraging online platforms allows businesses to access advanced analytics based on the platform’s user information to better target potential customers. “In 2019, an estimated 82% of European SMEs promoted their products and services on online search engine platforms” and a UK report indicated that “60% of SMEs are using paid digital advertising.”¹¹⁵
- **Matchmaking:** Virtual platforms can bring together suppliers with potential consumers, allowing businesses to access many more clients and at a lower marginal cost as such platforms provide “advertising, software and mobile

applications, customer care” and logistics. Moreover, these platforms facilitate customer reviews. A 2023 survey of consumers of local businesses found that in 2022, 98% of people “at least ‘occasionally’ read online reviews,” 46% trust online reviews “as much as personal recommendations,”¹¹⁶ and 68% of potential consumers form an opinion about an offering after reading between one and six online reviews.¹¹⁷

- **Extended geographic reach:** Online marketplaces enable businesses “to trade across regions and countries and provide a wide range of complementary services” such as logistical support and data analysis. In 2017, Amazon’s marketplace was estimated to have allowed roughly 300,000 Amazon-registered SMEs to export goods to various nations.¹¹⁸

The benefits of connectivity and networking are not limited solely to virtual platforms, however. Other types of networked business ecosystems are emerging. These newer models feature engagement across several enterprises from one or more industries and typically span both digital and physical experiences. Having these affiliations enables the following business benefits:

- **Solutions development:** New technologies—particularly the internet of things, which brings together sensors, data and online access—are allowing organizations to identify new ways to drive sales by internetworking their respective consumer bases. New types of solutions for specific customer needs are being designed that offer enhanced benefits beyond buying an individual product or service. For example, an appliance seller may create a partnership with a household goods manufacturing company, which then programs its smart washing machines to allow the owner to automatically reorder detergent pods online when needed—thus creating convenience for the appliance owner.¹¹⁹
- **Community building:** A growing number of business ecosystems—forged across independent but related enterprises—are banding together around a unifying goal or purpose and using the community that such a mission could attract to create a shared and devoted customer set. An example is the Walgreens Boots Alliance’s (WBA’s) partnership with Microsoft, which began in 2019. This venture seeks to make health care delivery “more personal, affordable and accessible for people around the world” by delivering “innovative platforms that enable next-generation health networks, integrated

digital-physical experiences and care management solutions.”¹²⁰ By the end of 2022, WBA had taken majority ownership in several health care businesses, combining them with WBA's health care business—Walgreens Health—and the digital platform WBA developed with Microsoft to bring together “primary care, specialty pharmacy care, post-acute care and home care to cover the patient care journey continuum.” Walgreens also partnered with payors such as Blue Shield of California to allow Walgreens Health's solutions offerings to serve a patient population of more than two million “individual subscribers and consumers in-store, at home, in the doctor's office and via mobile app.”¹²¹

- **Innovation:** Partnerships between established and emerging companies are also becoming more common as the costs of research and development are often prohibitive, in-house talent may lack the skills that drive emerging technologies, and large enterprises typically have sourcing requirements that disqualify the onboarding of smaller and less-established ventures. Instead, established businesses are looking at risk-free collaborations with emerging firms to explore, shape and draw on new types of expertise to help fuel innovation. For example, John Deere—a leader in agriculture and construction equipment—created its Startup Collaborator program in 2019 to “deepen its interaction with startup companies whose technology could add value for John Deere customers in the future.” Each year-long program creates an opportunity “for John Deere and various startup companies to test innovative technologies with customers and dealers without a formal business relationship” and provide “startups affiliation with and mentoring from a world-class leader.” The eight companies selected for the 2023 program span an aerospace company applying space technology to the agriculture industry, an agribusiness sustainability certification company, a startup developing low-flying satellites for ultra-high resolution imaging, among others.¹²²
- **Value discovery:** Another way that businesses are joining forces is through sharing expertise and information to enable new pathways of value to be developed organically,

without a centralized driver shaping such engagement. Such models often feature “partner programs” that allow other businesses to access unique assets from the sponsoring entity and utilize those resources in a multitude of ways. For example, Philips created a lighting division and eventually spun it off as Philips Lighting, which later changed its name to Signify, a “world leader in lighting for professionals, consumers and lighting for the Internet of Things.” The company is devoted to “unlocking the extraordinary potential of light for brighter lives and a better world.” Signify does this largely by fitting lights with communication devices to collect data, effectively creating a data network. The company makes this resource available to other businesses as part of its “Certified System Integrators” partner program so that other firms—each with “unique expertise across a wide range of industries and complimentary software solutions, services and hardware”—can create solutions using Signify's products and information.¹²³

What all these models have in common is that elements of what drives a business's strategy have shifted to being sourced or delivered by other businesses that provide or rely on network effects and connectivity to succeed. These relationships and the value they deliver are an intangible asset that directly affects an enterprise's performance; however, as was the case with earlier forms of intangible capital—human capital, intellectual capital and social capital—the impacts are difficult to quantify.

While a network's growth and success can be measured through formulas like Metcalfe's Law (“the value of a telecommunications network is proportional to the square of the number of connected users of the system”¹²⁴) or key performance indicators such as the number of total users versus active users, a business relationship supported by a network is harder to assess. These relationships offer more value than the measurable impact on customer acquisition or sales growth. They offer potential—through insights, collaboration, affiliation and partnership.

What all these models have in common is that elements of what drives a business's strategy have shifted to being sourced or delivered by other businesses that provide or rely on network effects and connectivity to succeed.

The pathways for realizing that potential are beginning to be better understood. As discussed, they include the delivery and utilization of network-derived data and analytics, internet-working of customer bases, the creation and leveraging of community affiliations, the ability to bridge physical and digital experiences, and the organic growth of solutions based on related areas of expertise.

Each of these types of business-to-business engagements today require significant negotiation, creation of contracts, reengineering of business processes and systems, and operational oversight. This limits the number of such arrangements that businesses can pursue, and thus the value that can be found through these interactions. New technologies emerging as part of the fourth tech-driven innovation cycle—decentralization—offer superior options for addressing these constraints and might soon create a new source of business value, not just being connected into business networks but being composable and interoperable with other businesses' processes.

Connectivity standards may unleash and amplify the power of business networks

One of the most successful network-driven models of engagement helping to shape the current third cycle of tech-driven innovation has been the launch of cloud-based development platforms like Amazon Web Services, Microsoft Azure and Google Cloud. Collectively, these three platforms controlled 64% of the entire cloud infrastructure services market at the end of 2021.¹²⁵

The service that these platforms provide is cloud computing to enable infrastructure and application development and hosting. Rather than investing in computing equipment and incurring up-front expenses, businesses rent access to cloud-based services from these and other suppliers. The computing services offered by these platforms—app storage, processing power, development tools—are available on a pay-per-use basis over the internet.

Applications built using these tools create application programming interfaces (APIs) to allow them to connect to the cloud provider and to other business functions. APIs are powerful protocols that enable communication between components, connect systems and eliminate redundant functions. For example, anyone who has used PayPal to transact on a public website has probably noticed that they will not need to re-input their shipping and billing address information

when they are returned to the merchant's site to complete their purchase. This is because the PayPal API has already transferred that information to the seller's order fulfillment system along with the payment authorization.

Cloud-computing platforms and APIs have worked to re-architect the way that businesses build their systems. Rather than programming a process end to end, APIs allow each distinct task in a process to be made callable as a "microservice." Microservices are interoperable—they can communicate with each other and trigger actions in each other. Developers can stitch together microservices to build an end-to-end process. Certain frequently used tasks, such as "look up customer account," can be created as a microservice and then inserted into every system within an organization that requires customer account information. This makes the task more standardized and less prone to errors. Moreover, the microservice could be redirected if the system providing account information is changed simply by updating the API. This would save businesses from having to reprogram and redirect each system that relies on account information.

APIs are standardizing the way that application development occurs. This is happening not just around tasks within a business process, but at the capabilities level. For example, a new "composable commerce" approach is allowing merchants to replace previous e-commerce monolithic platforms with a set of best-of-breed elements by using pluggable microservices that operate like building blocks. Thus, rather than buying a single e-commerce platform that combines a content management system, a logistics manager, customer relationship management, shopping cart technology and other components, an enterprise can pick the top provider of each element and connect them together. This offers developers an ability to "add, remove, replace or customize components without compromising" the platform or the user experience.¹²⁶

This progression in how APIs and microservices are used—from standardizing access to tasks within a process to standardizing the use of functional components within a system—is likely to progress further as the fourth tech-driven innovation cycle unfolds. Smart contracts—a new tool that offers API-like capabilities with programmable business logic—can make entire commercial activities callable, interoperable, composable and, most importantly, self-executing. This would significantly reduce the frictions that limit the ability of businesses to connect with and access ecosystems

and their accompanying networks, thus allowing for more opportunities and sources of business value, as shown in Exhibit 16 below.

Smart contracts are one of the key pieces of new technology enabling the emerging digital asset ecosystem. They are self-executing contracts with the terms of the agreement between the buyer and the seller written into the lines of code. In essence, they are computerized transaction protocols that execute the terms of a contract either immediately or when certain conditions are met.

Each smart contract is stored on a blockchain—the distributed, decentralized ledgers discussed earlier. As such, the transactions are trackable and irreversible. They can be carried out between pseudo-anonymous parties because the digital wallet addresses that pay for and receive the contract benefits are publicly available and have been verified by the blockchain’s peer-to-peer consensus mechanism. These contracts allow for transactions to occur without a central authority managing the process and without an external enforcement mechanism.

What makes smart contracts highly important to today’s and the future of commerce is that they are based on a common template written in a common coding language that all participants within a blockchain ecosystem use, but, at the same time, they still provide each participant an ability to program the contract to operate in a unique manner.

This means that the contracts are standardized and can be recognized and interacted with by other contracts, while they are also able to handle a wide variety of business functions. In a sense, they are like a single transaction microservice delivered through an API, but one that does not need any human intervention to be recorded, administered and completed.

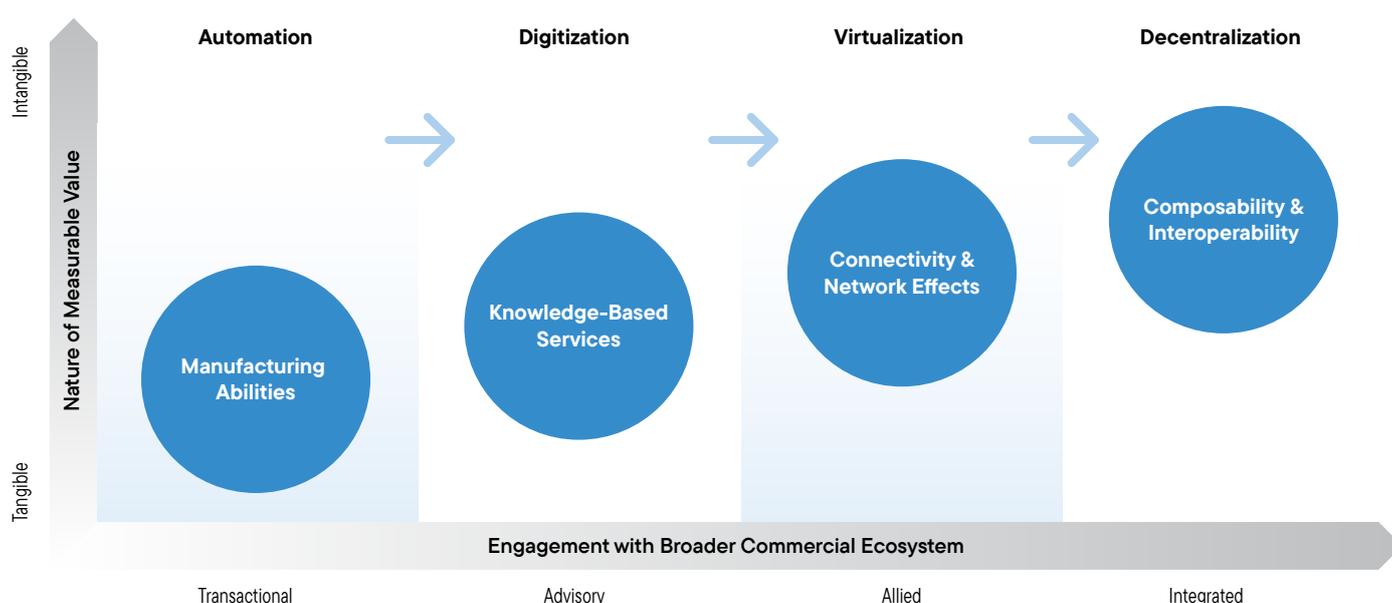
Connecting smart contracts and using them as building blocks can create entire new commercial activities, just like connecting microservices enabled by APIs today can create new functions or even new systems. This is illustrated in Exhibit 17 on the next page.

The benefit of this advancement would be that many of the activities enabled by today’s virtual platforms will be able to be executed in a decentralized, automated manner.

Consider the following examples:

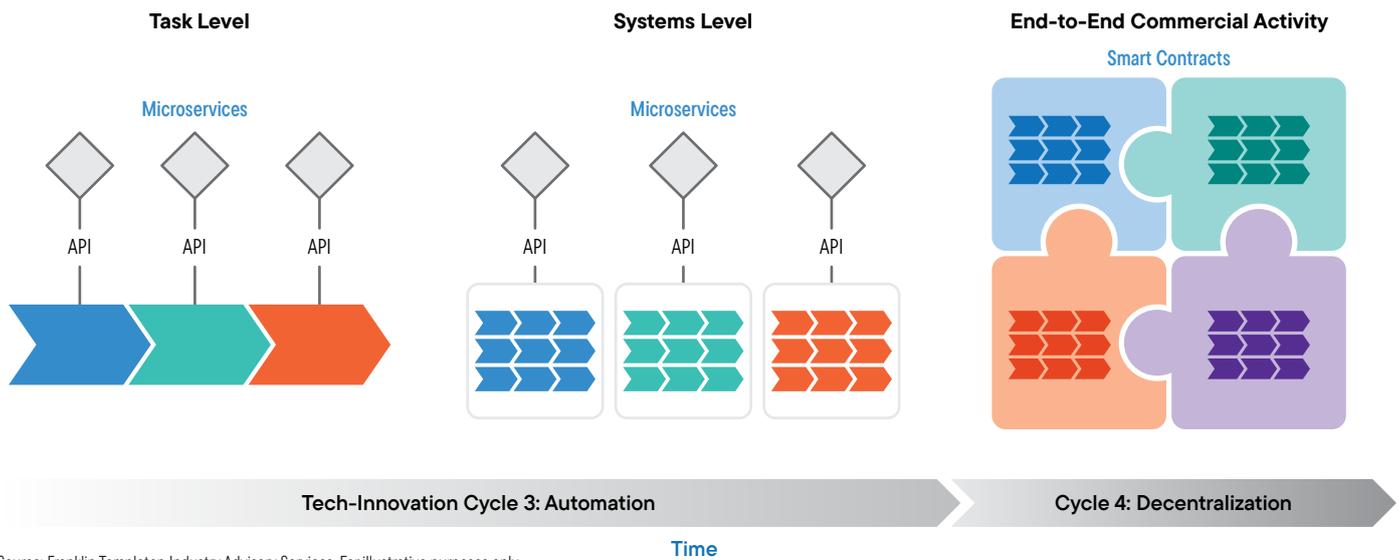
- **Tech-innovation cycle 3:** Today, an individual wanting to hail a ride on Uber would download the Uber app, input their personal information and payment method, and then request a ride. They would be assigned a driver by the platform, and they could watch the car’s representation approach on a map that displays their pickup point and then track the car’s progress to their destination (which is enabled by a microservice).

Exhibit 16: Decentralizing the Delivery of Business Value



Source: Franklin Templeton Industry Advisory Services. For illustrative purposes only.

Exhibit 17: Making Business Functions Composable and Interoperable



Source: Franklin Templeton Industry Advisory Services. For illustrative purposes only.

Once the driver picks them up, a charge would be put through to their payment method (another microservice). If they wanted to, the rider could listen to their Spotify playlist in the car during the ride (another microservice offered by the ride hailing app) or order food to be delivered to their destination (another microservice offered by the ride hailing app). After the ride is complete, they could opt to tip the driver (another micro-service) and score how well the driver performed (another microservice).

Each of these microservices might be sourced from different providers. Uber would need to negotiate contracts with each provider, administer those relationships, track the invoices, send payments and resolve disputes. The data on the rider, the cost of their ride, their pickup and drop-off locations, their form of payment, etc. would be collected by Uber and might be sold to third parties to generate an additional Uber revenue stream.

- **Tech-innovation cycle 4:** If that same service were offered in a decentralized manner, the end-user experience may feel similar, but the method of delivering the service could be quite different. The individual in this instance could enter a decentralized ride-hailing app's web address into their browser (or download the app) and be taken to a ride-booking page. They would not have to give any personal information or have pre-entered a payment method. The individual could request a ride and several nearby drivers might submit bids to get the fare. The individual could select one of the drivers. This would create

a smart contract between the requestor and the provider of the ride, each of whom would affirm their intention to transact by submitting their digital signature—which contains the internet address to their digital wallets.

The nodes on the underlying blockchain would check the validity of the digital wallets, ensure that the requestor has sufficient currency in their wallet to pay for the transaction and if so, would authorize the transaction and add the smart contract governing the ride and its cost to the blockchain. When the ride is completed—as verified by a geolocation tag—the money would automatically be moved from the rider's digital wallet to the driver's.

Meanwhile, the decentralized ride-hailing app may have created affiliations with other apps that would be alerted that a ride is taking place when they see the rider's smart contract information show up on the blockchain. These other businesses would be able to access data about that ride from the blockchain data. Services from these other apps would then be presented to the rider through the ride-hailing app interface.

A decentralized streaming app may send an offer asking whether the rider would like to listen to their favorite playlist, and a decentralized food delivery app may send an offer asking if the rider would like to set up a delivery from a restaurant near the rider's destination. Other types of businesses could also embed themselves into the ride process. An events app may alert the rider about concerts happening near their destination and ask if the rider wants tickets. A personal services app may prompt

the rider to see if they would like someone to pick up and deliver the rider's dry cleaning or walk the rider's dog once they arrive. If the rider accepts an offer, another smart contract is set up between the rider and that provider, and the transaction is added to the blockchain.

Because the offer was accepted through the ride-hailing app, a separate smart contract prepopulated with the terms negotiated between the ride-hailing app and the other service provider would also be created if the rider opted to use the service or buy the goods. This additional smart contract would send a fee from the other app to the ride-hailing app for having provided access to the rider. All of this would be accomplished by self-executing code. No human intervention would be required to create the contract, approve, oversee or administer the arrangements.

What should be clear from these examples is that the range of potential services and product offers that could be displayed to the rider during their ride with the ride-hailing app might be far more extensive in the upcoming technology cycle than in the current approach. The templates to offer potential services and goods are standardized and can be easily embedded into the ride-hailing app, just as the ride-hailing app might reciprocally embed their offers into partner apps—this is composability.

The commercial activities that each app delivers can be initiated and fulfilled from within other apps—this is interoperability. The reason that this approach may take over from today's microservices and APIs is that the actions are self-executing—reducing the administrative burden, operational friction, engineering and service-related costs that might limit the number of services an app is willing to embed today.

While we used the example of app-delivered goods and services, the same smart contract and blockchain-led approach could be used by more traditional off-chain businesses. Cross-border trade has been difficult to digitize because of 1) the large number of variables required to describe the transactions—e.g., country of origin, product details, shipping schedules, warehouse locations; 2) the large volumes of documentation required to assure the transaction; 3) the multiple handoffs and extensive coordination that must be accomplished to affirm each step and complete a transaction; and 4) the multitude of payments that must be determined and issued to complete a deal. As such, this has been one of the areas where experiments using smart contracts and blockchain have already occurred.

In 2017, the project lead for the World Economic Forum's Disruptive Innovation in Financial Services described a transaction that had "guaranteed the trade of almost US\$100,000 worth of cheese and butter between Irish agricultural food co-operative Ornua and the Seychelles Trading Company. The process—from issuing to approval of the letter of credit, which usually takes between seven and 10 days—[was] reduced to less than four hours."¹²⁷

Other examples of traditional businesses experimenting with blockchain and smart contracts are also emerging. Real estate transactions are laden with costs relating to closing, title transfers, broker commissions, jurisdictional taxes and more. Such costs might be reduced or even eliminated by utilizing smart contracts that can operate without intermediaries. Smart contracts can even be utilized to streamline rental agreements or automate the provision of credit, mortgage agreements or insurance.

Several nations with less developed infrastructure are looking at these options. For instance, "the Republic of Georgia (in the Caucasus region) has been developing a blockchain-based land title registry," as have "other jurisdictions such as the United Arab Emirates."¹²⁸ Once implemented, these blockchains could support a large set of smart contract transaction use cases.

While nascent, these efforts are creating a new approach to deriving business value. By standardizing the ways in which businesses connect and making the delivery of commercial activities composable and interoperable, a more dynamic, efficient and less expensive model might result. Dissatisfaction with intermediaries has been growing and might soon hit a tipping point that pushes commerce into a new direction. One of the factors that may help push enterprises to that tipping point is demand from end users. As the next megatrend will explore, tech-driven innovation cycles have given a stronger, unifying voice to consumers, allowing them to band together and achieve expanding power as a crowd.

Megatrend 3

Expanding power of the crowd

The balance of power between commercial enterprises and their consumers has been foundationally altered as tech-enabled options have transformed the ability of consumers to voice feedback to businesses. From a starting position with less power, consumers have gained increased agency and influence as the tech-enabled innovation cycles unfolded. This has led to a broad shift in buying behavior and corresponding change in enterprise marketing strategies.

Consumer power has been amplified by technology offerings that allow individual consumers to share their views about a commercial experience with each other through first the internet and then social media. This results in organic networks as opinions are distributed across individual participants' contacts and followers, shaping a community or crowd view and allowing certain opinions or ideas to go viral and influence a growing number of network participants. The power of the crowd continues to expand and may become the primary force driving commercial activities as the emerging fourth tech-driven innovation cycle unfolds. This would mark a complete reversal of the situation that reigned when the first tech-driven innovation cycle of the computer age began.

Enterprises control their own narrative despite enhanced customer service options

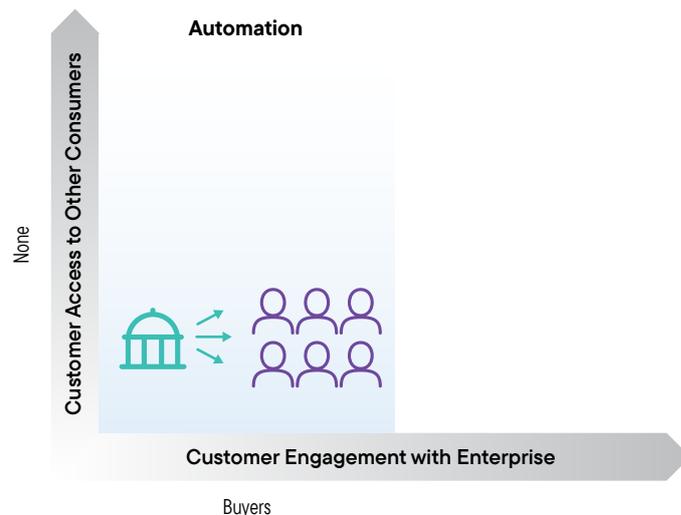
The proprietary networks that grew during the first tech-driven innovation cycle—automation—resulted in insular decision-making within most organizations. Enterprises would determine their business strategies based on the amount of capital they would consume to produce and build a need for their goods or services through advertising and marketing aimed at influencing consumer desires.

The 1960s began what many term to be “the golden age of advertising.” Though television (TV) advertisement broadcasting began in 1941, it was not “until the late 1950s that owning a TV became” mainstream. The spend on TV advertising rose in line with TV’s popularity. In the United Kingdom, ad spending increased from the 1956 total of £10 million to £86 million in 1966.¹²⁹

The 1960s was also a period when many modern advertising strategies were conceived. Brands first began using consistent messaging and ideas across all their different forms of marketing material to develop what they hoped would become established brand personalities. Advertisers also recognized the power of using a spokesperson to personify a brand. In 1963, for example, McDonald’s launched Ronald McDonald. This was also the era when lifestyle advertising began—associating a product or company with a specific type of attitude such as Pepsi’s “now it’s Pepsi—for those who think young,” one of the era’s most successful campaigns.¹³⁰

The customer’s only role in this dynamic was to be the buyer of the good or service, and at the most, to share their responses to advertising proposals through marketing-led focus groups. Customer complaints or feedback based

Exhibit 18: Enterprise-Controlled Messaging



Source: Franklin Templeton Industry Advisory Services. For illustrative purposes only.

on the enterprise’s actual products or services was never factored into marketing and rarely if ever factored into sales and product strategy. The one-way nature of engagement in this period is illustrated in Exhibit 18.

“In 1970, the American economist Albert Hirschman introduced the terms ‘voice’ and ‘exit’ to characterize the two main channels” by which an individual might influence or impact an organization. His work noted that an individual could try “to change something by speaking up, complaining or voting for another leadership” if that option existed. This is considered “voice.” Alternatively, an individual could quit the organization and “sacrifice future influence for the (hoped for) strong impact of quitting.” This is considered “exit.”¹³¹

The same concepts held true for “the relationship between a customer and a business.” Voice could “be exercised by direct contact with the firm in question, such as asking for a manager to complain or give suggestions.” Exit was voting with your wallet to simply quit buying the company’s products or services. Departing customers might leave, hoping that their action could force the organization to make the correct conclusions and that numerous customers might follow suit to help create “a downward trend in sales.”¹³²

There were some problems with this type of “exit,” however, that made the gesture mostly meaningless. Signals were “only felt when many customers quit.” The reasons for why customers were quitting were unclear, leaving the enterprise looking at the resulting pattern, not its cause. “Important qualitative information [was] lost.” Moreover, a firm had so

many customers that it was able “to dismiss an insistent, vocal customer.” Conversations between the firm’s representatives and unhappy customers were typically kept private. Even when an employee promised to pass along a customer’s feedback, “the bureaucratic distance from the ‘friendly representative’ on the phone, to persons having power to decide changes in organizational” offerings was “so great that even a sympathetic listener will not make much of a difference.”¹³³

The first significant improvements to this situation came in 1967 when AT&T introduced the toll-free telephone number. For the first time, customers were able to directly call a company and be routed to a dedicated customer service agent rather than trying “to call collect and speak to an operator” in the hopes that the inquiry might be routed to the right division or individual. “Companies could deploy whole departments of agents, trained and employed in-house, to anticipate the customers [sic] needs, gather information about their products and upsell more premium offerings.” It was the first time that “companies really started to recognize the advantages of customer service and how it could drive additional revenue.”¹³⁴

Concurrently, many organizations were deploying their first computers and using the advanced data management and processing power to evaluate their “finances, assess market trends, [and] analyze proprietary data”—including customer feedback as collected and entered by the customer service representatives. This became an even more valuable source of intelligence with the introduction of interactive voice response technology in the 1970s. This innovation was possible because of “significant improvements in hard drive technology which in turn allowed customer support departments to store digitized speech on disk, as well as play previously [recorded customer] messages and move the customer through elaborate phone trees based on their response.”¹³⁵

Despite these improvements, a customer’s feedback was still being interpreted and input solely by a company’s dedicated customer service agent and captured in the company’s proprietary systems. The voice that this allowed customers was limited at best.

There was some hope in that feedback was being recorded and aggregated. When enough customers complained about the same thing, there was at least a chance that the aggregated feedback might be statistically relevant and make it into corporate analytics and reporting. The introduction of the World Wide Web in the 1990s set the stage for the major transformative advances in consumer power.

The size of computers had been shrinking throughout the 1950s and 1960s as new chip technologies were being developed. “In 1969 Busicom, a Japanese calculator company, commissioned Intel Corporation”—a new Silicon Valley semiconductor “spun off from Fairchild Semiconductor”—to create a custom chip for its planned line of calculators.

Digital channel opens sidebar for consumers to respond to enterprise messaging

The size of computers had been shrinking throughout the 1950s and 1960s as new chip technologies were being developed. “In 1969 Busicom, a Japanese calculator company, commissioned Intel Corporation”—a new Silicon Valley semiconductor “spun off from Fairchild Semiconductor”—to create a custom chip for its planned line of calculators. The engineers assigned to the project proposed a far more powerful chip than had been requested—a general-purpose chip that would “control, send, and receive signals from other chips and devices. A set of instructions was stored in memory, and the chip could read them and respond to them.” This “came to be called a microprocessor or microcomputer”—the central processing unit or the brain that supports a computer.¹³⁶

“Busicom eventually sold over 100,000 calculators powered by the” chip and “accepted a one-time payment of \$60,000 that gave Intel exclusive rights to the 4004 design.” “Intel began marketing the chip to other manufacturers in 1971.” By 1974, the processing capacity of the chip doubled. Intel at the time was a little company with products that were revolutionary but with no ready market for their use. It began placing articles in electronics magazines and “expounding the microprocessors’ capabilities,” hoping to encourage “engineering organizations and companies” to “come up with applications.”¹³⁷

Despite the potential that Intel’s young engineers saw for the chip, the major computer makers of the time showed no interest. “The big computer companies overlooked the opportunity” and, in several instances, “turned down explicit proposals by their own engineers to build such machines.”

“The new generation of microcomputers” (which came to be known as personal computers) was thus built as a hobby by young engineers and commercialized by entrepreneurs.¹³⁸

“Magazines such as *Popular Electronics* and *Radio Electronics* helped spread the notion of a personal computer. And in the San Francisco Bay area and elsewhere, hobbyists organized computer clubs to discuss how to build their own computers.” A September 1973 article in *Radio Electronics* described a “TV typewriter, which was a computer terminal that could connect a hobbyist with a mainframe computer.” Micro Instrumentation Telemetry Systems “came up with the idea of selling a computer kit”—a package offering with “all the components necessary to build an Altair computer,” including the latest Intel microprocessor. The kit was sold for US\$397 and “hundreds of orders for the kit” poured in after the offering was featured in “a January 1975 cover article in *Popular Electronics*.”¹³⁹

In Silicon Valley, “a computer and hacker hobbyist group called the Homebrew Computer Club gathered around an Altair at their first meetings.” Regular attendees included Steve Wozniak, Fred Moore, Jerry Lawson Li-Chen Wang, Dado Banatao, Liza Loop, Lee Felsenstein, and Steve Jobs. In 1978, another group of hobbyists assembled in Chicago, the Chicago Area Computer Hobbyist’s Exchange (CACHE), which became the most popular among the first small-scale bulletin board services (BBSs).¹⁴⁰

These enthusiasts decided to archive the club’s newsletters, which were “an invaluable source of information.” The system they built “welcomed users..., provided a list of articles to read, and invited them to leave messages.” It was “an electronic version of the community bulletin boards.” Eventually, “a small but lively community began to form.” The developers of the community wrote up a “how-to” article on starting a bulletin board service and published it in *Byte* magazine. “Over the next few years, hundreds of small-scale” BBSs emerged.¹⁴¹

The introduction of the Telnet protocol allowed these BBSs to communicate. Introduced in 1973, Telnet was a way for machines to communicate with each other in a bidirectional

manner—in other words—“to send and receive information.” It was an interactive approach that required a user on one end of the phone line. The protocol was text only and did not allow for any file transfer. This allowed dial-up modems to connect and communicate with the BBSs.¹⁴²

One of the key BBSs that developed during this period was FidoNet—a “network of BBSs.” By 1993, it was estimated that FidoNet had built a network with more than 20,000 nodes, with 59% in North America, 30% in Europe, 4% in New Zealand and Australia, and 7% scattered in Asia, Africa and Latin America.¹⁴³ In 1979, another type of BBS was developed—Usenet. It was a discussion system that allowed users to publish messages or articles “in one or more categories called newsgroups.” The initial newsgroup—NET. general—was developed in 1981. Usenet introduced the concept of being able to subscribe to newsgroups. Contributors went on to develop early online behaviors including the use of “LOL” to describe “laughing out loud” and the introduction of terms like “FAQ” and “spam.” Discussions on both BBSs and Usenet were posted sequentially with the latest comment at the top of the screen.¹⁴⁴

Another innovation introduced by the bulletin board systems was discussion forums. They utilized “asynchronous communication,” which enabled “users to post and respond to messages from any computer at any time” instead of requiring participants to be logged on at the same time. “Forums typically arranged messages by thread—topic, date, and time—and allowed users to respond to certain messages or create a new message, or thread, of their own.” “Certain discussion forums also had moderators, who viewed messages before they were posted in order to ensure that they met the site’s standards.” To become a part of a forum, many sites required users to establish an ID and password.¹⁴⁵

By 1985, the discussion forum format had begun to move away from computer enthusiasts to a broader group of creators. Steward Brand and Larry Brilliant founded the Whole Earth ‘Lectronic Link (WELL) to facilitate “dialog between the writers and readers of the *Whole Earth Review*”—a publication devoted to debating the role of technology in

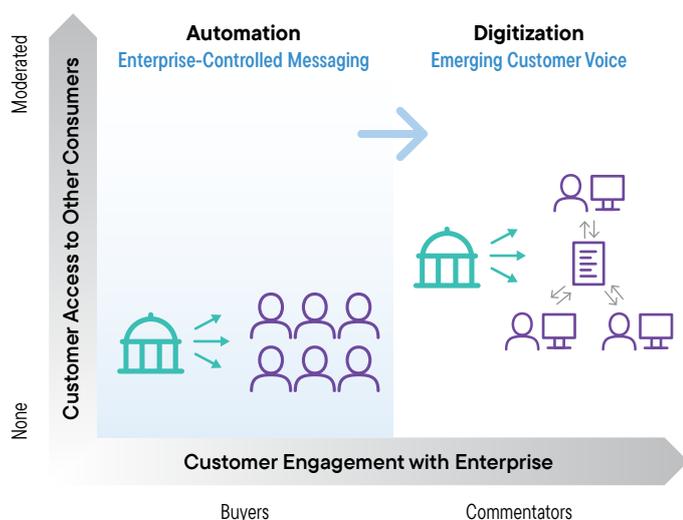
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society, invention, natural sciences and the arts. It cites itself as “the primordial ooze where the online community movement was born” as it brought together “writers, journalists, futurists, thinkers and, somewhat randomly, Deadheads (fans of the music band The Grateful Dead).” One of the members of this forum created the “virtual community” term and established the content maxim that still rules much of the thinking around online content today—“You Own Your Own Words (YOYOW).”¹⁴⁶

These networks were open to anyone with a computer and modem. By contrast, the internet throughout the 1980s was still primarily limited to individual users associated with large universities or research centers. By the mid-1990s, that dynamic shifted, however, and more and more former BBS networks and discussion forums began to migrate to the World Wide Web. This increased the audience that might be involved in online discussions exponentially, allowing consumers to be commentators as well as buyers. Furthermore, this marked the beginnings of customers having a true heard “voice,” as shown in Exhibit 19.

The first software dedicated to forum protocols for the web was developed in 1994. Online journals also started in 1994 as “a place where individual users could write about their day-to-day life” and observations. This evolved into something more social network-oriented and became a weblog or a “blog” with “new features like comments, feed subscriptions,” etc. “Advanced software packages like WordPress” allowed blogs to reach a worldwide audience. By 2011, “there were over 173 million blogs on the internet.”¹⁴⁷

Exhibit 19: Customers Begin to Share Their Views



Source: Franklin Templeton Industry Advisory Services. For illustrative purposes only.

Together, discussion forums and blogs began to offer individual users a way to share their views about their experiences, including their commercial experiences, directly with each other. Chat rooms, review boxes and other internet media accelerated the feedback loop on products and on after-sale service. This posed a significant challenge to commercial enterprises that had previously had complete control over their brand building and messaging.

Not only did consumers now have a new, public channel on which to share their “voice,” they also had a way to broadcast their “exit” and tie their action to the issues that prompted them to stop buying a company’s product or service. The search functions of the internet improved throughout the 1990s and it became easier for individual users to find information on products and services, beginning a trend of self-service that relied on FAQs and forums. These behavioral shifts—enabled by tech innovations—forced enterprises to create an effective system to manage negative social network responses or feedback before word spread and undermined the credibility of the brand. This gave rise to a new practice called customer relationship management (CRM).

The late 1990s saw the beginning of the era where organizations tried to intensify their focus on customer satisfaction. This was a pursuit that combined information technologies with customer service and marketing communications. The idea was to learn as much as possible about customers and their shopping behaviors. It started with the sales force gathering information about specific customers to create a database, often using the information to personalize email or other communications. Visits to an organization’s website became another important source of information and input for the CRM systems, supplementing the call center information from the earlier era.

Studies found that statistically, “one happy customer will share their experience with around 9 people.” By contrast, for “every customer who complains,” there are approximately “26 unsatisfied customers who don’t communicate their frustrations.”¹⁴⁸ Addressing that particular customer complaint was found to have impacts on a far wider audience.

Despite the advancement in customer power enabled by the new online channel, nearly all the discussion forums, blogs, and customer feedback mechanisms in the second tech-driven innovation cycle—digitization—remained asynchronous, just like the BBS systems that dominated

the 1980s. Moreover, feedback options were typically hosted on a company's own website, allowing them to install their own moderator, suppress or censor feedback, and recruit in-house individual users and reviewers to contribute and put more positive comments toward the top of discussion threads.

The number of consumers that might see online content that could influence their decision-making about a company was also limited to only those individual users who were specifically looking for such information. The advance from discussion forums and blogs to social media communities in the third tech-driven innovation cycle—virtualization—eroded many of these barriers that helped to preserve companies' control of their brand and messaging, resulting in even more empowered consumers and the emergence of the “crowd.”

Social media gives voice to the crowd and creates a feedback loop with commercial enterprises

Several key changes in the way that the web operated began in the mid-2000s and altered the dynamics of online consumer engagement.

- The advent of camera- and browser-enabled mobile phones, and then later tablets, removed a requirement for users to be in front of a personal computer to post—allowing for on-the-go capture of thoughts and images and more instantaneous feedback.
- New Web2 technologies allowed for the upload of user-generated content, including photos and videos, allowing individual users to use more than just words to make their point, thus increasing the impact of their commentary.
- Website design changed to be more user-centric, displaying content around topics, areas of interest and user-selected feeds rather than making individual users search for and navigate to relevant pages.
- Most importantly, social media—a new type of virtual community gathering place—emerged, allowing individual users to amplify their “voice” across vast networks that spanned the globe. This changed the nature of engagement from asynchronous to synchronous, creating a constantly evolving ecosystem of likes, comments and sharing.

Individual users gained the ability to influence one another using third-party platforms, as opposed to company-sponsored, moderated discussion forums and feedback on company sites. Increasingly, it was not a small number of individual users sharing their views, but a distributed network of individual users shaping each other's views independently through an ever-evolving dialog—effectively, a crowd.

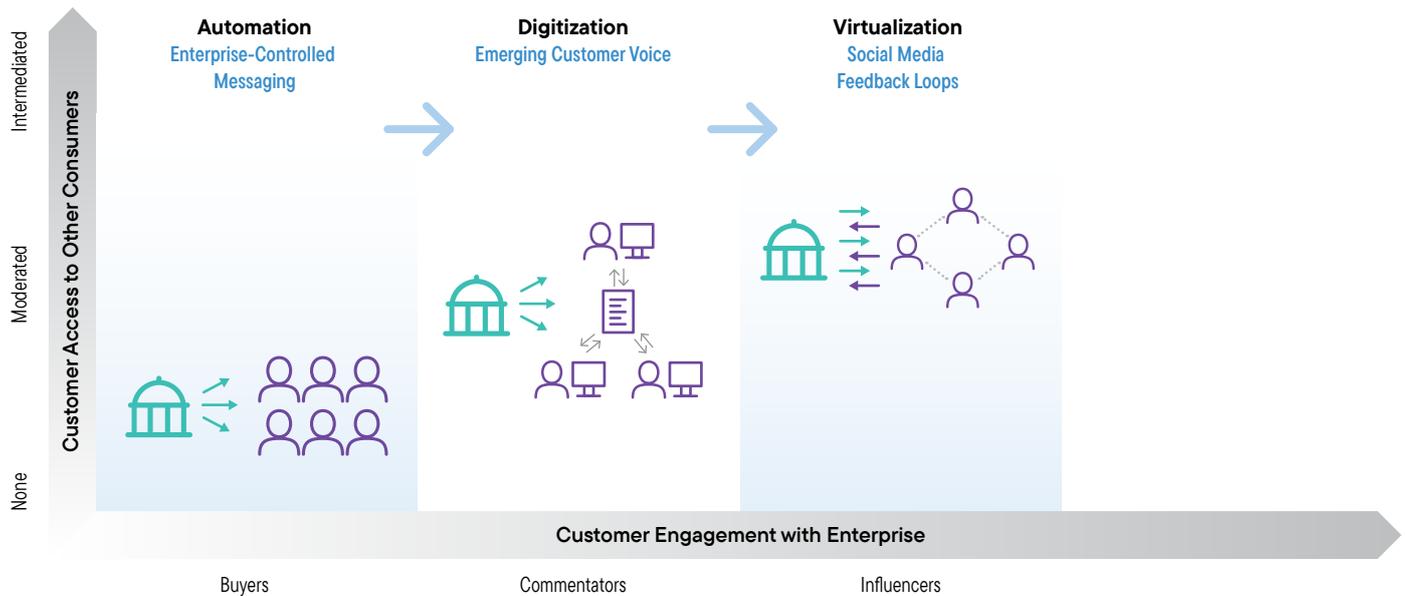
The result of these advancements was a shift away from the publisher-centric model, which enables commercial enterprises to control (at least to some extent) the content being put forward about their products and services and the perception of their overall brand.

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Commercial enterprises were forced to join into these discussions as a participant rather than as the shaper of views. The company's voice was now part of a feedback loop rather than being the main controller of its messaging. This evolution is illustrated in Exhibit 20 on the next page.

The immediate impact of this change has been that consumers are now able to exert greater influence over products, services and the enterprises that offer them. Consumers can learn about and engage with brands much more easily and in a more balanced playing field. A 2012 study found that “there are more than twice as many brand-related searches on social-networking sites” for user-generated content “as compared to marketer-created content.”¹⁴⁹

Exhibit 20: Emerging Power of the Crowd



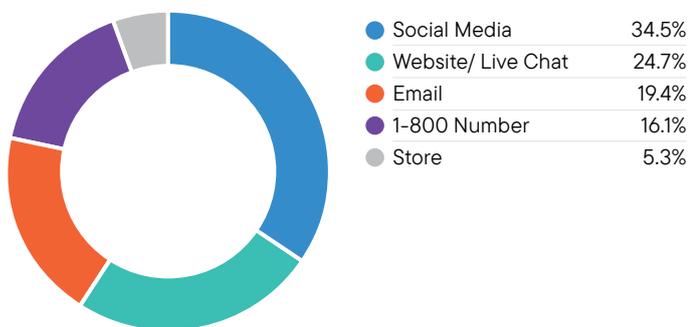
Source: Franklin Templeton Industry Advisory Services. For illustrative purposes only.

The availability of social network channels has significantly altered the customer care experience. Exhibit 21 shows that by the first quarter of 2016, 59% of customer service interactions were occurring through social media or websites with live chat. Email engagement accounted for another 19%. The once-vaunted 1-800 customer service phone line and in-store interactions were down to only 21% of customer touchpoints.

Interestingly, this shift to digital channels has occurred across age demographics. Salesforce's State of the Connected Consumer survey from May 2022 found that 65% of both Millennials and Gen Zers preferred to engage through digital channels and that 57% of Gen Xers expressed this preference. Even a significant share of baby boomers

Exhibit 21: People's Top Choice for Customer Care

As of First Quarter 2016



Source: "The Sprout Social Index, Edition VI: Shunning Your Customers on Social?" Sproutsocial web site.

surveyed (42%) preferred the digital channel. Additionally, the report found that 53% of customers preferred to make purchases online versus in store, underscoring the importance of digital engagement and the outsized importance that the "crowd" might play in shaping buying decisions.

The following statistics help to underscore just how important the "crowd" view is for a branded company:¹⁵⁰

- "More than half (51%) of consumers read reviews on forums or social media to evaluate a product or service before purchasing" as buyers and these "consumers are more likely to trust this unfiltered peer feedback from people who have already tried a product or engaged with a brand."¹⁵¹
- Eight out of 10 "consumers expect brands that have a social media presence to interact with their customers in meaningful ways." Nearly "one-third of consumers discover new brands through digital word-of-mouth" and look at "a brand's network to gauge their values, relevant news and offerings, and how they relate to their audience."¹⁵²
- "78% of customers say that environmental practices influence their decision to buy from a company" and 66% "have ceased buying from companies whose values didn't align with their own."¹⁵³

There are two aspects to this “digital experience”—the first is understanding the customers to effectively tie together all their touchpoints...The other facet of the digital experience that individual consumers seek is an organization’s ability to deliver brand authenticity.

- “71% of consumers switched brands at least once as priorities, lifestyles, or financial situations changed” and as online options lured “them away from tried and true favorites in favor of trying new alternatives.”¹⁵⁴
- 88% of customers in 2022 said that the digital “experience a company provides is as important as its products and services”—up from 80% in 2020.¹⁵⁵

There are two aspects to this “digital experience”—the first is understanding the customers to effectively tie together all their touchpoints. Whereas at one time touchpoints referred to a customer’s use of various communication channels, that concept has now expanded to include insights on every client interaction with an organization. The goal is to tie together the entire client journey across the marketing, purchasing and customer service continuum—from marketing promotions offered to a client to a view into their past orders, their e-commerce activities and behaviors, their past customer service interactions, and outcomes. The Salesforce 2022 survey found that “61% of consumers are comfortable with companies using relevant personal information transparently and beneficially—up from 52% in 2020.”¹⁵⁶

The other facet of the digital experience that individual consumers seek is an organization’s ability to deliver brand authenticity. Preferences around the types of content consumers want to see from brands they follow on social media illustrate this trend. Posts that highlight a brand’s product or service were cited by 51% of respondents contributing to the 2022 Sprout Social Index as the most important content they wished to see, but the next most important was “customer testimonials or real customer demos” (39%). “Authentic, less produced videos” were cited by 34% of respondents versus only 26% who chose “polished, highly produced videos.”¹⁵⁷

Brand authenticity also encompasses upholding the “organization’s claimed values, listening to” their “audience, discussing what matters to them, and delivering on the promises” made.¹⁵⁸ The range of topics on which individual consumers judge businesses now span far beyond the

organization’s actual offerings. The 2022 Edelman Trust Barometer found that “by an average five-to-one margin, respondents in 28 countries surveyed wanted business to play a larger role on climate change, economic inequality, workforce reskilling and addressing racial injustice.” About 60% of respondents said that they bought “brands based on their values and beliefs, almost 6 in 10 employees choose a workplace based on shared values and expect their CEO to take a stand on societal issues,” and 64% of investors sought to “back businesses that aligned with their values.”¹⁵⁹

Failure to demonstrate these actions in their business pursuits can work against an enterprise and result not only in lost customer loyalty, but in some cases viral campaigns to boycott or protest a company’s actions. “The spread of anger” online can result in “outrage cascades—outbursts of moral judgment which start to drive the conversation around brands,¹⁶⁰ their products and their corporate messages. The virality of moral judgments” is¹⁶¹ often accentuated because of the algorithms used by most social media platforms to generate engagement.

A recent study found that most social media boycotts “don’t have an immediate impact on earnings,” nor do they produce statistically significant sales declines, “but this type of consumer activism is vitally important for...public relations. The real power of a social media boycott lies in its ability to hurt corporate reputation and consumer sentiment by generating negative media coverage.” “A study of 133 corporate social media boycotts conducted by Northwestern University’s Kellogg School of Management found that media coverage of boycotts is detrimental to a company’s reputation and that the stock price of a targeted company dropped by nearly 1% for each day that it got national attention.” Moreover, “about 25% of social media boycotts that received national media attention resulted in concessions from the targeted company.”¹⁶²

The need to engineer a positive digital experience and the threat that negative customer perceptions might lead to an outrage cascade have made many companies highly reliant on scanning social media for clues as to the mood

of the crowd. A recent survey found that most marketers (60%) check in on a company's social media daily and another 29% use such data weekly. The key uses of social media and trends data were cited by Sprout Social Index survey respondents as follows: 65% to support sales strategy; 48% to enhance product development; 46% to focus on content strategy; 44% to enhance the customer experience; 40% to develop competitive insights, and 32% to conduct market research.¹⁶³

These figures underscore the growing importance of social media and trends data to an organization's core business strategy. As we move from today's third tech-driven innovation cycle—virtualization—to the next cycle—decentralization—the shift in the ownership model for platforms and data is likely to put the consumer in an even more powerful and primary position. Commercial enterprises are less likely to engage in a dialog with their individual consumers and more likely to become wholly responsive to the signals emerging from the crowd.

Tapping into crowd factors may become the key driver of business engagement

Natural tensions exist between the company and the crowd in the current approach to commerce. This is because the priorities of successful businesses in today's network economy change as they mature. As discussed earlier, today's virtual platforms that deliver the user-centric web—what many term to be Web2—rely on network effects as their key driver of value.

Successful platforms initiate their network effects by getting resource providers to contribute content, products or services while simultaneously attracting customers who want access to those resources. Interactions between providers and buyers create data that become a proprietary resource of the platform provider, from which they can deliver insights to incentivize advertisers and target the delivery of the platform's offerings.

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Effectively drawing advertisers and engaging customers based on proprietary data-driven insights makes the platform an ever more attractive venue for other resource providers—partners, creators, affiliates and more. This allows the ecosystem to expand—in turn attracting more users to generate more data. This is the flywheel effect that defines value creation today. In a 2019 study, the Boston Consulting Group found “that 83% of digital ecosystems involve partners from” three or more industries and 53% have “partners from more than five” industries. Collectively, they found that the average digital platform has 27 partners and the most successful have around 40.¹⁶⁵

By expanding the ecosystem, these virtual platforms capture a growing share of the customer's wallet—positioning the platform provider for revenue and profit growth. This is where the tensions begin to kick in, however. Most of these virtual platforms that began as private enterprises are now public companies with a large set of shareholders. This sets up competing priorities within the network ecosystem.

Shareholders look to maximize the profits being driven by the platform; resource providers look to maximize the value of their contributions—services, goods, or content; and customers look to maximize the utility and minimize the costs of the platform. The tensions between these constituents can create situations where the needs of one group are elevated over another, potentially tipping the balance required to sustain the network effects.

For example, a report from the Institute for Local Self-Reliance (ILSR) “found that Amazon's seller fees accounted for an average of 19 percent of sellers' earnings in 2014,” but that the amount had nearly “doubled to 34 percent in 2021.”

Simultaneously, they found that “seller fees accounted for 14 percent of Amazon’s entire revenue in 2014” but that the figure had increased to 25% by 2021. ILSR estimated that in 2021, Amazon will have earned “\$121 billion from seller fees alone.”¹⁶⁶

Another illustration of this trend can be found on TikTok. The platform provider has been under pressure after it announced that it would pay “a total of \$1 billion in creator fees over a three-year period” from its creator fund, but creators later revealed that they had only been paid a fraction of this promised money—“\$0.02–\$0.03 per one thousand video views” versus US\$1.00 per 1,000 views on YouTube. One of TikTok’s top creators with more than “32 million fans on the platform” earned only \$25.10 in a month.¹⁶⁷ In comparison, ByteDance, the parent company of TikTok, grew its revenues from the 2019 total of US\$17 billion to US\$34 billion in 2020.¹⁶⁸

In both the Amazon and TikTok examples, the needs of the shareholders were elevated above those of the resource providers. Top TikTok creator Hank Green explains, “If the [creator] fund were a percentage of revenue, rather than a static pool, that would be very bad for TikTok’s bottom line. Compared to what it is now, they would have less profit, (but) it would be very good for creators.”¹⁶⁹

Dynamics in the emerging Web3 ecosystem operate differently, changing the incentives for commercial protocols by seeking to align interests among constituents. The commercial protocols that drive businesses in Web3

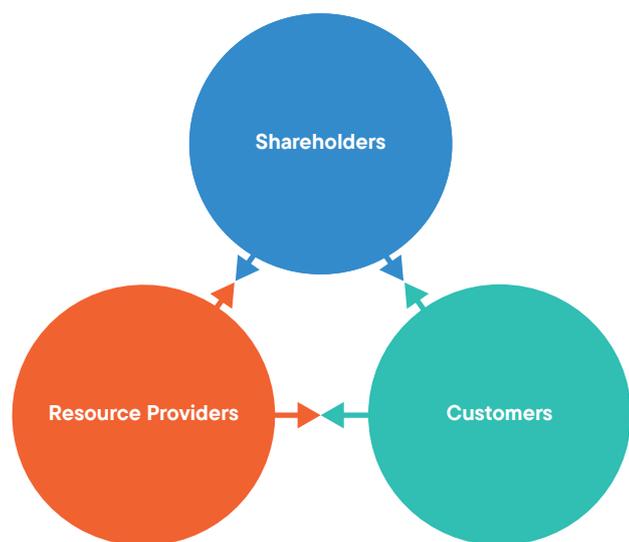
are typically run by either a founder pool or a foundation, instead of a corporate entity. The founders or foundations can design and issue their own programmable tokens that can offer unique rights such as an economic interest in the project or the right to vote on issues of concern or strategic direction. Tokens can be purchased by those interested in having exposure to the protocol or a voice in the protocol’s governance and they can be earned through participation—whereby tokens are “dropped” into the wallets of the most active protocol users and those who contribute resources.

This approach makes resource providers and users a part of the token holder pool and elevates their status—giving them a voice and stake in how the protocol develops. As such, the decisions made by a protocol will reflect the sensibilities of not only its founders and developers, but also the priorities of its most engaged participants and resource contributors. This is illustrated in Exhibit 22.

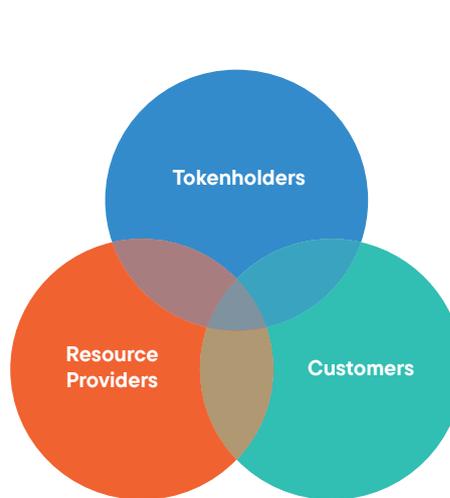
Keeping all constituents supportive of the protocol is a foundational requirement in Web3. Protocols are code-based and open source. Unhappy developers could fork the code and create a new instance of the network—drawing resource providers and users away from the original offering. For example, in 2020, a pseudonymous developer forked a popular decentralized finance (DeFi) protocol “Uniswap to create SushiSwap—a near clone protocol that added ‘community-oriented’ features like a governance token and staking rewards to Uniswap’s original code.” The new protocol then mounted an attack on Uniswap to siphon off billions

Exhibit 22: Competition between Constituents in Web2 and Alignment of Constituents

Competition between Constituents



Alignment of Constituents in Web3



Source: Franklin Templeton Industry Advisory Services. For illustrative purposes only.

of dollars, resulting in Uniswap losing nearly 55% of its liquidity. In turn, this forced Uniswap to create “its own governance token...to re-incentivize its own community’s engagement.”¹⁷⁰

Community engagement is foundational to Web3 because commercial protocols are run on a blockchain. Transactional data are shared and transparent to both those who choose to participate in the network as a verification node and—in somewhat more limited form—to the public. The Web2 model of leveraging exclusive ownership or access to the data being created by the platform’s users and resource providers is thus not viable for a Web3 network.

Instead, Web3 protocols thrive by keeping their resource providers and user base happy and engaged—extending the opportunities offered by the platform and ensuring that rewards and ownership are shared. Providing tokens as incentives helps to attract the most talented developers to create new offerings, encourage resource holders to share their assets and drive customers to focus their buying power. In each instance, the participant could be incentivized by the prospect of earning even more tokens. Thriving protocols are more likely to pull in other developers, resource providers and users—driving up the platform’s crowd appeal and initiating a crowd effect.

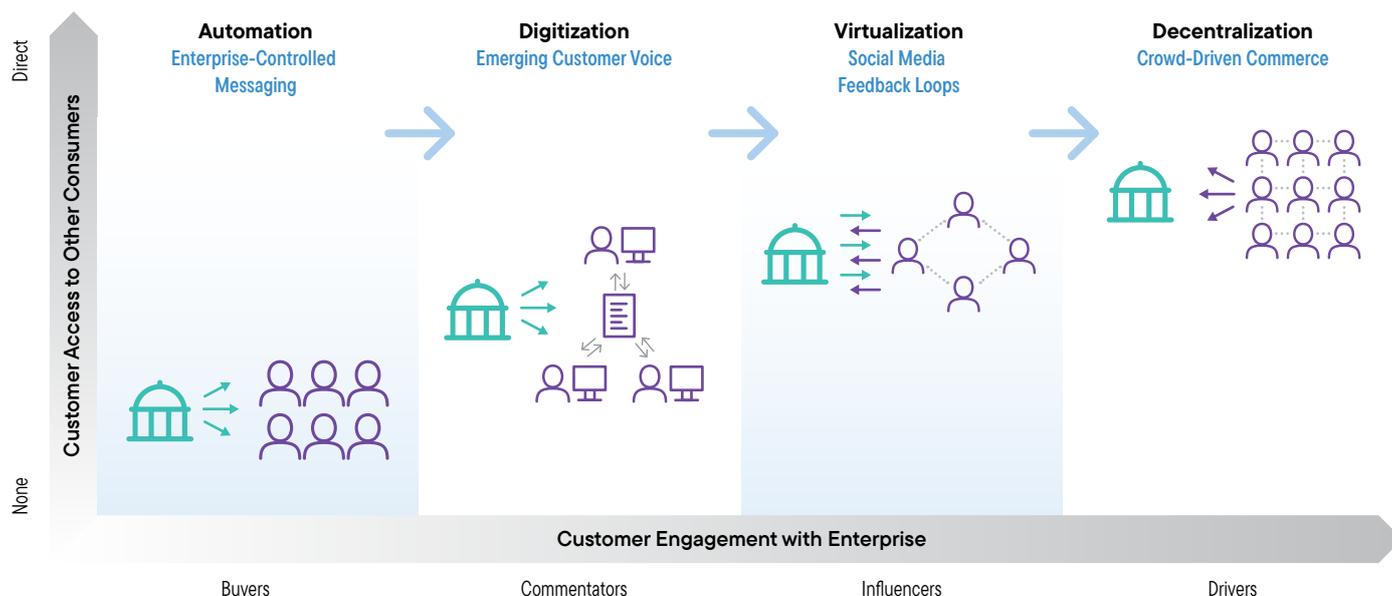
This becomes the new flywheel in Web3. Community benefits—created through shared participation and the award of tokens—align the interests of all the network constituents.

Decisions are then made that will increase the crowd appeal and grow the size of the protocol’s incentive pool. More of the platform’s resources—such as fees collected—can be shared. This creates the conditions to draw in even more resource providers and users, which in turn drives up the economic activity on the platform—and can increase the value of tokens already awarded and increase the protocol’s earnings, which could then become a new source of potential reward options.

Empowering the crowd is thus not a by-product of the virtual platform’s business model in Web3—as it is in Web2—but is instead the goal and lifeblood of these platforms. As such, businesses that look to compete in the emerging Web3 dynamic must position their products, goods and services in a manner that is responsive to and builds on the signals from the crowd. This is illustrated in Exhibit 23.

If this vision proves correct, in the span of about 70 years, there would have been a complete rewiring of how the promotion of commerce occurs. Enterprises fully controlled the messaging that was delivered to their prospective buyers in the first tech-driven innovation cycle—automation—with the goal of having customers embrace the brand values and lifestyle that the organization’s marketing team determined. In the emerging fourth tech-driven innovation cycle—decentralization—buyers might become the driving force dictating to enterprises the attributes their brand must deliver to win buyers’ trust and interest.

Exhibit 23: Crowd-Driven Commerce



Source: Franklin Templeton Industry Advisory Services. For illustrative purposes only.

The growing use of social media and trends data to direct sales strategy and product development are signals that this dynamic is already beginning to take hold. New abilities enabled by the smart contracts offered in Web3 platforms may accelerate the use and enhance the importance of social media data—shifting it from an input to being the driver of future business offerings.

The growing use of social media and trends data to direct sales strategy and product development are signals that this dynamic is already beginning to take hold. New abilities enabled by the smart contracts offered in Web3 platforms may accelerate the use and enhance the importance of social media data—shifting it from an input to being the driver of future business offerings.

This is because new offerings can be structured in such a way as to deliver both a good, product or service as well as a new set of “utilization rights” that become selling points in and of themselves. The programmability of smart contracts and ability to set data-triggers and enable auto-execution of contract clauses will allow future commercial offerings to provide greater value to the buyer than today’s offerings.

Let’s build out the ride-hailing example provided earlier to illustrate this point. As noted, in the new composable and interoperable Web3 world, many providers may offer a rider access to potential goods or services as their ride is taking place by embedding their offerings into the ride-hailing app. One such provider in the earlier example alerted the rider to a concert happening close to the rider’s destination and asked if the rider might want a ticket to the show.

If the rider had agreed and initiated a transaction, a new smart contract would have been created. This contract would have issued a ticket to the rider for that evening’s performance, but for a slightly higher price, the rider might have also opted to join the royalty pool of the band performing—thus generating a new income stream—and for an even higher price, the rider might have secured the right to future tickets in the first 10 rows at three shows during the next five years plus a video meet and greet with the band each year.

The smart contract terms could be basic (the ticket itself), advanced (the ticket plus a share of the royalty pool), or platinum (the ticket, a share of the royalty pool, and the exclusive seats and video meet and greet). Whichever the configuration, the smart contract would be embedded into the digital ticket that allowed entry to the show.

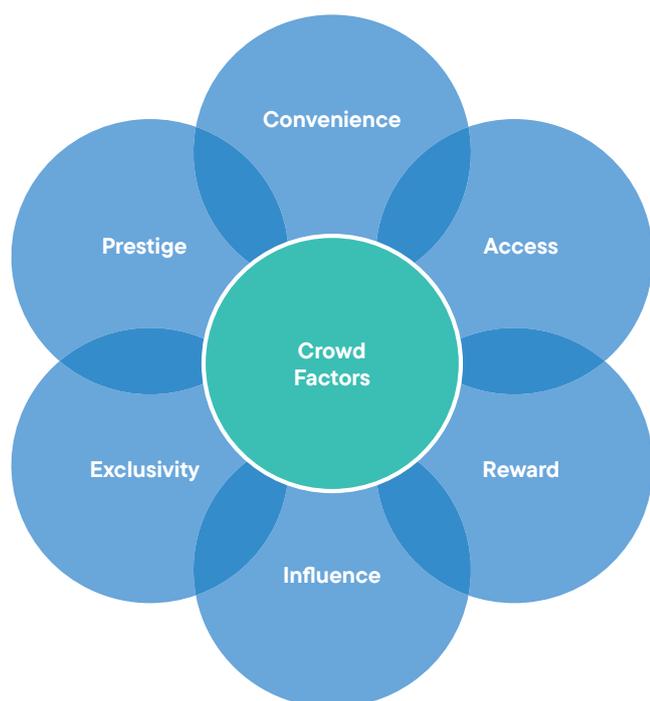
This ticket would be issued as a non-fungible token (NFT)—a digital asset that would sit in the user’s wallet and have its own unique QR (quick response) code or identifier.

Let’s say the user chose to get the ticket and join the royalty pool. The NFT would be deposited into the user’s digital wallet by the time they arrived at the concert venue. The user would launch their digital file and allow their QR code to be scanned at the door to enter the show—just like today’s digital tickets. Meanwhile, the smart contract would automatically link the user’s digital wallet to the band’s royalty pool and designate the share of the royalties that the band creator should receive. The next time that royalties are paid out—let’s say quarterly—the specified sum of money would automatically be deposited into the user’s wallet. No action is required from the user. Payments would continue to automatically flow each time royalties are distributed until the user opts to sell their NFT.

This transaction thus has far more value than just buying a ticket to a concert. Yet to sell the higher value offerings, the business issuing the ticket would need to understand the customer and their interest in a specific band and would have to pre-arrange a deal to access the band’s royalty pool. For the platinum package that included the front row seats and video meet and greet, the business would have had to pre-negotiate that package and agree with the band how many such packages the band might offer. The insights needed to identify which band to negotiate with, what demographic audience would be most willing to pay and how to value each package would be derived from social media and trends data—the vast majority of which could be accessed for free through the blockchain.

This example underscores that in the arising economy, it will become increasingly important to build products, services or goods around their ability to deliver an experience to the buyer. These experiences are likely to be built around a set of crowd factors—returns that an experience must deliver to make it appealing to a potential buyer. This is illustrated in Exhibit 24 on the next page.

Exhibit 24: Crowd Factors That Drive Desirable Customer Experiences



Source: Franklin Templeton Industry Advisory Services. For illustrative purposes only.

The experiences that people are willing to pay for typically deliver one or more of the factors shown—the more factors they combine, the higher the likely valuation on the experience. Such factors include:

- **Convenience:** a way to complete an action with fewer frictions or less effort.
- **Access:** the permission to enter a venue, utilize an approach, engage with specific individual participant(s) or join a restricted community.
- **Reward:** a benefit obtained for a user’s actions— participation, service, merit or achievement.
- **Influence:** an ability to affect the actions, behaviors or opinions of other participants.
- **Exclusivity:** a privilege or provision that grants and limits access or shuts out competition.
- **Prestige:** an enhanced position that is recognized by other participants as having favorable attributes.

In the ride-hailing example above, the platinum package would have combined four of the factors—convenience for having the tickets dropped directly in the user’s wallet, access for the current show and to the future shows and video

sessions, reward for the participation in the royalty pool, and exclusivity for being able to hear directly from the band in the meet and greet. To a lesser extent, owning the platinum package might also bestow prestige on the holder from the band’s other fans.

While our example was theoretical, there are businesses that are beginning to offer such crowd-appeal packages as part of their commercial activities today.

- “In December 2021, celebrity chefs Tom Colicchio and Spike Mendelsohn released 8,888 pizza-themed NFTs called CHFTY pizzas. Valued at approximately \$200 each, the tokens offered “a digital piece of art featuring unique “pizza-shaped characters,” but the smart contracts embedded into the offering “granted access to a community connecting NFT owners with their favorite chefs through online masterclasses and events”—“both virtual and IRL [in real life].”¹⁷¹
- In the summer of 2021, “Dolce & Gabbana released a 9-piece collection of NFTs titled Collezione Genesis,” which was “inspired by the rich history of Venice.” The tokens netted US\$5.56 million at the sale (roughly US\$618,000 each) and entitled the holder to a digital and physical version of the fashion item; in addition, it included exclusive access to three events that Dolce & Gabbana hosted in Venice in August of that year.¹⁷²
- California winemaker Robert Mondavi earned US\$6.9 million from the sale of 1,996 wine label NFTs, each of which could be traced through blockchain technology and had a unique key that authorized the holder to redeem their bottle of limited-edition wine.¹⁷³

In each of these examples, the business sponsor was able to earn more for its product, good or service by turning the sale into an experience that delivered crowd factors. The tools that enable these types of offerings are both technology-driven—blockchain, digital tokens and programmable smart contracts—and data-driven access to the social media and trends data to identify and structure the package to appeal to a specific demographic audience. What ties the two together, however, is the ability to know that the resulting product, good or service will indeed deliver a desired—and thus valuable—experience. Confidence in the ability to translate social media and trends data into actionable insights is possible because of developments linked to the next megatrend—the quantification of behaviors.

Megatrend 4

Quantification of behaviors to shape commercial outcomes

Gathering and utilizing information has always been a key input to business decision-making but turning that information into systematically generated “intelligence” that will help to create a competitive edge has been a relatively new and rapidly evolving science.

In 1865, Richard Millar Devens presented the phrase “business intelligence” in the *Cyclopedia of Commercial and Business Anecdotes* “to describe how Sir Henry Furnese, a banker, profited from information by gathering and acting on it before his competition.” Nearly 100 years later, in 1958, an IBM computer scientist wrote an article describing the potential of using technology to gather business intelligence, but little progress was made on that front for at least another decade. By “1968, only individual users with extremely specialized skills could” maneuver the silos of computer databases at the time to extract and “translate data into usable information.”¹⁷⁴

The introduction of the relational database that emerged in the 1970s eliminated that hurdle and set the stage for the creation of a new category of “decision support tools.” Over time, these tools evolved, becoming increasingly interactive and real time. In parallel to the growing efficacy of these offerings has been a corresponding trend toward narrowing the target of the analytics. What began as attempts to better understand intelligence about the overall enterprise has since morphed into gathering and understanding intelligence about cohorts at first and then individual customers.

The algorithms that drive today’s personalization models and the algorithms of tomorrow that may determine the construction of product or service “experiences” are woven into commerce to such a degree that it is often easy to overlook how this ability to quantify behavior is a relatively new phenomenon of the modern computer age.

Executives extract organizational intelligence to enhance enterprise decision-making

The roots of business intelligence date back to the early 1970s and were made possible, in part, because of a recession that impacted the aerospace industry. Up until that time, the aerospace industry and other government-backed research organizations had been active users of time-sharing service bureaus—offerings that allowed widely dispersed sets of users to access large, centralized computers and industry specific applications to run inquiries as a service.

Engineers in the aerospace industry and other industries were provided remote terminals that were hardwired into terminals at the service bureau. A dial-up protocol would relay requests from the remote terminal user and send it to the service bureau, where it would be routed to the right application for processing. When the data results were ready, the information would be sent back to the remote terminal through the same modem-based protocol.

When the “aerospace recession” hit in 1970, many of the engineers that had been the users of the service bureau lost their jobs. This caused the time-sharing companies to revisit their strategies and pivot their efforts to focus on financial and business users.

When the “aerospace recession” hit in 1970, many of the engineers that had been the users of the service bureau lost their jobs. This caused the time-sharing companies to revisit their strategies and pivot their efforts to focus on financial and business users. Financial-modeling applications were developed to attract the new audience. These offerings were precursors to today’s spreadsheet software.¹⁷⁵

The goal of these applications was to create a rules-based software that “could capture the highly personalized metrics of performance—for strategic planning, tactical performance monitoring” and calculating executives’ performance-based compensation. These early financial modeling applications had several limitations, however. Terminals at the time only had character-oriented teletype machines without graphics or screens—“just characters on a page.” The keyboard was also a challenge for business executives as only the secretarial pool of the time had proficient typing skills.¹⁷⁶

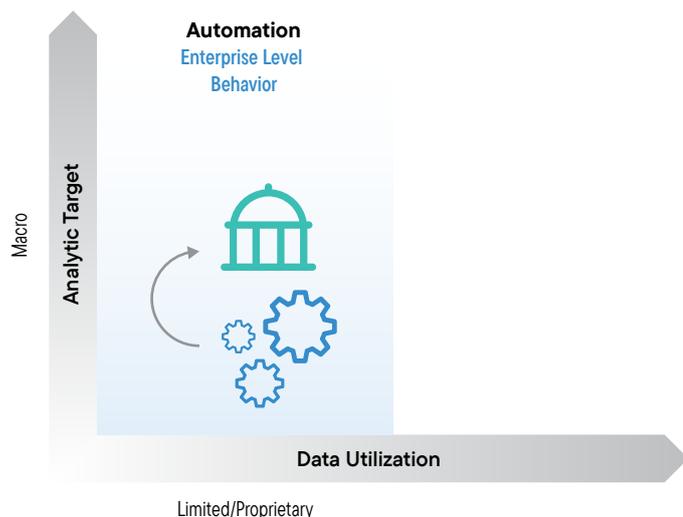
Innovations emerging from the Xerox Palo Alto Research Center (PARC) allowed for a significant improvement in the late 1970s. As discussed at length in Part I of this series, the Xerox PARC team had developed the Alto workstation that performed “word processing, electronic messaging, printing...filing and document distribution.” It was also being used for experiments in interactive graphics with “statistical tables and charts.” The Alto combined a keyboard for data entry with a mouse that offered two-dimensional motions to move an arrow on the screen and let users interact with icons.¹⁷⁷ The design was so revolutionary that it remains the blueprint for operating systems to the present day.

The ability to use physical motions in place of commands was seen as a huge benefit that could allow the infrequent user to interact with a computer. It set the stage for a new executive information system (EIS) to be developed for the business and financial executive user and allow for a more

intuitive way to interact with data, thus addressing many of the issues with the earlier time-share service bureau financial modeling solutions.

EISs brought together a view of data from different departments within a company and was able to aggregate multiple sources of information. The goal was to provide leadership a view of the status of the overall enterprise. This is illustrated in Exhibit 25.

Exhibit 25: Emergence of Virtual Intelligence



Source: Franklin Templeton Industry Advisory Services. For illustrative purposes only.

With the EIS offering, executives were able to review more information in less time, identify needed decisions and issue instructions more rapidly to improve management performance. It was designed to increase upper management’s span of control by increasing an executive’s ability to monitor activities at different levels of management. In 1988, the leading EIS offering, Comshare’s Commander system, “was in use in over 170 companies with over 8,000 executive users in 10 countries.”¹⁷⁸

Over time, the popularity of these systems waned. While the intent “was to turn executives into ‘hands-on’ users who handled their own” correspondence, “research, appointments, and reading of reports, rather than receiving the information through middle men/women,” the actual delivery proved less effectual. Most executives preferred to have those directly responsible for their various divisions deliver their reports in person to allow for questions and discussion about the implication of data insights.¹⁷⁹ Improvements in the reporting available to these mid-level executives helped encourage the shift away from EIS platforms as new options allowed for a much deeper level of analysis.

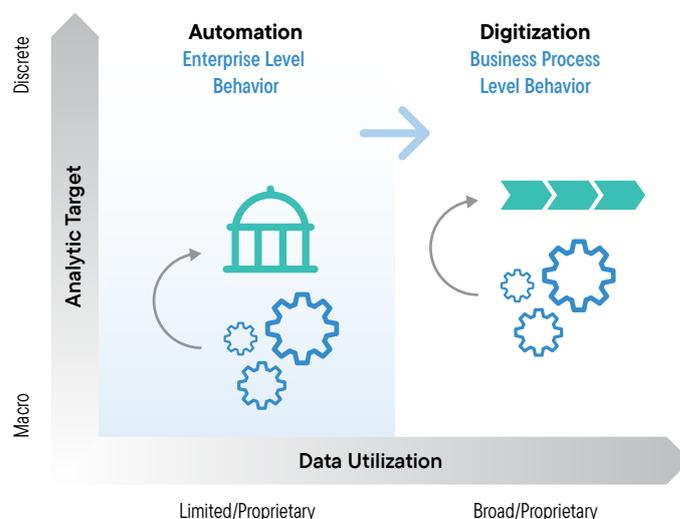
Online analytic processing systems (OLAP) were the tools that laid the foundation for modern business reporting. These offerings were designed to work with new relational databases and could pull information from various divisions and aggregate information at a functional level—sales, marketing and various business lines—and it could enable multiple types of reporting, including sales analysis, budgeting, forecasting and financial reports. It offered a “variety of ways to assemble and organize information.” It allowed for three basic functions that remain the foundation of analytic techniques today—consolidation of data, drilldowns into data, and the “slicing and dicing” of data.¹⁸⁰

Having developed the toolkit to understand the overall organization, the next evolution of business intelligence narrowed to focus on individual business processes and improve the productivity of teams.

Business intelligence delves more deeply into organizations to optimize workflow

The next iteration of business intelligence tools developed during the second tech-driven innovation cycle—digitization—sought to distribute insights across a network of users within the organization to improve outcomes. Rather than looking at divisional or enterprise metrics, the next set of tools narrowed the lens to look at specific business processes and workflow within those divisions. This progression to a more discrete analytic target and the resulting expansion in the amounts of proprietary data being collected is illustrated in Exhibit 26.

Exhibit 26: Quantification of Business Process Level Behavior



Source: Franklin Templeton Industry Advisory Services. For illustrative purposes only.

The goal of business process intelligence is to provide an organization with accurate information about what work items exist, who does the work, how long it takes work to be completed, what the average wait time for each step of a process is and where the most errors or issues occur. By monitoring and analyzing processes on a historic or real-time basis, the organization can apply levers to enhance productivity, improve throughput, reduce costs and optimize the experience.

Broadly, this process intelligence is applied to workflows—the steps involved to accomplish a process from initiation to completion. “The concept of workflows can be traced to Frederick Taylor and Henry Gantt, two mechanical engineers in the early 20th century who sought to improve industrial efficiency. Their work led to time and motion studies, which measure the time it takes employees to complete a task or series of tasks in order to find ways to eliminate redundant or wasteful motion.” Additionally, Gantt introduced “a bar chart used to visually track tasks and milestones in a project schedule” that remains in use today for project planning software.¹⁸¹

Process intelligence looks at each discrete step of a business process or workflow and systematically collects data to analyze that individual task. In the 1980s, workflow diagrams—also known as flow charts—began to be used to describe each step of a process and link how processes were related. These diagrams were printed on paper and bound into instruction manuals to guide department and divisional work. This made it difficult to update charts and retrain people, leading to inflexible and slow-to-respond businesses. By the 1990s, “workflow management software was created to replace the paper-based workflow diagrams with electronic-based flowcharts that could be...updated with a few clicks.”¹⁸²

This design software allowed companies to program “business rules” within the workflow tools “to analyze, model, and describe business processes.” This “helped companies analyze” the “‘as-is’ processes” in their organization and contrast them “with ‘to-be’ processes to make them more efficient”—thus allowing the processes to be reengineered. Initially, IT developers had to recode systems manually to enact improvements. By the mid-2000s, these process enhancements became automated “with the introduction of business process management (BPM) methodologies and tools.”¹⁸³

Using the detailed transactional data as an input, it becomes possible to analyze each step of the process and apply the resulting intelligence to reengineer, redeploy and ultimately create new metrics to assess a more effective approach.

Armed with the ability to reenvision workflows and processes, the organization needed a way to measure how its efforts were affecting the actual performance of tasks. The introduction of commercial off-the-shelf software platforms in the 1990s allowed for the collection of such granular data to power new analytics.

First introduced in the early 1990s, enterprise resource planning (ERP) tools could integrate and process data in accounting, human resources and other operational centers, digitalizing enterprise data and processes on in-house servers. These ERP systems, along with other targeted applications such as customer relationship management (CRM) systems, “created event logs” for each transaction conducted within their environment, which in turn provided an “audit trail of processes,” showing “what work was being done, when and by whom.”¹⁸⁴ This data log became a valuable repository from which to extract process intelligence.

Using the detailed transactional data as an input, it becomes possible to analyze each step of the process and apply the resulting intelligence to reengineer, redeploy and ultimately create new metrics to assess a more effective approach. T-Mobile US, a cellular network provider, offers a good case study of this approach.

T-Mobile was part of an industry where both the “pay structure and customer service success” measures were designed to create speed and efficiency at a time when it wanted to differentiate itself by making customers happy. Customer service representatives were “measured mainly by First Response Time (FRT) and Average Handling Time (AHT).” Yet the nature of their inquiries was becoming more complex. The introduction of web-based “self-service portals” allowed customers to check “basic transactional questions such as balance inquiries and change of address” themselves. Customers were only reaching out to the call center with more “complex issues that customer service [representatives],

with their existing level of training, low level of authority, and disconnect to local markets, could not solve.”¹⁸⁵

At the time, the typical call center resembled a factory floor with row after row of reps, each wearing their headsets and sticking to the script they had been provided to minimize their “handle time.” T-Mobile used process intelligence to reengineer this approach. The company changed the nature of customer service from a “factory floor to knowledge-work.” T-Mobile accomplished this by implementing the following solutions:¹⁸⁶

- **Team consisting of experts:** Rather than routing customers through one long queue to the next available agent, T-Mobile reorganized its reps into cross-functional teams to serve a dedicated geographic market.
- **Empowered employees:** The authority to make decisions was distributed. Whereas a manager had been called in for any request beyond the limited customer service script in the previous model—which “was clogging up the process, increasing wait times”—agents were given authority to manage the process themselves and decide what actions to take to solve a customer’s issue from “start to finish.”
- **New metrics:** Rather than measuring how quickly a customer service rep was able to handle a call, new metrics tied to customer satisfaction were introduced. The teams of experts were treated like a business unit with their own profit-and-loss analysis for which they were responsible. The team was incentivized based on its overall profit and the loyalty of customers it handled.

In the three years following the changes, “T-Mobile achieved a 71% decrease in transferred customer calls, 31% reduction in calls escalated to supervisors, 25% drop in postpaid customer churn, 56% increase in Net Promoter Score, and 48% decrease in annual customer agent attrition.”¹⁸⁷

Looking for ways to improve process outcomes within its own organization was the primary goal of process intelligence during these years, in part because most of the data available to model transaction-level activities could only be extracted from proprietary in-house systems. As the third tech-driven innovation cycle—virtualization—began and more data on customer interactions started to be available through social media, transactional platforms, the internet of things, and geolocation, a shift in focus occurred. Organizations began to look at ways to reengineer their customer behavior by turning the analytic lens outward.

According to Statista, “the total amount of data” predicted to be “created, captured, copied, and consumed globally” in 2022 was 97 zettabytes, up from only 6.5 zettabytes in 2012 and 2 zettabytes in 2010. By 2025, that figure is expected to reach 181 zettabytes.

Customers become the new source of intelligence and target for process enhancements

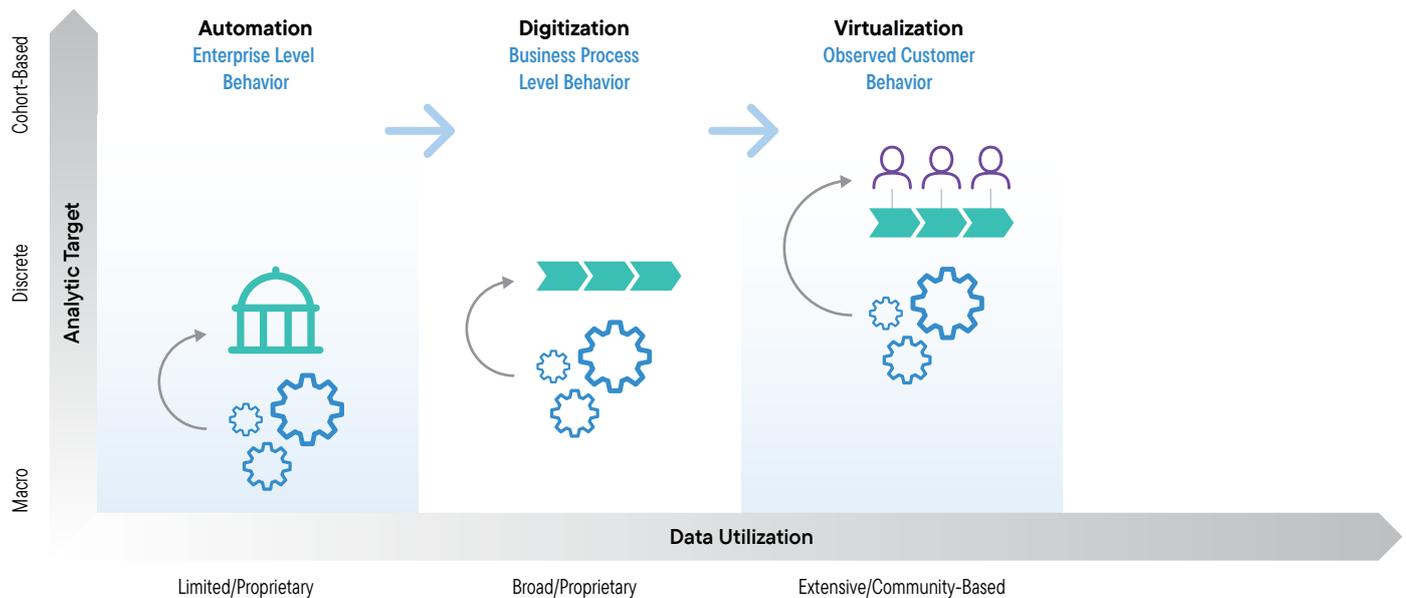
The shift from business intelligence to a focus on clients has been enabled by the growth of the network economy that has resulted in an unprecedented period of data creation and by the introduction of new big data and AI technologies discussed earlier that have given enterprises the ability to ingest and process previously impossible amounts of data. According to Statista, “the total amount of data” predicted to be “created, captured, copied, and consumed globally” in 2022 was 97 zettabytes, up from only 6.5 zettabytes in 2012 and 2 zettabytes in 2010. By 2025, that figure is expected to reach 181 zettabytes.¹⁸⁸

As a modern society, we have been experiencing an explosion in data creation fed by the internet of things that creates machine-to-machine data, the increased use of wearable technologies and RFID (radio-frequency identification) chips that enable the tracking of people and goods, the access to satellite geolocation data, and the increase in social media and sharing platforms that result in growing volumes of transactional and interaction data.

Big data analytic techniques allow new modeling tools to access and process this information, working across large sets of both structured and unstructured data inputs, including images, video, sensors and more. AI tools look across this variety of data types to identify patterns and predict future outcomes. Together, the capabilities have allowed for the emergence of a new science—customer intelligence.

By gathering and analyzing data from various customer interactions and activities, enterprises are finding new sources of insight that allow them to understand their customers’ behaviors better and to use such insights “to personalize or adjust selling strategies.”¹⁸⁹ As shown in Exhibit 27,

Exhibit 27: Quantification of Customer Behavior



Source: Franklin Templeton Industry Advisory Services. For illustrative purposes only.

enhancements are being designed for each step of a consumer-focused process to improve outcomes just as business process intelligence sought to improve each step of an internal process to create a more impactful result.

By shifting the focus from internal to external optimizations, commercial enterprises can draw the consumer into their process flows in new ways and across multiple touchpoints. To accomplish this goal, they rely on extensive amounts of personal and community-based data, looking both at the individual and at the individual as a part of a cohort. There are four types of customer intelligence data gathered to inform this process:¹⁹⁰

- **Demographic data:** This includes the customer's "income bracket, age, profession, and geographic location."¹⁹¹
- **Behavioral data:** This category relates to the ways in which consumers interact with a brand's various touchpoints, including online purchases, engagement with email, marketing, ads clicked and devices used.
- **Transactional data:** This covers a customer's historical purchases and payment methods as well as any items wish-listed or "added to cart but not purchased."¹⁹² Clickstream data can also be purchased that shows the items that customers browsed, which ones they spent a long time considering or came back to, and which ones they quickly moved past.

- **Psychographic data:** This information seeks to measure a "customer's personality, values, habits, interests, and lifestyle,"¹⁹³ as well as other defining attributes. New approaches are emerging to gather such data. For example, Stitch Fix offers a "Style Shuffle" interface that lets new subscribers "swipe right for items they like and left for items they don't" to build a clear view of the user's "personal taste and style."¹⁹⁴

Data collection is accomplished across multiple touchpoints. Webforms, surveys and lead tracking tools that extract publicly available information such as details from social media accounts are one set of sources. "Questionnaires, as well as customer reviews and testimonials"¹⁹⁵ are used as inputs to build psychographic profiles. Social listening is another technique by which new types of tools monitor social network channels for mentions of a company's brand, its competitors or certain pre-selected keywords.

Through the various sources of customer intelligence, businesses gain a comprehensive understanding of their customers wants and needs. Such information is being fed into new corporate strategies designed to achieve "digital-advantage supremacy"—"the ability to capture, analyze, and utilize personalized customer data at scale and apply AI to understand, shape, customize, and optimize the customer journey."¹⁹⁶

A 2022 survey of “more than 100 leading global companies” reported on in the *Harvard Business Review* found that “large-scale personalization efforts” allowed these organizations to increase their revenues between “6% and 10%” and increase their “net incremental revenue attributable to personalization initiatives anywhere from 40% to 100%.”¹⁹⁷

Efforts focus across each stage of the transactional experience—“prepurchase (advertising/marketing), purchase (sales/transactions), and post purchase (service/loyalty).” To craft “an end-to-end experience, companies” look “to design the flow of a given moment, the information needed to support it, and the cross-channel or cross-party connections...required to successfully complete the interaction.” The focus is “on microgoals—positive individual moments that compose the total experience”—and on ensuring that “those goals are stitched together.”¹⁹⁸

AI “machine-learning algorithms” are a key enabler of this approach as they are “constantly testing, always learning, and fueling decisions about” an ongoing interaction “to figure out the right next step to enable the customer’s progress.” Five key inputs are examined to fuel this analysis: 1) Algorithms “connect data signals and insights from a constantly expanding range of sources”; 2) “they reimagine the end-to-end experience as a seamless flow, powered by automated decisions”; 3) “they activate the experience across channels, connecting touchpoints to engage customers wherever they may be”; 4) “they fulfill according to the customer’s context, always recognizing who and where someone is”; and 5) “they test relentlessly, injecting new innovations, rigorously measuring their impact, and understanding how things affect people differently.”¹⁹⁹

The following examples illustrate this approach. Starbucks can geo-target customers “who are near one of its stores with ads about new seasonal beverages,” and send “customers personalized in-app offers to encourage them to visit a store or to try their convenient mobile order-and-pay option.” Qantas Airlines “makes real-time recommendations” to fliers pre-check in, informing them about “what time to leave for the airport, and the best route to take.” Giant Eagle—a mid-sized grocery chain—“has gamified the shopping experience” through its app, “rewarding its customers with loyalty points” each time they “complete a ‘weekly shopping challenge’” in-store where they might receive additional “points for shopping in a new category that, judging” by other customers’ profiles, would seem to appeal to “them, such as chocolate.”²⁰⁰

Each of these examples shows how enterprises are looking to compete by integrating the physical experience and the digital experience—a practice called seamlessness.²⁰¹ This omnichannel approach is being combined with ever-enhanced personalization tools. Use of machine-learning AI algorithms can turbo-charge the extraction of business-relevant insights from customer data to further these trends—bringing product development, sales, and customer care together as an iterative process that is constantly tested against actual consumer results.

For example, The Brink’s Company, the 163-year-old company known for its armored trucks, has an independently operated security company—Brinks Home—that struggled to “compete against better-known systems” such as Ring and Google Nest. The company began working with an AI startup called OfferFit in late 2020, feeding that firm’s machine learning algorithms data from Brinks Home’s combined repositories of “historical customer-level transaction data”—that had been accumulated by its call centers since 1994—with competitive data from its field representatives. The company moved from running two–three tests daily that varied combinations of “creative content, channel, and delivery times” to approximately 50,000. This “dramatically reduced the need to wait for test results,” allowing for rapid and significant product and experience improvements. By “the first half of 2021,” the company’s “average direct-to-consumer (DTC) package size increased from \$489 to \$968. DTC revenue per user increased from an average of \$42.24 to \$45.95” and total revenues rose 9.5% versus the year-ago period.²⁰²

As the amounts of customer-relevant data continue to grow and the power of the AI toolkit continues to increase, the analytic lens is likely to narrow even further. Rather than looking to make an overall business process seamless and optimize the customer’s journey generically, the upcoming fourth tech-driven innovation cycle—decentralization—may see the creation of multipath experiences designed to appeal solely to a unique individual—a segment of one.

Personal intelligence may replace generic customer intelligence to drive future commerce

Advances in customer intelligence accomplished in recent years have started to shift the decision-making timeframe for commerce. The result has been a growing focus on “immediacy.” Micro-moments have been accelerating customer expectations for “right here, right now” experiences.

Mobile device website traffic worldwide increased from 31% of all website traffic in the first quarter of 2015 to 59% in the fourth quarter of 2022.²⁰³ This shift in the channel of engagement is having impacts on consumer behavior. With their device in hand, people are searching at the exact moment they need something and are looking for places that can meet their immediate need. Searches for “near me” increased 68-fold from December 2012 to December 2022.²⁰⁴ Searches for “open now” increased 10.6-fold in the same period according to Google Trends.²⁰⁵ “Smartphone users are significantly more likely to purchase from companies whose mobile sites or apps customize information to their location.”²⁰⁶

This is adding more dimensions to personalization. Not only do consumers expect companies to understand what products and services will appeal to them, they are also starting to expect that those products and services will be offered to them at the time and at the location that they want or need them. As this more multidimensional view of personalization develops, models will be able to correlate more variables around commercial behaviors and create continually more precise predictive outcomes.

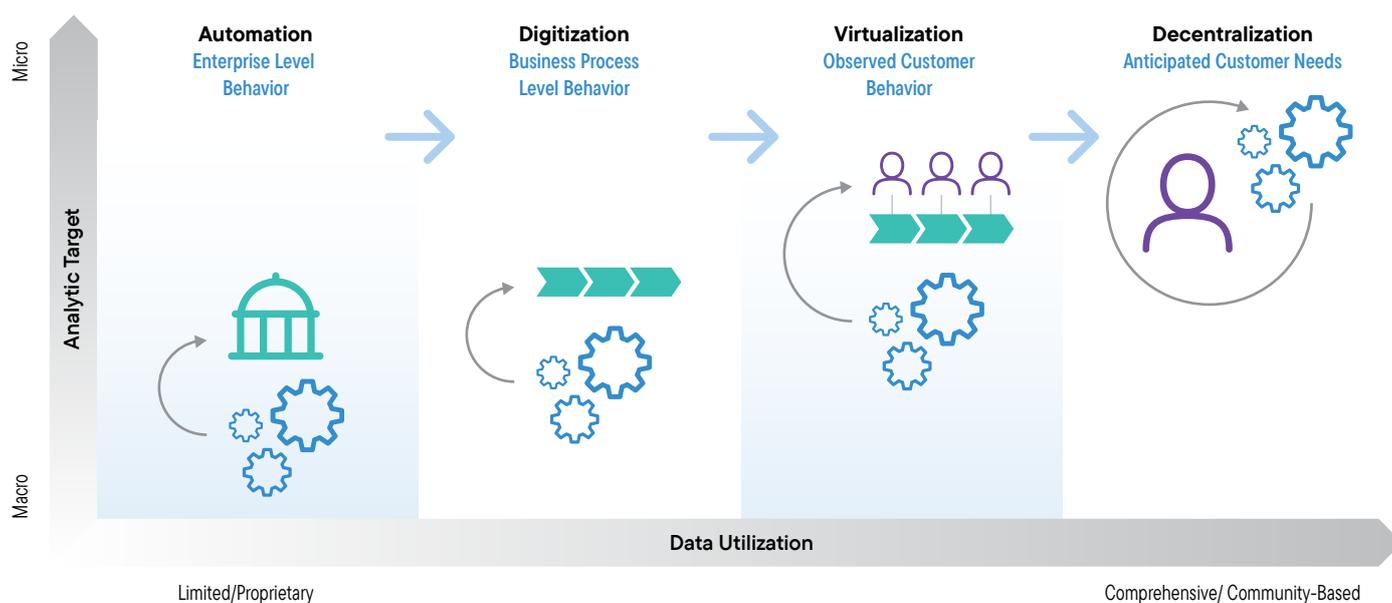
This capability is likely to reshape what is meant by personalization. Intelligence built around a unique individual consumer might be able to build models that go beyond the here and now to the near future. Such models may predict when, where and what that specific individual consumer

might desire and allow a provider to offer that item, good or service just before the individual consumer is likely to want or need it. Even more importantly, having this level of insight on an individual consumer is likely to change the nature of the goods, products and services created for and offered to them. This progression to “personal intelligence” is highlighted in Exhibit 28.

Advanced predictive analytics could help determine what customers will want in the future by looking at current and historical data patterns about that specific individual user and correlating them to the user’s current as well as future time and location. These models could become critical inputs for future enterprises to determine how and where they might optimally embed their offerings in the ecosystems of the emerging fourth tech-driven innovation cycle—decentralization.

This phenomenon can be seen in the future state of ride-hailing example outlined earlier. Seeing the address that the user had entered for their upcoming ride in the ride-hailing app, knowing the time of the user’s departure and arrival, modeling the options available to the user in the geographic location they are traveling to and correlating those variables with the user’s historical transaction history—including their interest in events or music related to the specific band playing in that area—strengthens the odds that the user may be receptive to going to a concert and not just buying a ticket, but perhaps a higher-value package

Exhibit 28: Personal Intelligence Drives Predictive, Individualized Models



Source: Franklin Templeton Industry Advisory Services. For illustrative purposes only.

related to that band. Predicting the user's interest might create a transactional opportunity even if the user was unaware that the band was playing in that neighborhood.

Several emerging product development trends show how the use of customer data is progressing from positioning the individual user as part of a cohort to putting the individual user's own unique needs and preferences at the heart of the design process.

- **Product customization:** “Advances in digital and manufacturing technology now enable brands to offer customization to buyers at scale. A customer can order a custom item with a few clicks online, the brand can produce it on demand, and the item can be delivered in a few days.” Letting customers “choose their own design, color, and add-ons to create exactly the piece they want” enhances the buying experience and allows buyers to create their own unique versions of products. Research from “Deloitte reveals that 1 in 5 customers who want personalized products are willing to pay a 20% premium for them, and more than half of customers want personalization and customization options.”²⁰⁷

This is a trend happening across industries. Medelita, a company that offers tailored laboratory coats for scientists and doctors, allows multiple customization options on its website that enable buyers to add their name, department and logo. Chick-fil-A offers about 20 options for customers to personalize their chicken biscuit sandwich, including extensive choices for sauces, toppings and add-ons. Inkbox, a provider of temporary tattoos, allows customers to upload their own digital images and choose both the size and colors of their body art.²⁰⁸

- **Implicit signaling:** Most customer data used today to rank or recommend products relies on implicit data. These models look at what a user does in terms of their interactions and draws conclusions from those activities. For example, housing site Zillow uses “information implicitly expressed through users’ activities, such as clicks and saves,” to “capture their personalized interests” and tailor their display of homes.²⁰⁹ Netflix will “adjust the movie posters” they display on a user’s home pages “to fit the interests of the user”—featuring different actors or actresses based on the subscriber’s interests or making the image scarier for horror movie enthusiasts.²¹⁰

Implicit behavior represents the reality of what an individual subscriber does rather than their intentions or projected social behavior. More organizations are

starting to use AI to extract signals from this data to discover hidden trends and sentiments and apply it to their product design. For example, Netflix reviews daily 30 million “plays,” four million ratings and three million searches²¹¹ and uses such information to develop original shows like *House of Cards*. For *House of Cards*, Netflix selected the director, actors and writers whose shows were the most popular with the largest number of subscribers; built the visual style of the show based on the types of sequences that viewers paused or replayed most often—such as an actor speaking directly to camera; and then created distinct trailers and promotions that were targeted to individual viewers based on their unique profile. The team was so confident in its approach that Netflix committed US\$100 million for 26 episodes before a single frame had been shot.²¹² It later repeated the data-driven approach with another of its most successful shows, *The Crown*.²¹³

- **Agentive design:** A new class of smart products are becoming “agents” that will do things on behalf of individual users, adjusting to their individual preferences. Most interactive designs have relied on manual user inputs—buttons, inputs and forms. They require an individual user to interact with them to extract their value. Automated technologies are now being developed that allow consumers to tune and monitor a product—having “set it,” they are able to “forget it” and trust that the activity is completed.²¹⁴

Agentive technology is designed to reduce the effort required of an individual user—allowing individual users to steer and guide as opposed to perform work—and reduce the information work required of an individual user. “Agents are software that act on your behalf. The software monitors data streams and responds to triggers with rules.” Advanced agents can “refine predictive models with increasing experience and as new real-time information comes in.” “Agents are not just conversational interfaces or chatbots as these tend to be assistive.”²¹⁵ Agents may have assistive elements, but they determine and apply the resulting action on behalf of the user.

“The Nest is an example of agentive technology because it monitors the homeowners preferences daily and year round, to assist with saving money and energy through smarter usage.” Other examples of agentive software include autocorrect while typing or Spotify Discovery Mode for music playback.²¹⁶

- **“Phygital” engagement:** Several brands are experimenting with “immersive technology to give their customers a fully developed live experience.” These are seen as effective merchandising techniques because they evoke an emotional response from the audience. Immersive technologies merge the physical and digital aspects of the shopping experience.²¹⁷

For example, Covergirl’s new flagship store has introduced “glam stations,” where augmented reality allows customers to virtually try different makeup products on by altering the customer’s image as if the product had been applied. As AI advances, the system can generate recommendations based on analyzing a customer’s skin tone, facial features and emotions in real time to tailor what to recommend or what to avoid. The next level of in-store personalization could include an example like creating a virtual reality mountain that allows customers interested in buying hiking boots to try out the fit of different offerings.²¹⁸

None of these innovative techniques rely on a fully built-out notion of “personal intelligence” at the present time, but they are facilitating the interactions and creating the data bedrock that might allow AI models of the future to attain this degree of individual customization and prediction. One key challenge in that regard will be determining when a customer’s intent and preferences may be shifting. Automating the selection of the next “best” offer for a customer requires real-time database connections, machine learning and orchestration. It might also need interrogative models that are able to assess and detect signals about when a buyer’s responsiveness and/or the competitive environment may be shifting. These capabilities are still theoretical, but some progress in this regard is emerging.

Inspire Brands was formed in early 2018 when Arby’s bought Buffalo Wild Wings and Rusty Taco and it subsequently acquired multiple brands including Dunkin’, Sonic, Jimmy John’s, and Baskin-Robbins.²¹⁹ Interestingly, though Inspire Brands’ product is clearly food, it describes itself as a “data- and tech-first company.” The company pursues its media strategy as a shared service across all the brands. To optimize this service, it moves its ad spend around in real time between app marketing, TV, in store or online based on what’s working best in each moment. To accomplish this, its advertising team looks like a floor of day traders, scanning multiple monitors and optimizing its ad spend in real time based on very specific key performance indicators that roll up to provide a measure of return on ad spend.²²⁰

If our predictions prove accurate, by the fourth tech-driven innovation cycle—decentralization—the entire system of commerce will be firmly anchored on individual participants.

Having the insights on a customer that will allow enterprises to predict and tailor their products, goods, services, messaging and offerings to the individual customer’s unique circumstances, preferences and needs in the moment and at their location is a vision for the future, but potentially not a far future based on already unfolding trends. This capability, if realized, could help bring together the earlier megatrends.

If our predictions prove accurate, by the fourth tech-driven innovation cycle—decentralization—the entire system of commerce will be firmly anchored on individual participants. They will be able to use commercial rails to enact their own transactional activities and earn their own livings if desired. They will have the business functions they desire and require embedded into their workflows at their point of need rather than being forced to search out, select and navigate to complementary services. The commercial offers being provided to them will be defined by smart contracts able to deliver rights and privileges that activate crowd factors, helping to turn the purchase of a product, good or service into an experience and their participation into a resource that is recognized by a share in the ownership of the platforms they use most frequently. And as this current megatrend illustrates, the machinery of commerce itself will be informed and shaped around the quantification of the individual user’s behavior as translated into personal intelligence.

This vision of the supremacy of the individual participant marks a profound shift away from how modern society operated at the outset of the modern computer age in the 1960s. Power in that period was firmly concentrated in the hands of institutions—governmental, educational, military, community, and commercial. The final megatrend we will explore tracks how the options available to these institutions—which allowed them superior opportunities to succeed commercially—have been reenvisioned and extended to individual consumers, users, and participants over the past 60+ years using technology innovations.

Megatrend 5

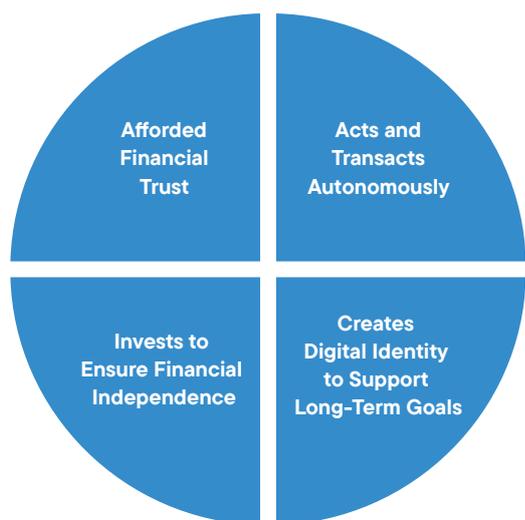
Institutionalization of the individual participant

A great divide used to exist between the institutions that serviced, educated or sold to individuals and the individuals that consumed their offerings. Institutions were afforded privileges that were not available to the average individual. Such privileges positioned institutions to achieve superior results in their commercial and financial pursuits, especially when compared to the options and outcomes available to most individual consumers.

New offerings that emerged in each of the four tech-driven innovation cycles and the changes they enabled in how enterprises and modern society operate have narrowed the opportunity gaps between institutions and individual participants. The result has been a gradual “institutionalization” of individual opportunities and improvement in the ability of individuals to pursue and achieve their own commercial and long-term financial goals. Developments are working to balance the power between individual participants and institutions—setting the stage for the new engagement models envisioned in the fourth tech-driven innovation cycle—decentralization.

Exhibit 29 provides a listing of the key privileges that have historically been enjoyed by large institutions across disciplines—government, education, military, community, and commercial. As shown, these organizations and enterprises have been afforded a level of financial trust that allows them to obtain credit lines and make purchases in a more economically efficient manner; they are able to self-direct their transactional activities, soliciting expert advice and negotiating as an autonomous entity with selected providers to create contracts that address the institution’s needs and requirements; they are able to shape their own identity through branding, affiliations, and events to publicize and help achieve their mission and long-term goals; and they are able to access a broad range of investment opportunities and utilize advanced investment techniques to ensure their financial independence.

Exhibit 29: Institutional Privileges



Source: Franklin Templeton Industry Advisory Services. For illustrative purposes only.

These abilities were available to institutions prior to the modern computer age, though the same forces working to democratize access to these opportunities since the 1960s have also benefited institutions by making it easier, less costly and more efficient to obtain the benefits. The major difference has been that individual users have gained the ability to utilize these same strategies to act more like an institution—setting long-term goals, building a brand that reflects one’s values, identifying ways to engage and grow networks to support one’s development, and finding superior pathways to optimize the utilization of one’s assets and enhance their investments.

Individual investor access to these opportunities did not happen all at once, but rather built over time as each tech-driven innovation cycle provided new options and access points.

Introduction of bank-issued revolving credit cards activate consumers’ buying power

Individual businesses have offered credit to their customers throughout history with credit arrangements going as far back as 5,000 years ago. An infographic from credit rating company Equifax indicates that in circa 3500 BC, Sumer—the first urban civilization, with about 89% of its population living in cities—offered “consumer loans for agricultural purposes.” By 1800 BC, Babylon had written the Code of Hammurabi—one of the first recorded set of laws around credit that established the maximum interest rates that borrowers could be charged and mandated that to be valid, loans had to be written into a contract and witnessed by a public official.²²¹

The use of credit continued over subsequent centuries. Around 50 BC, the Roman statesman Cicero noted that his neighbor used credit to complete the purchase of 625 acres of land for 11.5 million sesterces. The collapse of the Roman Empire and decline into the Dark Ages in Europe caused economic activity to grind to a halt. During Charlemagne’s rule (AD 768–814), the Church banned the practice of charging interest on loans.²²²

In 1545, after the Reformation, under the reign of King Henry VIII, England became the first country to establish a legal rate of interest—10%. Merchants were beginning to establish trade missions to faraway lands and the need for capital and credit was on the rise. By the late 1780s, the philosopher Jeremy Bentham wrote “a treatise called ‘A Defense of Usury’ arguing that restrictions on interest rates harm the ability to raise capital for innovation.” By the early 1800s, some English tailors

The shift to a modern system of credit began in 1919. Up until this time, credit was only extended to known customers on a one-off basis. General Motors “commercialized” lending by linking the extension of a loan to anyone able to afford a 35% down payment for one of its new cars that were rolling off freshly designed manufacturing assembly lines. This was the first example of installment plan financing.

came together and swapped information about customers who failed to settle debts—the first known English recorded instance of credit reporting.²²³

The shift to a modern system of credit began in 1919. Up until this time, credit was only extended to known customers on a one-off basis. General Motors “commercialized” lending by linking the extension of a loan to anyone able to afford a 35% down payment for one of its new cars that were rolling off freshly designed manufacturing assembly lines. This was the first example of installment plan financing. Installment plans expanded rapidly to cover a surging variety of consumer products and appliances from washing machines to furniture to refrigerators to radios over the subsequent years.²²⁴

By 1950, the typical individual consumer either paid in cash or had installment loans with several different merchants.²²⁵ Diners Club founder Frank McNamara saw this as a nuisance for the businessman who was forced to assemble records from a variety of sources to compile their monthly expense reports. He created one card that could be used across many different merchants. He called it a “credit card” even though the balance had to be paid off in full each month. Diners Club “had no penalty or interest charges for payments made after 30 days. The company’s main source of revenue was the 7% fee—called interchange—charged to merchants on each transaction.” American Express “launched its first card in 1958” following the same model.²²⁶

By the mid-1960s, the first tech-driven innovation cycle—automation—was underway, fed by the computer boom. New, more compact and agile mainframes allowed transactional record-keeping systems to progress from punch-holed

index cards that had to be fed manually into computers—a process that might take several days—to electronic data stored on magnetic tapes that could be updated in hours. This made it far easier to record and process large numbers of transactions.

California-based Bank of America issued a “BankAmericard” with a pre-approved spending limit of US\$300 to 60,000 customers in the Fresno area and then rolled this new product out statewide by 1966. This revolving credit card was an innovation that allowed an individual borrower to carry a balance from month-to-month. America’s growing middle class grabbed on to this financial product that provided both convenience and an instant personal loan. By 1976, the BankAmericard name was changed to Visa—a word that sounded the same in nearly every language.²²⁷

Uptake of revolving credit cards was unprecedented. Between 1966 and 1970, more than 100 million credit cards were mass-produced and mailed, unsolicited, to customers the banks had deemed credit worthy. This mass distribution strategy led to a wave of white-collar crime, privacy concerns and legislative debates. By 1970, the practice of issuing non-solicited credit cards had been banned and issuers could only send out application requests.²²⁸

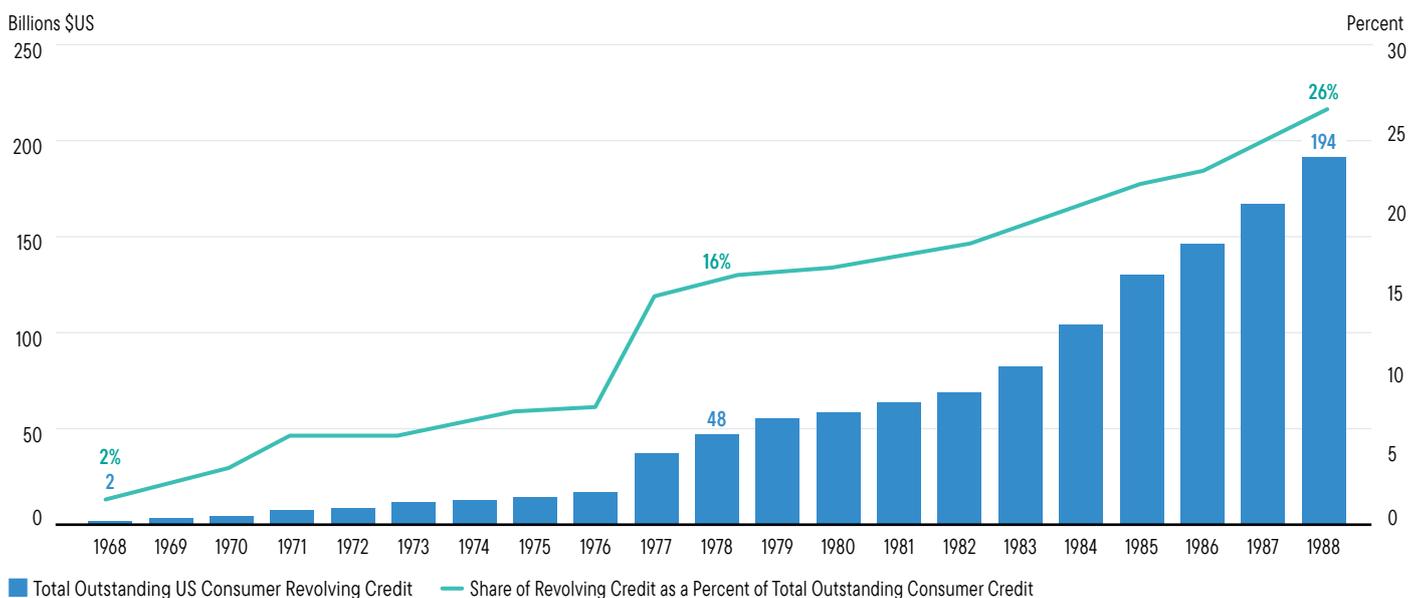
Meanwhile, ongoing tech enhancements extended the convenience of using cards. In 1969, IBM developed magnetic-stripe credit cards to speed transaction authorizations and in 1971, IBM partnered with the banking and airline industries to develop an international standard for such cards, enabling credit cards to be used worldwide. Electronic authorization systems able to use electronic clearing and settlement systems proliferated throughout the 1970s, spurring even more growth into the 1980s.²²⁹

Between 1968 and 1988, the revolving portion of US consumer credit outstanding rose from US\$2 billion to US\$194 billion and from 2% to 26% of total outstanding consumer credit, according to the US Federal Reserve. This rapid growth is highlighted in Exhibit 30 on the next page.

“In 2000, more than 70 percent of US households had at least one general-purpose credit card—MasterCard, Visa, Optima or Discover. Thirty years earlier, in 1970, the number was only 16 percent.”²³⁰ By 2008—50 years after the broad introduction of credit cards—revolving consumer debt in the United States had risen to US\$970 billion. There were 3.67 billion payment cards in circulation with more than two-thirds held by consumers outside of the United States.²³¹

Exhibit 30: US Consumer Revolving Credit Total Outstanding and Share of Total US Consumer Credit Outstanding

1968–1988



Source: Consumer Credit - G.19 data. US Federal Reserve.

The extension of credit lines through the revolving credit card changed the way that individual consumers could live. These cards conveyed the same level of trust to an individual borrower that an institution could historically count upon. A person could now travel halfway around the globe and pay for a hotel room with a credit card issued by a financial institution that was based thousands of miles away. The hotel clerk would not know the guest, their family or have any first-hand knowledge about the guest’s ability to pay their bills, but if they received an electronic approval from the credit card issuer—which could happen within seconds—they could extend credit and let the guest spend at their establishment.

This ability to be afforded financial trust based on the extension of personal credit lines and the option to make purchases with credit cards is illustrated in Exhibit 31.

As the second tech-driven innovation cycle—digitization—unfolded, more institutional benefits began to be added to the individual user’s arsenal.

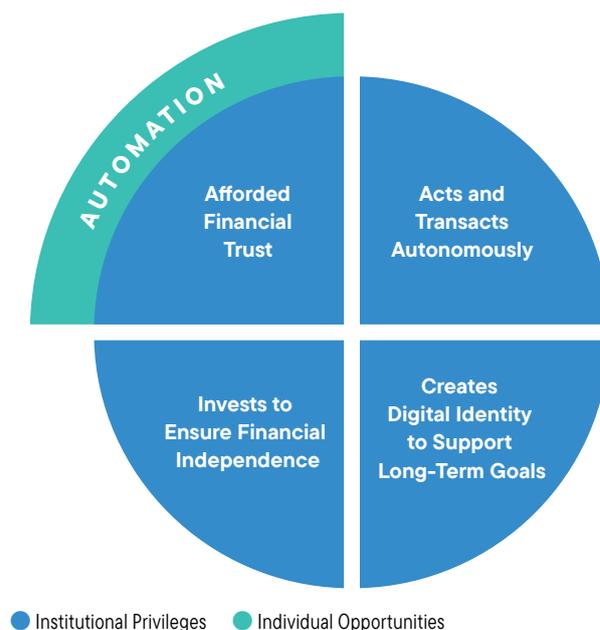
Personal computers and the internet enable individual user’s autonomy

The next advancement in institutional benefits offered to individuals occurred because of the introduction of personal computers and the internet. By 2001, more than 56% of US households had a home computer and the number of US households with internet access nearly doubled between

1998 and 2001, from 26% to 50.5%.²³² About 28% of European households and 40% of Europeans had internet access in 2001, accounting for more individual users than in the United States due to population size.²³³

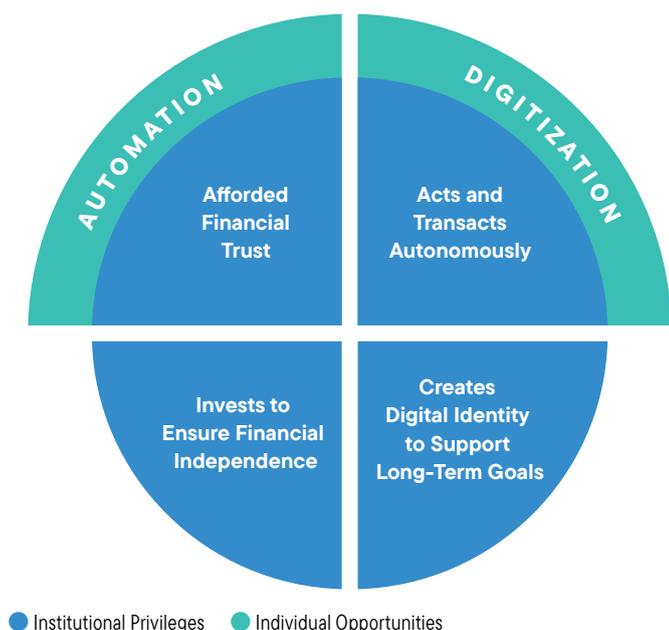
The rapid adoption of internet technologies—enabled by the growth of household computer ownership—was nearly unprecedented. It took 46 years for electricity to penetrate

Exhibit 31: Institutional Privileges and Individual Opportunities



Source: Franklin Templeton Industry Advisory Services. For illustrative purposes only.

Exhibit 32: Institutional Privileges and Individual Opportunities



Source: Franklin Templeton Industry Advisory Services. For illustrative purposes only.

25% of US homes, whereas the internet was able to accomplish this feat in seven years.²³⁴ This tech-driven transformation enabled new abilities for individual users as shown in Exhibit 32.

While having revolving credit cards increased trust in individual consumers and extended their buying power, the internet offered them a new degree of autonomy to shape their transactional experience and expand their commercial options through new online models. The internet offered both a new channel and an entirely new approach to pursue commercial relationships. This changed the nature of shopping and service experiences. The following are but a few examples:

- **Online groceries:** Peapod was one of the earliest online shopping sites, having first launched in 1989. The pilot involved 400 households in Evanston, Illinois. The company allowed people to purchase groceries over the internet and then delivered those groceries to the home of their customers. It was one of the first enterprises to control the entire process, from taking an online order to transmitting the shopping list to grocery retailers to delivering the goods. The founders personally picked up and delivered the groceries during the company's first two years.

“By the end of 1995, Peapod had expanded its customer base to over 10,000 people in Chicago and San Francisco” and had over 450 employees both shopping and making deliveries. “Over 1995 and 1996, Peapod was adding approximately 2,000 subscribers a month to a total customer base that had already reached 27,000.” It had found a section of the US population—young, time-starved married couples with demanding dual careers and children—who preferred and afforded paying more and shopping less to spend more time with their families. By the end of 1997, Peapod had expanded to eight US cities and had over 100,000 subscribers. “By the end of 1998, the company had surpassed its one-millionth order via the internet.”²³⁵

- **Online bookstores:** Brick-and-mortar bookstores such as Barnes & Noble, Waldenbooks and Crown Books dominated the US book-selling market in the mid-1990s when Jeff Bezos launched Amazon.com. “Promoting itself as ‘Earth’s Biggest Bookstore,’ Amazon launched in July 1995 using major book distributors and wholesalers to rapidly fill its orders.” One of the novelties offered by Amazon was its access to low-cost books that might not be available in the box chains or independent brick-and-mortar retailers. “Amazon was carrying more than 2.5 million titles by 1997”²³⁶ versus typical bookstores that carried about 200,000 titles.²³⁷ Amazon was inexpensive and convenient. By 1997, “the company had 1.5 million customers in more than 150 countries” and sales totaled US\$148 million.²³⁸
- **Online shopping:** E-commerce began earlier than the internet with the “Videotex” system deployed in Gateshead, England. In 1984, a 72-year-old grandmother named Jane Snowball used her TV remote to place an order for margarine, cornflakes and eggs. The order was then phoned into her local Tesco and the goods sent to her door. The next major innovation occurred 10 years later, when a 21-year-old set up an online marketplace called NetMarket. It was dubbed a “new venture that is the equivalent of a shopping mall in cyberspace.” This site lays claim to the first digitally secure transaction—a Sting CD (compact disc), retailing at US\$12.48. Other online shopping sites emerged shortly thereafter—eBay in 1995; Rakuten, a Japanese e-commerce site, in 1997; and Alibaba, a Chinese e-commerce site, in 1999. Pizza Hut was also early into the space, becoming one of the first brick-and-mortar companies to launch its own online shopping site in 1994, the “PizzaNet” portal.²³⁹

Disney.com launched in 1996 with secure online ordering from the online Disney Store.²⁴⁰ Ticketmaster sold its first online concert tickets in 1996 and “was an instant success, topping US\$3 million a month in revenues within a short time.”²⁴¹

- **Online banking:** “In 1994, Stanford Federal Credit Union was the first financial institution in North America to provide all of its customers with internet banking” services. “By 1995, Presidential Bank was the first bank in the country to give customers access to their accounts online.”²⁴² At the time, many consumers were hesitant to conduct monetary transactions over the web. The success of sites like eBay and Amazon helped to erode such concerns. The first internet-only bank was started in 1999 in the United States; DBS Bank in Singapore launched internet banking in 1997, and by 2001, market leaders like Citibank and Wells Fargo had started to service their customers over this channel.²⁴³

These innovations were in addition to the online brokerage, online travel and online music distribution examples discussed back in Megatrend 1.

Collectively, these new online offerings allowed individual users to access goods and services in a self-directed manner that was freed from the constraints of physically entering a store and from the limitations of only being able to access commercial products during certain business hours. This ability to directly transact, rather than route orders through salespeople or service representatives, provided significant benefits to individual consumers in terms of managing their time, allowed them to explore competitive offerings with a click and opened the globe for commercial opportunities, creating more optionality for consumers and in many instances access to lower-priced goods. By 2000, 40 million Americans had purchased a product online.²⁴⁴

Being able to access and engage experts using new online channels was another transformative technological change that occurred because of the second tech-driven innovation

cycle. The web offered more than transactional options, it also afforded individual users the opportunity to increase their knowledge and seek professional advice at a click. Early web offerings allowed for rapid and easy exploration of new topics, as discussed below.

- **Financial advice:** The Motley Fool was an early site that provided financial investing advice. Originally launched as a content partnership with America Online (AOL) in 1994, the company migrated off the platform and launched its own website in 1997. Its site touted the “Fool Portfolio”—a US\$50,000 fund of the founders’ money that they “invested in a totally transparent and educational way” with the aim to demonstrate that they as “mere’ individual investors could and would beat the market over time.” They offered “free, ad-supported market advice” online and built a community of followers, augmenting their online presence with books and a radio program. By early 2000, when the stock market had reached its dot.com bubble top, the US\$50,000 portfolio begun in 1994 touched a high of about US\$1.0 million, before seeing that value more than halved, forcing the site to move to a premium advice, subscription model. The Fool Portfolio closed in 2003, “down two-thirds from its highs,” but was still able to post an annualized return of 20.16% between 1994 and 2003 versus 9.07% for the S&P 500 with dividends included.²⁴⁵
- **Culinary advice:** A series of online food sites began emerging in the mid-1990s, offering information on restaurants, wines and cooking. Condé Nast launched Epicurious in September 1995—“the first online counterpart to print magazines totally devoted to food and drink.” Epicurious drew on the offline content of Condé Nast’s *Gourmet* and *Bon Appetit* magazines—exclusive offerings with niche clientele—making the insights offered by these publications available to all. Another offering that year, StarChefs—which later came under Allrecipes—featured acclaimed chefs sharing their top recipes and tips. A *New York Times* article from December 1995

Being able to access and engage experts using new online channels was another transformative technological change that occurred because of the second tech-driven innovation cycle. The web offered more than transactional options, it also afforded individual users the opportunity to increase their knowledge and seek professional advice at a click.

notes that a search of internet sites containing the term “culinary” turned up more than 800 listings versus 0 in late 1994. New offerings allowed web users to “visit fine restaurants, chat with master chefs, swap favorite recipes, browse vineyards, and shop the culinary markets of the world.” By 1997, there were more than 3,000 websites devoted to food and recipes.²⁴⁶

- **Do-it-yourself (DIY) advice:** Online how-to sites also began to emerge. Dansm’s Guitar was a simple website coded by a college student in the mid-1990s that taught visitors the basics of how to play guitar—chords, techniques and some music theory.²⁴⁷ In 1996, Don Vandervort and his company authored and produced more than 30 DIY home improvement books and started HomeTips.com. The site continues to be live today with more than 1,000 expert articles covering DIY home repairs, improvements and also buying guides.²⁴⁸ HGTV launched its home and garden-focused channel in December 1994, initially reaching an audience of 6.5 million households in 44 markets. The network followed up in May 1996 with the launch of HGTV.com,²⁴⁹ creating an access channel to the content and tips on its network available to all, not just cable subscribers.
- **Online learning:** Formal online learning also began in this period. The University of Phoenix began online educational programs in 1989 through the dial-up consumer online service, CompuServe. Shortly thereafter, the institution became one of the first providers to offer online education over the internet. “Although a for-profit institution, the University of Phoenix’s move toward the online educational marketplace prompted many reputable institutions and not-for-profit colleges and universities to follow suit.” In 1998, New York University became “the first large nonprofit university to create a for-profit online education subsidiary, NYU Online.” “The California Virtual University, a consortium of almost 100 universities and colleges in California with nearly 1,600 online courses,” also opened in 1998. “By 2002, over 1.6 million postsecondary students were enrolled in online courses.”²⁵⁰

Having this access to online expertise created new opportunities for individual users to expand their interests, knowledge and skills. Things that had previously required apprenticeships to learn became accessible through the web. Activities that used to require individuals to hire a third party to complete became doable by the individual themselves with the right step-by-step instructions. This new autonomy to pursue a

As the web became more user-centric, existing opportunities—utilizing credit lines, engaging directly with suppliers and accessing expertise—evolved, but so did the demands on individual users that required them to think and act more like an institution.

broadening range of activities in turn created demand for new supply and distribution channels targeted squarely on the individual.

Home renovation and improvements suppliers are one such example. In 1994, Home Depot reported net sales of US\$12.5 million, but by 2018, the figure had surged to US\$108.2 billion. Lowe’s home improvement stores saw a similar trajectory, rising from sales of US\$6.1 million in 1994 to US\$71.3 billion in 2018.²⁵¹ New venues emerged to allow everyday people to reach global audiences with their own creative outputs. Etsy launched in 2005 to give makers an online platform on which to sell their goods. By 2007, the site “had nearly 450,000 registered sellers generating US\$26 million in annual sales.” By 2015, the site had more than 54 million members.²⁵²

Such impacts occurred when the access individual users had to expertise was limited to a two-way, asynchronous communication. Websites at the time published information on static pages that at best offered individual users a frequently-asked-questions section and possibly a discussion board. The quality, variety and ability to interact with experts expanded dramatically as the third tech-driven innovation cycle—virtualization—began.

As the web became more user-centric, existing opportunities—utilizing credit lines, engaging directly with suppliers and accessing expertise—evolved, but so did the demands on individual users that required them to think and act more like an institution. Another set of abilities emerged that allowed individual users to mimic more actions that institutions relied upon to achieve their goals. The next set of advancements proved pivotal, changing the nature of how individual users conceptualized themselves and bringing them closer to alignment with how institutions operated in the world.

Social channels allow individuals to shape their personal brand and align long-term goals

Individual users gained important benefits during the first two tech-driven innovation cycles—the trust that allowed them to extend their buying power and the ability to self-service, which provided autonomy over more aspects of their day-to-day life. These opportunities enhanced the way that individual consumers had been living, offering them better options to transact and learn, but such opportunities did not affect the foundation of how an individual user saw themselves in relation to the world nor how the world, in turn, perceived the individual user. Up until this time, technology innovations had been deployed as tools. The shift to a user-centric web changed this dynamic.

Every individual user is now served a unique view of content, goods, services, offers and communities based on their interests, interactions, transaction history and personal network. Each user is now a data challenge being assessed by various algorithms designed to increase our engagement and facilitate online social connections. The activities we undertake on the web are a window into our own unique online universe that others can view, track, assess, comment upon and share.

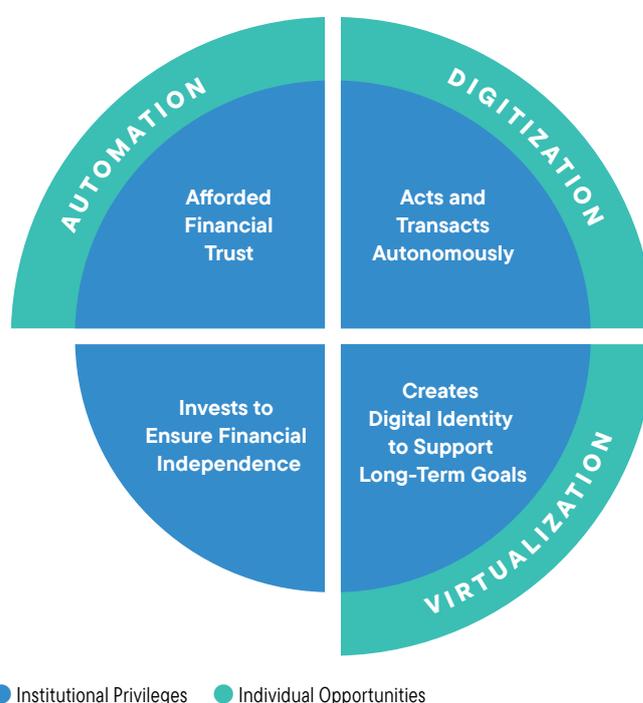
While searching, transacting, navigating social interactions, carrying our phones, wearing tech-enabled gear and living in smart cities and homes, every individual participant is explicitly and implicitly communicating information about which groups they belong to and identify with. People are constantly broadcasting information about their attitudes, beliefs and opinions. Even something as innocuous as posting a picture of food online can inform algorithms and allow individual viewers that see that photo to draw conclusions about the person who posted, regardless of whether they know who the individual poster is.

Individual users have always had a social online identity, but the perimeter of that identity is expanding. Rather than being displayed in front of local communities, individual users' social identities are now being observed by the global town square, offering both opportunities and challenges.

Increasingly, individual users are being forced to manage a digital social identity and ensure that the ways that they are perceived align to and promote their personal interests, goals and affinities. In this way, individual users are becoming very much like institutions. All institutions—

governmental, educational, military, occupational community, or commercial—are subject to being viewed through multiple lenses, including political, social, academic, technological, etc. To conduct their activities in the world and achieve their aims, they are forced to manage these differing views—defining their desired perceptions, drawing others to their goals and constantly looking to realign misperceptions. They can deploy numerous techniques to achieve this aim, including—branding, affiliations and recruitment of resources. Individual users are now leveraging these same techniques to manage their own online social identities as illustrated in Exhibit 33.

Exhibit 33: Institutional Privileges and Individual Opportunities



Source: Franklin Templeton Industry Advisory Services. For illustrative purposes only.

Branding

The way in which an individual user presents themselves through digital channels is now a critical activity that requires curation and intent. Individual users are using the social media channels available to them to shape their personal brand messaging. On social media, individual users express identities via text, visual materials, likes, shares and links to other sites. People use platforms to tell stories about themselves, sometimes to specific audiences or sometimes without conscious targets.²⁵³ Smartphones allow individual users to document their lives—choosing what to remember and what to display.

The communities that individual users join and the ways that they interact with content is another facet of how individual users can shape their personal brand. Large institutions have long used this strategy to create their own positioning. They build communities of like-minded peers and then affiliate themselves with certain networks through the content they promote, the events they attend and the experts they elevate.

In his book *The Social Photo*, Nathan Jurgenson observes that “most online photos are about sharing experiences, not creating memories.” Selfies, especially, are less an accurate picture of an individual user and more of a conjuring of place and time, or as he explains, “a visual depiction of the idea of me.” In this way, posted images are units of communication, more like emojis or hieroglyphics. They allow the individual user to produce a narrative of their life and contribute to their own mythos. The prevalence of disappearing photos and videos such as on Instagram Stories or Snapchat attest to the ephemeral nature of these artifacts.²⁵⁴

The sheer volume of online postings seems to confirm this view. By 2015, British parents were posting, “on average, nearly 200 photographs of their child online each year.” People were sharing 30 million images an hour on Snapchat.²⁵⁵ The explicit choices these postings represent are one manifestation of how individual users are using social media channels to shape their public personas.

Affiliation

The communities that individual users join and the ways that they interact with content is another facet of how individual users can shape their personal brand. Large institutions have long used this strategy to create their own positioning. They build communities of like-minded peers and then affiliate themselves with certain networks through the content they promote, the events they attend and the experts they elevate. This tendency can be clearly seen with today’s two major political parties in the United States.

Republicans likely align with think tanks that have views that reflect their conservative priorities such as the Heritage Foundation and the American Enterprise Institute. Democrats likely align with think tanks such as the Brookings Institute and organizations like the American Civil Liberties Union. Top contributors from these organizations are elevated and featured at conferences and in publications geared toward each party’s desired audience. The vice president of the Heritage Foundation was featured at the Conservative Political Action Conference in August 2022.²⁵⁶ One of the Heritage Foundation’s senior fellows published an article in the conservative *National Review* in December 2022. The same pattern holds true for Democrats. By promoting select positions at forums filled with like-minded participants, each political party looks to strengthen the passion and conviction of their affiliates and create a sense of belonging and mirrored reality.

This is not a phenomenon limited to politics or government. It happens in academia, in business and in the military. Increasingly, it is also being used as a strategy by individual users as they affiliate with online communities and build their own social networks. Members join a community because it resonates with them in some way. They are connecting with like-minded people and establishing relationships. They can seek support, advice and entertainment in these forums. These interactions can create the foundation for trust. “According to a Nielsen study, over 90% of consumers from various markets trust people in their social network—people they know and follow.”²⁵⁷

These communities and social networks can spawn their own experts. An individual user can be identified as an expert in a topic because they authored blog posts or tweets, commented on wiki pages, uploaded files, answered related questions and participated in related communities. Social media users can be associated with these experts by liking, commenting, tagging and forwarding.

Moreover, they can interact with these experts—an option not afforded in the earlier digitization cycle. Affiliating oneself with an expert in social media elevates the standing of that individual. When enough other social media users engage with the postings of this same individual user, their profile rises, expanding from a source of knowledge to a shaper of views about that topic—an influencer.

Increasingly, influencers are taking over the role of trust in modern society as evidenced by the rush from marketers looking to access the halo effect of that trust for their brands

as discussed earlier. A recent survey found that “consumers rated influencers as more impactful compared to an average person based on the following characteristics: more credible and believable, more knowledgeable, and better at explaining how a product works or could be used.”²⁵⁸

A sign of the continued evolution of influencers is that they are moving beyond having an audience and are building out their own communities.

The most successful influencer communities demonstrate the following characteristics: 1) they are viewed as subject matter experts who educate; 2) they promote a specific set of values; 3) they give audiences a consistent behind-the-scenes look into their growth, discoveries and challenges; 4) they organize events for like-minded people online, in person or both; and 5) they develop a unique expression that resonates and gives hope to others. These communities typically develop around niche interests, and the more niche, the better. They are additionally nurturing private meeting spaces using WhatsApp, Slack, Discord and other private groups to connect with greater intensity and develop a deeper level of trust.²⁵⁹

Affiliations with influencer communities and with online communities overall convey with them deep impressions about the social identity of the individual user that joins into these forums and of those in the related social network—for good or ill. Some influencers may have credentials, most do not. Yet this is often overlooked. Misinformation is not likely to be called out in these forums because the sense of belonging and connection can often be more important than facts to the members of the community.

Online affiliations, particularly with influencers who are trying to position certain values, are becoming a part of an individual user’s social identity strategy. It is a way of broadcasting to the world the goals they are pursuing and the types of people they see as their peers. In this way, they are using their affiliations in a similar manner to large institutions.

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Recruitment of resources

The third strategy that many institutions pursue to manage perceptions and advance their goals is to recruit resources to their cause. Such resources can take many forms, but the two primary targets are 1) people willing to help the organization achieve their goals by volunteering their time and expertise and 2) capital to fund its mission and operations. Social network destinations offer opportunities for individual users to also recruit people and capital resources to further their goals.

A recent academic study found that online communities can provide entrepreneurs with diverse learning spaces for developing ideas, learning new skills and coping with the uncertainties of being an entrepreneur. One of the benefits of these forums is that they can ignore the boundaries of time, geographical distance and even social hierarchy. Learning in online communities, they found, is driven by knowledge creation via communication versus more traditional learning, which is driven through observation.²⁶⁰

The authors of the academic study “gathered data from the start-up community 'r/startups' on Reddit, which counts over 380,000 users. Members use the online community as a space to discuss a wide array of entrepreneurial issues, such as marketing, team composition, or entrepreneurial exit strategies.” They studied the top 100 upvoted, and thus most visible and active, threads from October 2018 to October 2019, which contained 10,277 comments.²⁶¹

They found that certain types of conversations were most relevant to learning—personal narratives of success or failure, interpersonal conflicts with stakeholders, and the design and execution of business strategy. Within these threads, there were five categories that provided the most knowledge transfer: 1) lessons learned, 2) advice-seeking, 3) reflection, 4) calls to share, and 5) tips, tricks and resources. They found that it was through the iterative discussion of these topics that learning occurred—not simply

A growing body of evidence also supports the view that individual investors who are more engaged with potential investors through crowdfunding platforms are finding better results—again underscoring the social networks’ importance of these appeals. Overall, 22.4% of all crowdfunding campaigns are successful, and, on average, each successful campaign raises US\$28,656.

from having information posted. The back-and-forth between posters and commenters, how experiences were collectively analyzed, and how community members socially and emotionally supported each other during the knowledge building process were the keys to success. They also found that the range of topics discussed swung between emotionality and technical complexity—a unique combination due to the “social” nature of the discourse.²⁶²

Although this analysis was focused on entrepreneurship, the observations can hold true for any community that individual users access to obtain help, support and insight. Looking at Reddit alone, there were more than 100,000 active subreddits in 2022, with 430 million posts—a 14% increase from 2021.²⁶³ Among the top 31 subreddits in 2022 were forums created expressly to help individual users find insights, resources and support to advance their personal learning or goals. These included subreddits for “Today I Learned” (26.5 million subscribers), “Life Pro Tips” (20.7 million subscribers) and “DIY” (19.4 million subscribers).²⁶⁴

In addition to obtaining knowledge and support through social network forums, individual users are also able to access capital. Crowdfunding platforms are another type of social network forum utilized to raise funds for a variety of ventures, including startups, charities, nonprofit organizations and researchers. Global crowdfunding activities reached US\$1.67 billion in 2022 and were expected to grow at a CAGR of 16.7% from 2023 to 2030 to reach US\$5.53 billion, according to a report from Grand View Research.²⁶⁵

In addition to established crowdfunding platforms such as Kickstarter, Indiegogo and GoFundMe, social media platforms such as Facebook, Twitter, Reddit, Instagram and LinkedIn

have been gaining popularity for crowdfunding activities. The growing use of AI and machine learning technologies by crowdfunding platforms to match those in need and those willing to give capital has also been contributing to growth in the market. Many countries government entities are also supporting product launches related to crowdfunding platforms. For instance, government officials in Dubai, United Arab Emirates, helped launch Dubai Next in 2021 to support creative ideas and projects of Emiratis looking to start their own businesses.

A growing body of evidence also supports the view that individual investors who are more engaged with potential investors through crowdfunding platforms are finding better results—again underscoring the social networks’ importance of these appeals. Overall, 22.4% of all crowdfunding campaigns are successful, and, on average, each successful campaign raises US\$28,656. Campaigns accompanied by a personal video raised 150% more than those without a video, however, and appeals that provided daily updates raised 126% more than campaigns that failed to update potential investors.²⁶⁶

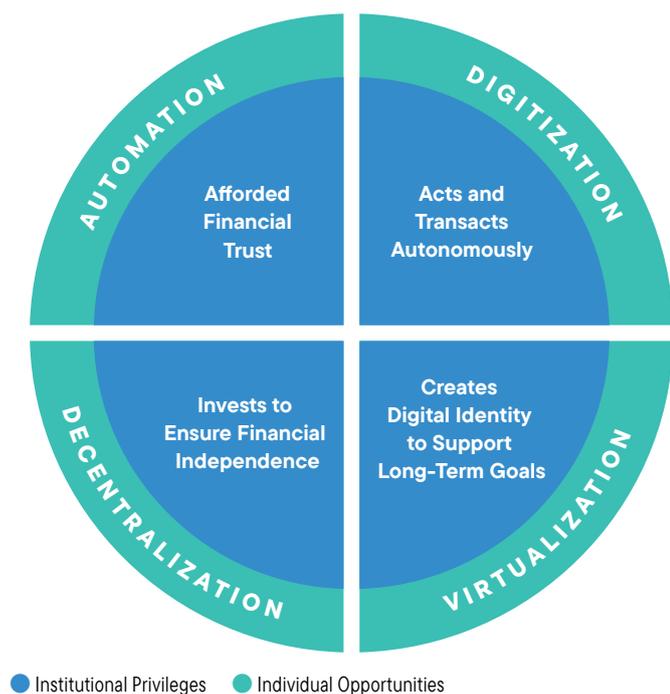
Much larger in scale, the peer-to-peer (P2P) lending market also continues to grow. Globally, P2P lending was valued at US\$83.8 billion in 2021 and is expected to rise to more than US\$705 billion by 2030, with a CAGR of 26.7%, according to Precedence Research. Consumer lending dominates the P2P space, accounting for more than two-thirds of the market in 2021. Supported by rising disposable income and rapid urbanization, most consumer P2P loans are short term in nature and focused on consumer credit or student loans. This compares to the business P2P lending space that is dominated by interest from small and mid-size enterprises as well as startups.²⁶⁷

Crowdfunding and P2P lending allow individual investors to access capital to meet personal goals and objectives—channels that had not existed prior to the current third tech-driven innovation cycle. The amounts and extent of capital available through such channels are still relatively small, however, and the financial relief these options offer tend to be short-lived. Opportunities likely to emerge in the upcoming fourth tech-driven innovation cycle—decentralization—are likely to expand greatly the financial opportunities for individual investors, allowing them to marshal a growing set of assets and broader array of channels to obtain and leverage investment capital using social networks.

Web3 protocols may offer individual participants more pathways to financial independence

Most opportunities historically reserved for institutions have been extended to individual users via new tech-enabled models emerging since the onset of the modern computer age in the 1960s. As discussed, credit cards bestowed financial trust on individual consumers; the personal computer and the launch of the World Wide Web enabled self-service models that provided autonomy to individual users; and the emergence of user-centric Web2 offerings provided a communal ecosystem that allowed individual users to manage their social network identities, find like-minded peers and access networks to promote their personal goals. The remaining gap between institutional and individual users' abilities—the utilization of resources to achieve financial independence—is likely to be addressed as emerging Web3 models gain traction. This is shown in Exhibit 34.

Exhibit 34: Institutional Privileges and Individual Opportunities



Source: Franklin Templeton Industry Advisory Services. For illustrative purposes only.

Today, institutional participants have access to a far more robust set of options than individual participants can rely upon to meet their financial goals and achieve financial independence. Specifically, institutions can invest in a broader variety of asset classes than individual investors; they can use a more sophisticated set of investment techniques to

enhance their portfolio returns than individual investors; they have superior access to new issuances; and in many instances, they can issue their own securities to raise capital directly. Only a subset of these options is available to individual investors and, even then, only to qualified or the wealthiest tier of investors.

Access to alternative investments

Over the past 20 years, there has been a significant change in institutional investment portfolios, as allocations to equity assets have been declining and more capital has been directed to alternative investments. According to the Thinking Ahead Institute, allocations to alternatives from the world's seven largest pension nations that collectively account for 92% of global pension assets rose from 5% to an estimated 19% of investor portfolios between 2001 and 2021. Allocations to equities fell from 61% to 45% in the corresponding period.²⁶⁸

Alternative funds typically require an extended lock-up period for investors and often allocate assets to illiquid opportunities. Regulators have discouraged these investment options for retail investors due to this lack of liquidity, limiting exposure to accredited investors only. This has disadvantaged the majority of individual investors as returns on private funds have outpaced those of the liquid markets. "Over a 21-year time period ending June 30, 2021, private equity allocations by state pensions produced a 11.0% net-of-fee annualized return, exceeding by 4.1% the 6.9% annualized return that otherwise would have been earned by investing in public stocks."²⁶⁹

Though regulators have yet to change their views on the suitability of private fund investments for retail participants, new technologies emerging as part of the fourth tech-driven innovation cycle are being used to experiment with democratized access to private funds. The ability to create programmable tokens that sit on top of blockchain has allowed private investment firms to tokenize limited-partnership sleeves of their private funds and offer lower minimums and more liquidity than traditional private fund options.

In September 2022, KKR, a US\$491 billion alternative asset manager, announced that it would be tokenizing an interest in its US\$4 billion Health Care Strategic Growth Fund II to provide investors access to private equity. The company noted that offering the fund to retail investors on blockchain "lowers investment minimums, improves digital investor onboarding and compliance protocols, and increases potential for liquidity."²⁷⁰

This initial offering is likely to prove the tip of the iceberg. Boston Consulting Group estimates that US\$16.1 trillion of illiquid assets will be tokenized by 2030.²⁷¹ Existing private fund structures are one target for such tokenization, but a growing set of real assets are also likely to be included in these totals.

There are different types of asset tokens that can be issued on the new Web3 rails. One type of token is fungible. A pool of such tokens can be minted and all the tokens in the pool represent an equivalent share of the whole. This works well for shares in a private fund, which entitles all investors to the same investments, rights and privileges. Another type of token is non-fungible. A non-fungible token (NFT) is a unique asset embedded into a token. These tokens are more suitable for one-of-a-kind offerings.

Works of art have been a popular target for tokenization through the NFT structure. According to CryptoArt, as of March 2023, close to 4 million artworks have been sold on NFT platforms for a total CryptoArt market capitalization of US\$2.07 billion, including 27 works that had sold for more than US\$1.0 million each.²⁷² The artist known as Beeple has had record-breaking NFT-based art sales, having sold two of his works at US\$69 million and US\$29 million.²⁷³

Using NFT structures offer advantages that buying a piece of art through traditional channels cannot provide. Since these tokens are programmable, certain clauses and rights can be built into the smart contract that is embedded into the token. New terms allow artists to maintain a right to benefit from the sale of their works into perpetuity. Typically, an artist receives a portion of the payment only when the work sells for the first time. They lose their financial interest after that original sale and are excluded from the economics of any subsequent resale of their work. With NFT-based art tracked on a blockchain, artists can remain an interested party and continue to benefit from the increasing value of their work.

Art is an example of how the new technology can allow for democratized access to a type of luxury alternative asset typically priced out of the range of most individual investors and consumers. This same model is likely to extend to many unique tangible assets (e.g., vineyards, private planes, yachts, collectible cars, jewelry, vacation properties) and digital assets (e.g., films, television series, music catalogs, manuscripts).

Options for individual investors to own a larger diversity of alternative assets in their portfolio are likely to multiply and

allow them to benefit from lower correlations across their investment holdings, just as many large institutional investors do today.

Expanded range of investment techniques

Just as regulations limit the types of investments that are deemed suitable for individual investors, many also limit the techniques that an individual investor might deploy to more effectively leverage their investment capital or hedge their exposures. Institutional investors regularly borrow capital to increase the size of their positions (margin lending), loan their securities to obtain additional yield, and purchase options or futures to hedge their portfolio holdings. Opportunities for individual investors to utilize these same strategies are stringently controlled by intermediaries in traditional financial markets and typically not approved for those with lower amounts of wealth.

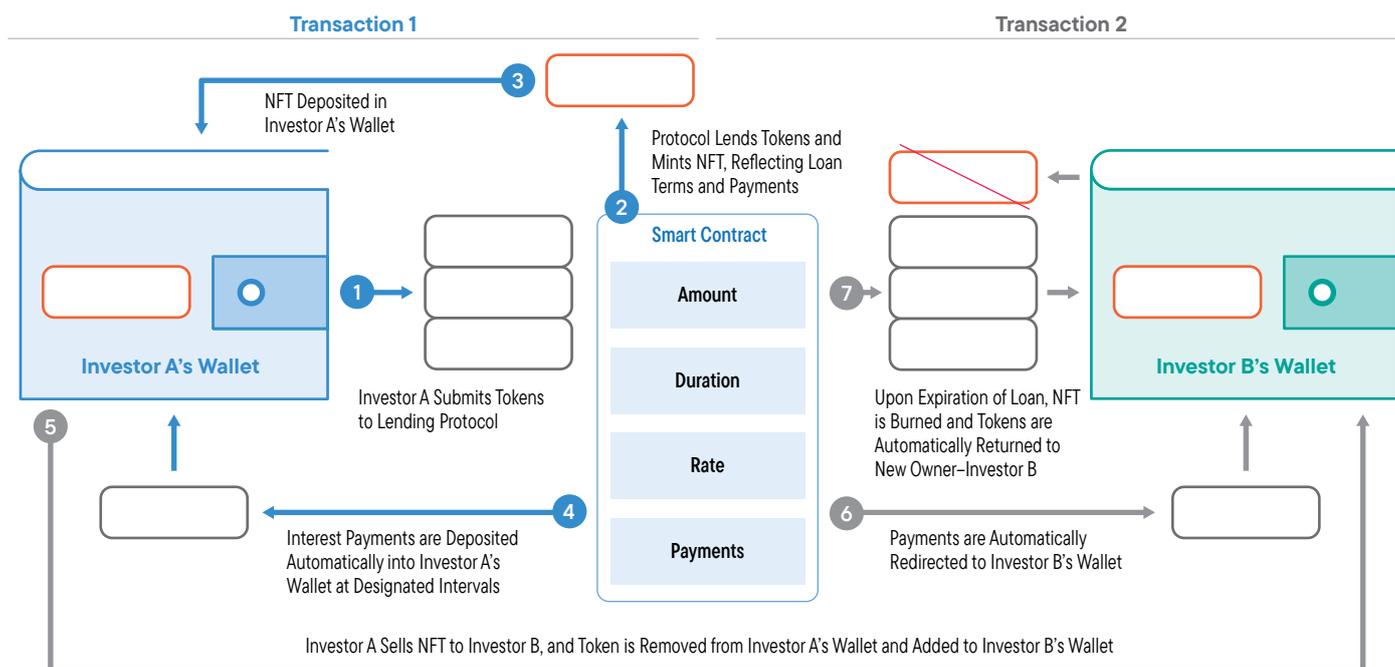
Emerging Web3 offerings have not yet erected the same barriers to entry for these investment techniques—though regulators may at some point step in to limit certain types of interactions. As of March 2023, the top three crypto derivative exchanges—Binance, Bybit and OKX—had total open interest of more than US\$37.7 billion and a 24-hour trading volume of nearly US\$129 billion.²⁷⁴

These exchanges offer any individual investor the ability to trade derivatives, including a range of futures, options and perpetual contracts—a type of futures contract that does not have a fixed expiration date and operates more like a contract for differential between the perpetual asset and an underlying asset. Individual investors today can only trade derivatives if they are sponsored by a broker-dealer and after they pass rigorous eligibility and investor verifications.

Individual investors are also offered other institutional trading techniques in the crypto marketplace through new decentralized finance protocols, also known as DeFi. These protocols allow individual investors to utilize their own digital asset tokens as collateral. Those who join DeFi protocols can lend their fungible tokens to other market participants and receive a new NFT in exchange that records the loan, assigns an interest rate that will be paid to the lender, lists the interval at which the interest will be paid, and designates a wallet address where those payments will be deposited. This is illustrated through Transaction 1 in Exhibit 35 on the next page.

The NFT that is issued to the lender can become its own asset and can be used as collateral in another transaction if the holder so desires. The holder can also choose to sell

Exhibit 35: Examples of DeFi Transactions



Source: Franklin Templeton Industry Advisory Services. For illustrative purposes only.

their token that lists the terms of the original loan. In that case, the smart contract would be updated with the new owner's information and the interest payments would be redirected. When the loan term expires, the assets would be returned to the new holder's wallet. This is possible because the smart contracts are written on the same templates and are thus interoperable. Moreover, all transactions are verified and are listed on the same blockchain, so all the transaction details can be tracked and tied together to display the ownership trail. This second transaction is also illustrated in Exhibit 35.

Conversely, any individual investor can borrow tokens in the crypto domain. In this scenario, the borrower would submit a request to a lending protocol for a specific number of tokens and designate the duration of the desired loan, in which case the lending protocol would indicate the required interest payments. If the terms are accepted, the protocol would create an NFT contract with the borrower outlining the terms that would be recorded on the blockchain and then deposit the borrowed tokens in the borrower's wallet.

Because any user is free to borrow or use their tokens to lend in this manner without having their eligibility confirmed by a third party, this entire category of transactions is called "permissionless collateral." In traditional financial markets, an individual investor would have to be vetted and approved by a regulated third party to be eligible to do similar

transactions. High hurdles for determining eligibility tend to limit availability to these types of investment techniques for most individual investors today.

Mint tokens

One of the most powerful new capabilities available to individual investors in the emerging Web3 space is the ability to create and issue—in digital terms, "mint"—their own tokens to raise capital. Many institutions regularly use this option, whether it be governments issuing notes or bonds or commercial enterprises creating an equity or bond security offering. This has never been an option for individual investors in the traditional financial markets.

Early examples of individual investors minting their own tokens in the crypto domain have tended to focus on collectibles or creative endeavors. OpenSea originally launched on the Ethereum blockchain and, now accessible through six different chains, is currently the largest NFT marketplace with more than 1.0 million registered users and nearly a 50% market share. It offers a wide suite of tools for creators to mint and list new collections. The platform offers art, collectibles, domain names, music, photography, sports and trading cards, and other items. Blur, Magic Eden, Rarible and Nifty Gateway are also leading platforms. During the 30 days ending March 24, 2023, OpenSea posted US\$399 million in sales volume across 278,498 traders with the average NFT sale listed at US\$98.20.²⁷⁵

Over time, these efforts are likely to migrate to more valuable assets. One with growing potential is the ability for individual users to use tokenization and smart contracts to take control of their personal data.

As more activity migrates to blockchain technology, the amount of publicly available data on individual participants and their activities will become more limited. Today, nearly all data associated with an individual is obtainable through virtual platforms, including their personal profile information—age, sex, income tier, etc.—and their geolocation data.

These inputs are critical for the effective operation of personalization algorithms and the digital advertising model. Data is often the highest-value asset held by platform providers.

In Web3, only a minimum set of transaction data and wallet addresses will be publicly available. Because the digital asset ecosystem is being built out in a pseudo-anonymous manner, personal information is withheld. As such, individual users are increasingly going to have the option of whether to share their personal and transaction data and to determine how much data they are willing to provide. Personal profiles can specify what types of data an individual user is willing to share and the rights to utilize that information can be granted through a personally minted token with terms outlined in the embedded blockchain-based smart contract. Advertisers and intermediaries will have to purchase such tokens to access and aggregate an individual user's data.

Web2 has already optimized an efficient Dutch auction market structure, where the highest price of something being offered—for example, data or keywords—is determined after all bids have been accepted. A similar style of auction approach is likely to emerge for certain types of individual participants' data, and data brokers may even emerge as a new type of facilitator to help individual participants optimize their personal data sales.

Many other types of personal assets may offer opportunities for tokenization over time—equity in an individual investor's home, title and ownership of an individual consumer's car, a share of an individual participant's future earnings in exchange for money to cover their educational expenses. Minting a token for any contract-based transactional agreement based around a digital or physical asset could become as simple and ubiquitous as posting a photo or video online is today.

New types of passive income opportunities

In addition to actively sought income through minting tokens around an individual investor's personal assets, there are also likely to be a growing set of novel opportunities for individual investors to earn passive income linked to new Web3 offerings. Passive income is derived from sources that do not require ongoing work to maintain. Individual investors often receive passive income from stocks that pay dividends or from rental properties that they own. New models are also emerging in the Web3 space.

- **Staking:** Staking is one such opportunity. Blockchains rely on consensus mechanisms to verify transactions, typically performed by independent nodes. For the Bitcoin network, that consensus mechanism is called proof-of-work. To participate in that process, significant investment in advanced computing and cryptographic equipment is required, putting this option out of reach for most individual participants.

Ethereum and other growing layer 1 blockchains utilize a different consensus mechanism called proof-of-stake. In this approach, a holder of coins for that blockchain (e.g., ETH for the Ethereum blockchain) delegates control of their coins to an independent transaction verification node and agrees to lock up those coins in the node's staking pool for a designated amount of time as outlined in a smart contract. Having a larger pool of coins increases the likelihood that the node will be selected to verify transactions—thus earning a commission for the node operator. Individual investors (or institutions) that stake their coins receive a “reward” from the blockchain based on the activity of the node they chose for staking.

Staking one's coins can, in a sense, be seen as a hedging mechanism. As more of the blockchain's native tokens are minted and released, the overall size of the token pool increases and the relative value of each coin in the pool diminishes. The size of the staking reward is meant to offset the impact of that inflationary pressure. Earnings from the reward could cover the amount of depreciation in coin value due to issuance, helping individual investors maintain the value of their token pool over time, but also resulting in an income flow.

- **Yield farming:** Yield farming is another passive income opportunity. In a sense, it is like staking as the individual investor pledges their coins to a protocol and receives payments for having locked up their supply. In yield

farming, however, the individual investor needs to post two different coins to a decentralized market making protocol, rather than to a layer 1 blockchain.

Decentralized market makers are protocols where crypto participants can come to exchange one cryptocurrency for another. If an individual wanted to exchange ETH from the Ethereum network for BTC from the Bitcoin network, the individual could submit a bid (buy ETH and sell BTC) or an offer (sell ETH and buy BTC). My price would be calculated based on the number of ETH/BTC in that pair's liquidity pool. Liquidity pools with a large amount of both tokens will be able to create tighter bid/ask spreads whereas those with fewer tokens will have wider bid/ask spreads.

To incentivize individual investors to deposit tokens into the liquidity pools for various pairs, decentralized market makers can share their trading revenues with those users that provide liquidity. In the example above, an individual investor could become a liquidity provider by depositing both ETH and BTC into that liquidity pool. The individual investor could then receive a proportional amount of the trading fees from all transactions that take place against that liquidity pool.

Moreover, the individual investor that deposits the ETH and the BTC is issued another token that represents their share of the liquidity pool. This token can be used as collateral and given to a staking protocol if the underlying token is part of a proof-of-stake network—thus enabling the individual investor to earn two passive income streams.

- **Resource sharing:** A third way for individual investors to use new Web3 models to earn passive income is through sharing their resources. Though sharing is already a well-established model through Web2 platforms like Airbnb and Uber, crypto sharing opens a new set of assets for consideration—some of which are unique and revolutionary.

A basic attention token (BAT) is a digital asset that is exchanged between advertisers, publishers and users. Individual users that agree to watch advertisements on a BAT-enabled media browser can earn tokens for their willingness to be displayed ads. This requires an action on the part of the individual user because the platform that initiated the model has a built-in ad blocker and therefore the individual user must opt in to view advertisements. Thus, users are being paid for paying attention to

content that they might have otherwise skipped. Users are free to sell their BAT tokens to monetize their willingness to view ads, and they can also designate a certain percentage of their BAT rewards to be distributed to the creators whose content they like best.

Sharing of one's router capacity is another novel model being developed in the Web3 space. Helium is a blockchain for app developers who are building business models for the internet of things. These apps require network connectivity in the physical world to operate, which Helium offers through its consensus algorithm that is called proof-of-coverage. An individual user can load software from Helium on their computer, which allows Helium to access and utilize the individual user's unused router capacity, thus making the individual user's computer a node in Helium's coverage network. All an individual user needs to do is keep their node live and they will receive monthly payments from Helium proportionate to their share of activity running through the overall network.

Taken together, these new Web3-enabled opportunities—own alternative assets, deploy sophisticated investment techniques, mint assets to raise capital, and earn passive income—represent a significant expansion in the options available to individual investors to control their own financial health. Such activities can both close a gap that has existed between institutional and individual investors in the traditional financial realm and provide new investment models for both individual investors and institutions to leverage.

Having these new abilities could allow individual investors to achieve greater financial independence by optimizing their investment and income-generating portfolios—just as institutions have been able to do for many decades. Having this final ability could improve investment parity between individual investors and institutions. Each can count on securing financial trust through their ability to utilize credit; each can utilize self-service options to have autonomy in how they pursue their commercial interests; each can build their own identity and align to communities of like-minded peers; and each can utilize their full range of assets to achieve financial independence.

This balancing of the opportunity set between institutions and individual investors could mark an important financial transformation of modern society—radically rebalancing the power dynamics that existed at the outset of the modern computer age.

Conclusion

By its nature, technology innovation drives changes in how governments, businesses, the military, educational centers, service sector communities, and individuals operate daily. As outlined in Part I of this series, since the commercialization of computers in the 1960s, there have already been three distinct cycles of tech-driven innovation, each of which has driven significant change. New Web3 technologies already point toward an emerging fourth cycle and future changes on the horizon.

As technology changes what we can do, it also shifts our behaviors and expectations. The speed at which recent tech innovations have been introduced and integrated can often make such change feel incremental, but the broader impacts, when viewed over a longer time horizon, often expose a more transformative arc. With this perspective, it is possible to see that the role of the individual user in modern society has been profoundly elevated and enhanced because of technology evolution over the past 60 years, and that the nature of commerce has changed profoundly to accommodate this shifting power dynamic.

Each of the five megatrends discussed in the paper play a part in this change.

- By **democratizing access to commercial transaction rails**, individual investors and consumers have been offered more opportunities to build their own businesses and leverage their own assets to obtain direct financial benefits. Businesses have responded by using these same rails to reduce the need for costly infrastructure by outsourcing key functions to platform-based intermediaries and by offering customers new ways of sharing in the revenues that their activities help to create. Future evolution may see individual consumers and businesses become partners in owning and running such platforms, and realignment of the financial and governance model to allow for a more balanced sharing of economic benefits.
- The **source of business value has also shifted from tangible capital to a broadening set of intangible assets** that are tied increasingly to the knowledge of the individual workers that make up the workforce and to an organization's ability to connect to individual customers. Simply providing a manufactured good has become less of a differentiator. Knowledge-based services and advisory have been elevated by the ongoing challenge of reengineering business processes to run on ever-evolving infrastructures in complex global marketplaces. Access to data and processing tools is allowing for innovation to be dispersed in organizations and resulting in a growing pool of intellectual property, which in turn raises the need to retain talent by offering an appealing brand and lifestyle. Distribution channels are shifting, requiring businesses to connect into ecosystems to access their network effects for customer acquisition and benefit from their shared economics for order fulfillment. Looking ahead, new Web3 technologies may increase the importance of connectivity as businesses embed their processes within a customer's, as opposed to the organization's or platform's workflow.
- The ability of individual participants to band together using new technology channels has also **elevated their collective influence, creating a new type of crowd power** that is forcing a shift in the dynamics that exist between individual consumers and institutions, particularly commercial enterprises. New technologies have given individual users the ability to first share and then combine their voice to shape opinions and to band together to broadcast their potential exit and lend weight to their demands when they are dissatisfied. The days of companies controlling their own messaging are gone, and today they must engage in a dialog with their customers in social network forums to prevent "outrage cascades" or other adverse outcomes. Social media and trends data are becoming ever more important to inform business strategy, product development and marketing. This trend is likely to become amplified as new Web3 technologies make it increasingly simple to design experiences to augment the sale of a product, good or service by delivering one of several crowd factors that enhance the enjoyment or utility of the transaction.
- Knowing precisely what aspects of an experience are most likely to appeal to an individual consumer to increase the value of a transaction may become possible because of **the growing sophistication of analytic tools that quantify and apply behavioral insights**. The quality of such tools has been improving since their emergence in the 1970s. Whereas early offerings focused at a macro level on the behaviors of the entire enterprise, there has been a progression since that time to being able to focus on a continually more micro analytic target. Today, analytics look to create

Taking this macro argument back to how investors might capture value is critical because each tech-driven innovation cycle and each advancement of the megatrends has not only changed modern society, but has also led to new sets of companies that are considered market leaders and new geographic markets to consider for investment opportunities.

seamless experiences that cross physical and digital channels and bring together insights in real time to influence individual customer behavior. Looking ahead, the continued advancement of predictive analytics and the growing ability to build models based on unique individuals—individual consumers—as opposed to cohorts—might allow for personal intelligence that predicts what a specific individual consumer may be ready to want or need and offers it proactively before that individual consumer consciously makes that determination.

- Turning an entire organization's apparatus toward being able to deliver to the needs and specifications of a unique **individual consumer has become a viable pursuit because individual consumers have collectively gained more of the privileges and opportunities that institutions have historically enjoyed**, making them more independent and financially empowered actors. Through technology-enabled options already deployed, individual borrowers can now be afforded financial trust and can utilize credit to extend their buying power; they can be self-directed and act autonomously to pursue transactions and take actions that meet their personal needs and objectives; and they can build a social network identity that defines

them, affiliates them with like-minded peers and allows them to recruit resources to meet their long-term goals. New Web3 technologies and models could create new options for individual participants to achieve financial independence and ensure that their resources are able to stretch across multiple generations.

Understanding the extent to which modern society is being re-architected to anchor ever more clearly on an empowered individual user and how enterprises are responding and reenvisioning their offerings to accommodate this change is critical for assessing where value may be created in the future and to be alert to where existing models might fail.

Part I of this series laid out the emerging technologies that provided the new capabilities and infrastructure that enabled such change. This paper has traced the impacts of those new technologies and how they have altered both individual users and institutional behaviors and expectations, including a discussion on how the next set of emerging technologies might balance the power of individual users and institutions. Part III will narrow the lens and look specifically at how technology advancements and shifting behaviors and expectations have impacted the ways that individual investors and institutions build wealth, and how this has required

both financial advisors and investment managers to continually reassess and upgrade their capabilities and offerings to meet evolving demands.

Taking this macro argument back to how investors might capture value is critical because each tech-driven innovation cycle and each advancement of the megatrends has not only changed modern society, but has also led to new sets of companies that are considered market leaders and new geographic markets to consider for investment opportunities. Investors who recognized these opportunities and positioned their portfolios well were able to generate returns in the past. Understanding these changes can help individual investors and institutions to be alert to the next set of opportunities that might deliver potentially favorable returns in the future.

Moreover, the capabilities of both financial advisors and investment managers have advanced alongside these technological and economic changes, continually improving the approach to portfolio construction, the understanding of risk and reward, the ability to access investments, and the effectiveness of the capital markets infrastructure. Part III of the series to be released later in 2023 will explore these advances and speculate on how the upcoming fourth tech-driven innovation cycle may impact the wealth and investment management industry.

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