CUTTER Business Technology Journal

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# FINTECH

## COVID-19 Impact & Opportunities for Economic Growth



Kevin O'Leary & Philip O'Reilly
Guest Editors

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# Opening Statement

by Kevin O'Leary and Philip O'Reilly, Guest Editors

COVID-19 has had a devastating impact on our society, the scale of which has not been experienced in our lifetime. A year ago, nobody could have predicted the effect the global pandemic would have on our lives. The fortunate among us have adjusted to working from home, reducing our social contacts, wearing masks, sanitizing our hands, and missing out on such milestones as weddings, graduations, and birthdays. Sadly, those less fortunate have lost their jobs and their loved ones to this disease.

As governments around the world tentatively look to reopen businesses, fintech is seen as an enabler for economic growth. While our economies have become increasingly digitized in recent years, COVID-19 has significantly accelerated this movement. E-commerce platforms have experienced sharp increases in activity; indeed, an OECD report highlighted that the crisis has "expanded the scope of e-commerce, including through new firms, consumer segments (e.g., elderly) and products (e.g., groceries)."[1] The use and acceptance of contactless payment solutions have become commonplace, 48 countries increased the spending limit on contactless transactions, mobile payment solutions such as Apple Pay and Samsung Pay are expected to be valued at over US $1 trillion by 2024,[2] and organizations including the US Centers for Disease Control and Prevention (CDC) recommends using contactless payments whenever possible as a means of preventing the spread of COVID-19 while shopping. Also, as customers were unable to visit branches, digital-only banks have continued to grow in popularity. It is apparent that a strong digital infrastructure is essential to survive and thrive in a post-COVID-19 economy.

In this issue of *Cutter Business Technology Journal* (*CBTJ*), we examine the role that fintech will play in facilitating economic recovery and growth. As researchers in the FINTECHNEXT project at University College Cork, Ireland,[3] we have noticed that the business landscape is evolving rapidly and people's behavior is noticeably changing due to the pandemic. We hope this issue of *CBTJ* will inform both research and practice by identifying how organizations have adapted during the crisis, and how they will continue to operate and innovate into the future.

Fintech is an exciting area due to the range of technologies involved and the diversity of industries it can impact. The Financial Stability Board (FSB) defines fintech as "technologically enabled innovation in financial services that could result in new business models, applications, processes, or products with an associated material effect on the provision of financial services."[4] Fintech refers to an array of applications, including (1) credit, deposits, and capital-raising services; (2) payments and clearing and settlement services, including digital currencies; (3) investment management services (including trading); and (4) insurance.[5] Fintech is not just about emerging technologies; just as important is how people and processes adjust to accommodate technological advancements and reap the benefits they afford.

*As governments around the world tentatively look to reopen businesses, fintech is seen as an enabler for economic growth.*

In this issue, our authors provide an insightful discussion on digital transformation across the financial services industry through a combination of technologies and strategy. Digital transformation refers to changes digital technologies can bring about in a company's business model, which result in changed products, organizational structures, or in the automation of processes. Digital transformation is a complex issue and therefore relies on a clear strategy in order to be successfully operationalized.

In addition to examining fintech from a strategic perspective, this issue's authors also explore high-potential technologies and services, including artificial intelligence (AI), blockchain, and cryptocurrencies. The disruptive potential of these technologies has been a cause for concern for many who feel that the

automation that these technologies afford will lead to job losses in many industries. Our authors address these concerns, highlighting that emerging technologies can serve to support decision makers, create new specialized roles in financial services, and create opportunities for new business models.

We are excited for the potential impact of this issue, as the articles within cover multiple areas of financial services, including e-commerce, banking, and investment management. Additionally, this issue offers a broad geographical scope, taking a global perspective in several articles, while also focusing on specific regions and economies, including the US and Ireland.

## In This Issue

Although financial services industry has become increasingly digitized with the emergence of new technologies, Bhavik Pathak argues, in our first article, that we have yet to see disruption in financial services parallel to what we have seen with Netflix, Uber, and Airbnb to the entertainment, transportation, and lodgings industry, respectively. The contrast is primarily due to restrictive regulations and infrastructure that favor the incumbents and limit the potential of emerging fintechs to niche product/service offerings. Pathak discusses how COVID-19 has disrupted this constraint by forcing governments to relax certain regulations. He goes on to suggest what this could mean for the digitalization of financial services in the years ahead.

Next, Cintia Guerrero-Castanon, Reema Jan, and Mahesh Raisinghani also look at the advances of technology in the banking sector in recent years. The key research question they seek to answer is whether this technological advancement facilitates or complicates the banking industry. Their insightful discussion examines a range of changes in banking, from what we may now consider to be modest developments like the introduction of ATMs, to the adoption of mobile banking, and more recently the advent of open banking and digital-only banking. However, the benefits of these technological developments also bring challenges, including cultural and infrastructural barriers, as well as information security concerns. While COVID-19 has accentuated the importance of digitalizing our banking systems, the associated challenges must also be given due diligence.

As we move to an increasingly data-driven society, many of us speculate on the future role of AI in our daily lives. In particular, we wonder if AI will lead to redundancies in different industries, and financial services is no exception to this concern. In our next article, Joseph Byrum provides a unique perspective on how investment managers can use AI tools based on the US military's OODA loop to assist in their decision making in periods of uncertainty in the market. Rather than replacing investment managers, Byrum illustrates that when there is an organizational culture willing to embrace the transformative power of AI, it can be harnessed to support expert practitioners and reshape organizations for the better.

Continuing the discussion of the transformative potential of AI, Denis Dennehy examines how AI can power a sustainable recovery for the Irish economy following COVID-19. He addresses common concerns associated with AI and shows that it will not just eliminate jobs through automation, but rather will create many new roles in specialized areas to support AI. Additionally, Dennehy discusses how AI can be used for social good to address several societal issues. In this thought-provoking discussion, he focuses on four strategic areas that he believes AI can support, namely: (1) agriculture, (2) smart manufacturing and supply chains, (3) education, and (4) smarter products and services. Dennehy concludes with a call for action that focuses on the development of a national AI and data strategy for Ireland but also has clear implications for countries across the globe.

Blockchain is commonly discussed as a high-potential technology in the fintech domain. However, it is often criticized as being a solution looking for a problem. In their article, Zion Schum, Isaiah Morales, and Roger Yin seek to address this issue by providing readers with an understanding of blockchain-enabled technologies and the gig economy, and how blockchain can be harnessed to develop innovative business models to facilitate growth post-COVID-19. They touch on several exciting

## Upcoming Topics

Data & Digital Architecture: Enabling Successful Digital Transformation
*Gustav Toppenberg*

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opportunities blockchain affords, including cryptocurrencies, tokenization, decentralized applications, and smart contracts. Through the lens of Alexander Osterwalder and Yves Pigneur's Business Model Canvas,[6] the authors illustrate how leveraging blockchain and the gig economy can both cut costs and increase revenues.

Next, Manjul Gupta, Carlos Parra, and Eduardo Salcedo focus specifically on the potential of cryptocurrencies by asking the timely question, "Are Americans nowadays more willing to use Bitcoin-like cryptocurrencies?" Specifically, they want to know whether Americans would be more willing to use cryptocurrencies over credit cards to complete different e-commerce transactions. To answer the question, they surveyed 195 US participants about their willingness to use a hypothetical cryptocurrency called "DIGIcoin," to pay for 11 different products and services. While results indicate that credit cards are still the preferred payment mechanism, the authors present an interesting examination of customer willingness to adopt cryptocurrencies, which appears stronger depending on the nature of the purchase. They also suggest ways to increase willingness to adopt cryptocurrencies in the future.

The forced closure of businesses across the globe during the pandemic has meant many of us have become more accustomed to shopping online. In our final article, Luke Merriman discusses the accelerated growth of e-commerce, which has been brought about due to COVID-19. Specifically, Merriman focuses on online classified marketplaces and looks to identify the changes required by these marketplaces to capitalize on the growth in e-commerce. He presents detailed results of a survey carried out by Trustap, an Irish startup specializing in escrow-style payments for online marketplaces. The results indicate that there is a need for online classified marketplaces to provide both buyers and sellers a secure, online payment solution. Trustap looks to provide such a solution that reduces fraud in online transactions and capitalizes on the growth of e-commerce, while also offering a valuable source of detailed analytics for online classified marketplaces.

## Conclusion

COVID-19 has undoubtedly had a transformative impact on our society that will persist for some time to come. As we look to rebuild our economies, we believe that fintech can support businesses to not only reopen but to develop a robust digital infrastructure that will support growth into the future. The articles in this issue of *CBTJ* illustrate how we can harness emerging technologies, adapt organizational processes, and adjust our perceptions of these technologies to achieve economic growth.

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THE LONG ROAD AND WINDING ROAD

# How COVID-19 Fast-Tracked Digital Transformation in Financial Services Market

by Bhavik K. Pathak

Financial services (FS) firms have been integrating computing technologies into their operational processes for more than six decades,[1] while the digital transformation technologies of cloud computing, the Internet of Things (IoT), and business analytics/artificial intelligence (AI) have been in place for around a decade. Although a new generation of online-first or exclusively online ("pure play") startups has leveraged these technologies to challenge the incumbents, digital disruption on the scale of Netflix, Uber, or Airbnb has not yet occurred in world finance.

Digital disruption, as described by Clayton Christensen, is a transformation that occurs when both technologies and business models affect the value proposition of the incumbent's existing goods and services.[2] While FS pure plays are agile and creative in adopting and utilizing the technology, their fundamental business models have generally remained very similar to FS incumbents, primarily due to high regulatory barriers and the prevailing infrastructure. Digital payment fintech firms, such as PayPal, Revolut, and Stripe, still require conventional banking or credit card information for consumers to open accounts and conduct transactions. For most practical purposes, consumers cannot use digital payments as a replacement for their traditional FS accounts. This is fundamentally different than the digital disruptions in entertainment, transportation, and lodging industries, where Netflix, Uber, and Airbnb have created transformative business models to replace those of the incumbents.

Digitization in the FS sector has followed two main trends. First, the incumbent "too big to fail" firms have been building digital capabilities to enable frictionless transactions, allowing them to maintain a stronghold in the market, although strict regulations and inherent product/market factors have slowed these firms' digital transformations.[3] Second, pure-play fintech startups have unbundled established firms' service portfolios and used transformative technology to challenge the incumbents in niche product/market segments. But fintech firms are a novice in the heavily regulated FS sector, and while they have been proliferating both in terms of number and volume of transactions, their impact (beyond a few subsectors such as payments) on the digital capacity of established financial conglomerates has remained minimal.[4]

The COVID-19 pandemic has further disrupted the slow digital transformation process of the FS industry. In this article, we begin by reviewing the digital transformation across the information-centric industries and summarize the pre-pandemic status of digitization in FS firms. Next, we explore the regulatory and product/market factors that have slowed down the pace of digital transformation in the FS industry and inhibited the emergence of a fintech-led disruptive business model. Then, we discuss how swiftly governments relaxed regulations, FS firms changed their business processes, and customers adopted digital technologies in the face of the pandemic. Finally, we explore how, post-COVID-19, incumbent firms may continue to lead FS by partnering with fintech pure plays and capitalizing on their size, knowledge, and regulatory compliance experience. Consequently, there will be a massive upsurge in large-scale strategic digitization projects and fintech mergers and acquisitions (M&As). And Big Tech firms — Amazon, Apple, Facebook, and Google — will likely play a significant role in the digital transformation of the FS industry.

## Digital Transformation of Information-Centric Industries

Technology-led frictionless commerce has substantially improved efficiencies in various information-centric industries over the last few decades. In just 20 years since its emergence, almost 70% of the US population shops online.[5] In the case of digital goods, the total number of US subscribers of leading streaming service providers (Netflix, Amazon Prime, Hulu, Disney+, and Apple TV+) is around 485 million.[6] The efficiencies in these markets are also found in the nearly instantaneous distribution of digital goods and significant progress — from same-day to same-hour delivery of physical

products. The extent of digitization in some information-centric sectors, including entertainment, communications, and retail, is nearly complete, comprehensive, and transformational.

Digital transformation has also been witnessed in industries where information technologies traditionally have not been crucial to the success of the industry and have not played a role beyond simple transactional processing systems. The transportation industry, for example, has been transformed by the digitally disruptive business models of Uber and Lyft; eBay has digitally disrupted fragmented used goods market transactions across the US; and Airbnb and Priceline have revolutionized the lodging and travel industries, respectively. Such successful disruptive models in retail, transportation, entertainment, and secondary marketplaces have all been prompted by challenger firms providing frictionless, efficient, and cost-effective alternatives to incumbent firms' products and services.

Traditionally, the FS sector is more information-centric than the retail industry, more technology-driven than the transportation and lodging firms, and more vital to people's lives than the entertainment services. The FS sector's central element is money. With only 10% of the global money supply existing in its physical form, the financial institutions' principal transactional resource is primarily digitized.[7] The storage, organization, access, retrieval, and transfer of money are simply database operations in most financial transactions worldwide. With the emergence of online accounts, mobile technology, and cloud computing, most financial transactions do not require the physical movement of goods (i.e., money and documents). In stark contrast to the transportation and hotel industries, where principal assets and transactions are still physical, it is intriguing that Airbnb- and Uber-type digital disruptions have not yet materialized even after decades of technology integration in the FS industry.

## Status of FS Digitization

The information-dominant FS industry has witnessed fractional, fragmented, and transactional digitization. Everything that can be digitized is indeed getting digitized, but at different scales, rates, and levels. "Financial technology," a phrase from which the abbreviated term "fintech" is derived, was coined in the early 1990s when Citicorp established the Financial Services Technology Consortium, but the FS firms had adopted computing technology decades before the term became popular. Since the 1960s, computing technology has played a vital role in facilitating financial transactions by removing spatial and temporal barriers. Some prominent examples include ATMs (1960s), credit cards (1970s), online brokerage (1980s), Internet banking (2000s), and mobile banking (2010s). Customers now can submit applications, open accounts, view statements, dispute transactions, pay bills, submit claims, book appointments, deposit checks, and transfer money using online or mobile channels. The integration of technology in the operational processes has helped financial institutions minimize transaction costs and continue growing organically by enabling product-market innovations. This organic growth, along with the M&A-led expansion strategies of the 1990s, has allowed incumbent firms to maintain their stronghold in the FS industry.[8]

*It is intriguing that Airbnb- and Uber-type digital disruptions have not yet materialized even after decades of technology integration in the financial services industry.*

The adoption of technology in the FS industry, however, has occurred on a piecemeal basis, without a strategic or transformative perspective. Firms have continued building digital capabilities but have not entirely harnessed digital technologies' power to improvise efficiencies. The inefficiencies in the banking, insurance, investment, and real estate sectors of the FS industry are striking. After all, it can take 42 days to close a home loan and two business days to clear checks.[9] Even in the post-Internet era of information transparency and disintermediation, the financial intermediation costs in real estate and insurance have shrunk very little. Indeed, the 6% real estate commission is still the reality, resulting in the US home sellers paying an estimated $100 billion to agents annually.[10] By and large, the traditional FS firms have remained ineffective in addressing much of the broader society's FS needs. Today, 6.5% of US households (around 8.5 million people) don't have bank accounts, while as many as 25% remain unbanked or underbanked; approximately 8.5% of the US population is uninsured; and 30% don't have credit cards.[11]

## Pure-Play Fintech

While digitization among the big incumbent FS firms is slow to develop, the fintech pure plays that have emerged over the last decade have focused on

narrow product/market segments and have used new technology platforms to increase the financial sector's efficiencies and effectiveness. Some noteworthy examples include the mobile-first Robinhood for a zero-commission stock trade, Stripe for cost-effective integrated payment processing and payment gateway solutions, Zendrive as an insurtech data intermediary, Xoom for instantaneous global money transfer, Root Insurance as behavior-driven personalized car insurance, and Opendoor for real estate property transactions.

Compared to entertainment, transportation, travel, lodging, and retail, the FS industry is heavily regulated, consolidated, and has already-built digital capabilities. The fintech pure plays have shown efficiency, but many are built on the same business models as the traditional FS businesses. Thus, a genuinely disruptive model challenging the prominent incumbents of the FS industry has not yet emerged.

*While technological developments provide considerable opportunities, the heavily regulated financial services sector cannot fully exploit these opportunities in the absence of a fostering regulatory climate.*

## Factors Affecting FS Digital Transformation

Two primary factors have slowed the pace of digital transformation in the FS industry. First, its strong regulatory nature means that, in many instances, firms require regulatory approval before they adopt new technology to build digital capabilities.[12] For example, the first digital scanners to deposit electronic checks were made possible only after the electronic Check Clearing for the 21st Century Act (Check 21 Act) took effect in the US in 2004.[13] Likewise, there has been an enormous opportunity to develop innovative products and services based on the insight into consumer behavior using data analytics and IoT. However, before the recent implementation of Europe's open banking regulations, such innovations were not practically feasible. The second factor slowing FS digital transformation relates to product and market factors. Customers are highly sensitive to the way financial institutes manage their money. Hence, factors including operational processes, security, and culture all influence the pace of digital transformation in the FS industry.

### *Regulations*

The FS industry directly impacts people's lives and nations' economies. These firms are among the most regulated, in an effort to maintain financial stability, protect consumers, and maintain market confidence. Regulations and guidelines exist for maintaining record-keeping, processing, auditing, securing transactions, and safeguarding customer information. Consequently, the technology enabling today's digital disruption models — cloud computing, IoT, and data analytics/AI — cannot be efficiently and speedily applied in the industry due to myriad security, privacy, audit, and control-related compliance requirements.

Many regulations that do exist are outdated or not updated with the times, creating loopholes or inhibiting innovations, and some pre-Internet era regulations lack specific requirements for online banking. For example, in these days of instantaneous money transfer, current US federal laws allow banks to hold at least some amount from a deposited check for up to three days. Regulations further mandate notarized documentation and appraisal in mortgage closings and "know your customer" and anti-money-laundering guidelines in banking. While technological developments provide considerable opportunities, the heavily regulated FS sector cannot fully exploit these opportunities in the absence of a fostering regulatory climate.

Traditional financial firms have a long experience with regulatory standards, and their business model and processes have evolved accordingly, but the fintech pure plays are relatively new in the business and have less experience with these regulatory frameworks. Typically, fintech companies are online businesses or technology-oriented companies. Apple Pay, Ant Group (formerly Ant Financial and Alipay), and PayPal are affiliated with Apple, Alibaba, and eBay, respectively. Stripe, Robinhood, and Square, on the other hand, were started by technology entrepreneurs. Neither of these two groups of companies have the breadth and depth of regulatory experience of the traditional FS firms. The comply-or-perish reality of the FS sector also slows down the pace of digitization. In many instances, fintech startups must partner with traditional FS firms to capitalize on their regulatory expertise.

## Product/Market Factors

The FS firms are custodians of people's financial assets, making trust, risk mitigation, and security critical requirements for success in the industry. As most financial investments and corresponding transactions now take electronic form, technological adoptions must pass through stringent scrutiny. In addition to their financial assets, FS firms are also responsible for protecting their customers' personally identifiable information (PII). Today's digitally disruptive models like Airbnb, Uber, and Netflix use the public cloud infrastructure of Amazon Web Services (AWS). However, most FS firms are reluctant or slow in moving data and core applications into the cloud due to regulatory guidelines as well as security-related concerns. Security compliance requires adequate supervision and oversight, geographic restrictions, and control over data management before adopting the public cloud infrastructure.[14]

The large volume of customer information that financial institutions hold creates significant opportunities for developing personalized products and maximizing the customer experience. However, these firms must maintain adequate security to highly sensitive data and balance data analytics opportunities with privacy- and security-related compliance requirements. The Payment Card Industry Data Security Standard (PCI DSS)[15] for securing credit and debit card transactions against fraud, for example, and the recent California Consumer Privacy Act (CCPA)[16] for regulating how global businesses can use California residents' personal information apply to both established FS firms and fintech pure plays.

Compliance, risk mitigation, security, and trust are built into the traditional FS firms' legacy business processes. The typical credit card transaction process does not allow direct data exchange between merchants and a customer's bank accounts. These protections result in multiple parties' involvement, including the cardholder, merchant, card association (e.g., Visa, Mastercard), merchant's bank, cardholder's bank, and payment processor, and require a 2%-3% processing fee for each credit card transaction.

The recently revised EU Payment Services Directive (PSD2) aims to protect customers, facilitate innovations, and secure transactions in the online payment sectors.[17] The open banking feature under this directive provides the possibility of direct data transfer between a customer's bank and a merchant, enabling extraordinary efficiency opportunities.[18]

Legacy processes in other FS sectors are complex as well. For instance, as noted earlier, an average mortgage loan closing process takes 42 days and involves many entities, including lenders, borrowers, real estate agents, title companies, insurance companies, home inspectors, notaries, and home appraisers. Most mainstream financial institutes provide a front-end online interface for mortgage applicants to submit various forms. But although it reduces the bank visits and paperwork, such digitization does not improve the process significantly. Likewise, while credit card application and approval can happen in minutes using online or mobile applications, it can take 7-10 business days to get a new card. This is in stark contrast with Apple Card, which one can start using immediately upon approval.

Moreover, many FS business processes are supported by a legacy technology infrastructure.[19] And, in many instances, digital transformation requires replacing this legacy infrastructure, which can have a widespread impact on firms' operations. In the absence of business process reengineering and changes in the technology infrastructure, even in these days of instantaneous real-time possibilities, the incumbent FS firms have continued using the benchmark of days, weeks, and months for many operational transactions.

Thus, the financial institutes' digital transformation requires a significant change in the organizational culture and a fundamental change in mindset. While employees are relatively younger and well in-tune with the technologies, many traditional FS firms still run on the legacy technology infrastructure based on COBOL and mainframes. It is estimated that 60-year-old COBOL systems run $3 trillion worth of daily commerce in FS.[20] COBOL supports checking and savings accounts, debit card networks, ATMs, and mortgage services. The mobile apps and other advanced features are written in new languages, but they need to work seamlessly with legacy COBOL systems. The digital transformation of the FS industry will require a large-scale technological transformative project.

Over the last few decades, primarily through M&As, the legacy IT infrastructure has become increasingly complicated and expensive to replace. The IT infrastructure conversion project for Commonwealth Bank of Australia, for example, took five years and cost more than 1 billion Australian dollars.[21] The risk of such projects' failure is high, resulting in nightmare scenarios like failed transactions and customer information loss. These risks have resulted in procrastination and a risk-averse culture across the industry.[22] The FS firms' culture is to focus on short-term profits and delay risky

long-term projects. The cultural change from "if it isn't broke, don't fix it" to "let us fix it before it breaks" requires a fundamental shift in mindset from top management and the board of directors, and a cultural change must occur on the market side as well. A recent survey finds that 73% of the US population does not use the new-generation online-only bank, popularly known as "neobank" due to satisfaction with the conventional brick-and-mortar bank.[23] There is an inherent inertia among the FS customers to switch to alternative options.[24]

*The evidence of fintech pure plays' financial inclusiveness and efficiency over traditional banking processes became evident during the pandemic.*

## The Response to Pandemic Disruptions

On 13 March 2020, the World Health Organization (WHO) declared the spread of the novel coronavirus, COVID-19, a pandemic, and the US announced a state of emergency. Subsequently, many US states announced shelter-in-place orders causing widespread disruptions in the nation's economy. The unemployment and income instability caused by COVID-19 has resulted in many people having difficulty meeting their credit obligations and many industries struggling to run their operations. Worldwide, governments and businesses have taken steps with exceptional speed to match this pandemic's unprecedented nature.

In the US, the government eased certain regulations specific to the FS industry, and firms, both incumbent and fintech pure plays, moved fast to enable digitization. The Federal Housing Finance Agency (FHFA), for example, adjusted mortgage closing guidelines to allow remote online notarizations (RONs) to replace the requirement of a physical attendance of a notary and paper/stamp notarizations, resulting in a 200% increase in RON usage.[25] Fintech startup Notarize created a secured and encrypted multimedia conferencing and document exchange application to conduct online notary transactions.[26] The FHFA also allowed drive-by appraisals for refinancing and desktop appraisals for home purchase transactions. Moreover, the real estate industry started using 3D room-scanning videos and pictures enabled by fraud-deterring geo-stamping technologies provided by mobile property inspection–based fintech startups like Verisite. About a third of mortgage borrowers closing on properties with low loan-to-value ratio and no red flags were approved for appraisal waiver altogether, improving the overall process both in terms of cost and time.[27]

The need for expanded and inclusive digitization in the banking industry became apparent when, as a part of the Coronavirus Aid, Relief, and Economic Security Act (CARES Act), the US government sent out stimulus payments to the population. While those who had filed taxes and had bank accounts received those payments faster through direct bank deposits, 14% of Americans making less than $40,000 without bank accounts waited for months before receiving the money.[28] Because of the financial, digital, and banking divide, millions of Americans still have not claimed the much-needed stimulus money after six months of passage of the CARES Act. With 260 million US mobile subscribers, the fintech option is more inclusive than direct deposit to bank accounts.[29] Venmo and Cash, fintech payment pure plays, were allowed to distribute stimulus money through direct deposits, and the US Small Business Administration (SBA)–approved fintech companies PayPal and Square to distribute Paycheck Protection Program (PPP) loans. Such regulatory relaxations were vital when more than 25 million of the 30 million small businesses are less likely to have a traditional banking relationship, as they are one-person operations with an average revenue below $50,000.[30] Square reported providing 80,000 PPP loans totaling around $873 million to such small businesses.[31] Fintech pure play Kabbage,[32] with zero prior experience in processing an SBA loan, approved nearly 300,000 small businesses to become the second-largest lender by application volume.

The evidence of fintech pure plays' financial inclusiveness and efficiency over traditional banking processes became evident during the pandemic. Overall, the fintech pure plays arranged 15% of the total PPP loans but handled 75% of the loans that the US Department of Justice (DOJ) has connected to fraud.[33] In its desire to speed the process, the US government allowed applicants to self-certify in attesting their eligibility for the loans, contributing to this financial fraud. The situation exemplifies the necessity of regulations and the significance of regulatory compliance.

As a response to the pandemic, regulatory relaxations were also introduced in the highly regulated healthcare insurance industry. In March, an emergency funding bill was signed to allow all Medicare beneficiaries

to access telehealth coverage regardless of location restrictions. It also allowed out-of-state physicians to virtually treat patients without any licensing requirements. Private health insurance companies were allowed to change their policy midyear to include coverage through telehealth services. In the auto and home insurance sectors, the direct impact of the COVID-19 pandemic on the digital transformation was minimal, as many of them already had full digital capabilities to open and manage accounts and in the processing of claims. AllState insurance company, for example, estimated that 90% of its auto claims would be submitted through virtual tools.[34] However, the pandemic has prompted fast-paced regulatory changes, highlighting the need for secured transactions and changing legacy processes. And the evolving digital consumer culture has sped up these insurance sectors' digital transformations.

The COVID-19 pandemic also has shown how swiftly governments can change compliance requirements, FS firms can reengineer their processes, fintechs can expand into unchartered territories, and customers can adopt digital channels. The digital transformation of the FS industry has been inevitable. Due to the pandemic, key stakeholders have realized the immediate need and have figured out how to address the inhibiting regulatory and product/market factors to speed up the transformation.

## The Road Ahead

The COVID-19 pandemic has clearly shown that the debate and procrastination over digital transformation should be over, be it in higher education, healthcare, or the FS sector. The FS industry has successfully transitioned following the major relevant events in the last two decades, including Y2K, 9/11, and the global financial crisis. They have accomplished that by changing their processes, adopting new technologies, enhancing security, and complying with additional regulations.

FS firms have been integrating computing technologies in their operations for decades and have built up digital capabilities. The slow pace of digitization in the FS industry is partially attributed to the inherent product/market characteristics and strict regulatory climate. Some emerging fintech models are exciting and innovative but not challenging to replicate because they are primarily based on the old FS models with the new technologies. But COVID-19 has revealed the urgency for government regulatory changes. It has highlighted the rapid changes in the digital culture as well as the need for changes in financial institutes' business processes and enhancement in security and risk mitigation practices.

Amid this changing environment, major incumbent FS firms will significantly enhance their digital capabilities by initiating massive IT infrastructure migration projects, merging with or acquiring financial institutions with low digital capabilities, or acquiring or partnering with the fintech pure plays, which are here to stay. The nature of regulatory development is still to be seen and may lead to a different set of outcomes. And Big Tech, with the interest it has already shown in the FS sector, will play a significant disruptive role with its unparalleled digital capabilities and resources.

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THE FUTURE IS UPON US

# The Challenges in the Race to Banking Innovation

by Cintia Guerrero-Castanon, Reema Jan, and Mahesh S. Raisinghani

The banking industry has evolved substantially over the past few years due to the advancement of emerging technology. Today, we know that technology has significantly helped customers modify their banking processes more easily and efficiently, but at the same time, it has generated significant concerns such as those around information security. As we explore in this article, an awareness of how improved technology has altered the experience of the banking industry is vital to invoke future infrastructures in assisting customers. Ensuring that customers have improved experiences and seeing where the banking industry is headed because of IT advancements can only be done by looking at potential threats, such as the COVID-19 pandemic, previous technological banking exposure, and how continued enhancements affect the banking and financial industries.

A key question is whether technological advancement facilitates or complicates the banking industry. Financial technology (fintech) startup companies use online software to provide financial services and are creating the biggest disturbance in traditional banking today — not just technologically, but also in operations, culture, and, most importantly, customer service. These technologies, along with increased Internet use and availability, have changed some of the ways people bank. Internet and mobile banking are becoming a self-service delivery channel, and these new information technologies have lowered the barrier of entry in the finance industry.[1] Customers today want self-service options to expedite the delivery of their needs; therefore, financial institutions need to continually provide virtual advancements and options such as products and solutions to increase user experience and satisfaction, while simultaneously ensuring that consumers' privacy and security are not compromised.

## The Evolution of Banking

With the increase in fintechs and other technological advancements in the industry, financial institutions have seen many recent IT innovations and products. Banking has traditionally been a non-virtual business, but this trend has changed. Previously, consumers would drive to their local financial centers for in-person assistance with tellers or bankers, making the entire process very brick-and-mortar. Banks were fully staffed until about five to seven years ago; today, a staffed teller line and a lobby full of people ready to assist is an alien concept.

Slowly, banks began to introduce simple developments, such as automated teller machines (ATMs) for digitized transactional experiences, including withdrawals and deposits. While the adoption rate was initially slow, clients eventually became more comfortable with self-service options. These transitions and progressions in technology created the initial shift in decreased staffing at financial centers and began the technological evolution in banking.

### *Technological Advancements*

ATMs and computerized online banking were among the first major technological advancements in the industry. ATMs carried cash in limited denominations where customers could withdraw a certain amount of money without having to visit a teller. Online banking enabled consumers to access their accounts virtually to review balances and transactions, access previous statements, order checks, and replace debit and credit cards. These two advancements led to the many additional enhancements and options now available to consumers in both personal and commercial capacities. But perhaps one of the greatest and most convenient technological progressions in this industry was the creation of mobile banking.

### *Mobile Banking*

Mobile banking is a major part of technological delivery and is still being revolutionized. Mobile banking is defined as an operation where a user (the customer) is able to check his or her device for services a bank usually provides, such as reviewing and managing bank accounts.[2] Mobile banking (aka m-banking) is an alternative delivery channel for the financial and

nonfinancial services, similar to an ATM. Generally, any virtual, electronically completed transaction that does not directly involve a bank in the "instrumental gratification of a service offered" is considered mobile banking.[3]

The goal of both mobile and Web banking (aka Internet banking and online banking) is to provide mobile services.[4] Mobile services comprise eight components: (1) efficiency, (2) fulfillment, (3) system availability, (4) privacy and assurance, (5) responsiveness, (6) compensation, (7) contact, and (8) personalization. Research has found that, when mobile services are offered in both mobile application and Web platforms, what customers considered most important depends on the customer's age.[5] More specifically, customers in older generations heavily based their decision on the use of either mobile applications or Web platforms on security and privacy as well as having a source of customer service for assistance. This additional resource was necessary because the usage among these customers was lower due to less technology adaptability. On the contrary, younger users of mobile applications or Web platforms focused more on completing their transactions on-the-go and quickly, and were concerned as well with information security.[6] Although mobile banking has satisfied some customer needs and desires, continual improvements and changes are necessary for mobile banking to continue to increase customer satisfaction across generations.

## Open Banking

Open banking provides third-party financial services providers access to consumer banking, transaction, and other financial data from banks and nonbank financial institutions by using application programming interfaces (APIs). Open banking has the potential to disrupt the retail banking sector in the coming years. Similar to mobile banking, open banking shares information electronically and securely with third-party providers to collect information on trends and processes in an effort to continually grow and advance technologically, eventually creating new products or services that can be beneficial from a process or efficiency perspective. Open banking has become the primary model for banks and regulators alike; the ever-improving concept will soon provide consumers with better options to manage their money as well as many other functionalities currently under development.

While open banking could benefit consumers by increasing competition, it could also have the opposite effect due to misuse of private financial data as well as increased consumer costs if it leads to consolidation in financial services due to the natural economies of scale from big data and network effects.[7] In the short time open banking has been running, it has been well received and adopted. Although much work is still required for true success, open banking has allowed third parties to develop their own products more rapidly with the current framework. As open banking strives to grow and develop, the focus will remain on offering high-performing APIs without technical barriers so that third-party providers can continue to build trustworthy services.[8]

## Digital-Only Banking

Digital-only banking is digitizing every aspect of banking; from front- to back-end processes with API-enabled, digitally agile platforms. Digital banks rely on artificial intelligence (AI) to automate processes such as data processing and administrative tasks. Increased customer demands in digital banking services have caused a surge of digital-only banking options. Revolut, for example, serves over 12 million customers globally with zero branch presence.[9] With most services offered online via self-service or virtual options, brick-and-mortar banking is rapidly changing and decreasing. While established brick-and-mortar financial institutions are growing their AI and continually providing enhancements, digital-only banks are positioned to transcend traditional banking due to their ability to meet the needs of today's tech-savvy clients.[10]

## Disadvantages of Technological Advancements

Many technological advancements face a level of scrutiny, concern, and reluctance, especially in the banking industry. Security breaches are a primary and understandable concern for consumers of banking due to the potential exposure of confidential financial information. According to the American Bankers Association, banks use sophisticated technology and monitoring techniques to secure customer data.[11] This includes intricate firewalls and various levels of security to safeguard personal information. Despite these measures, however, there have been many successful attacks via malicious software that has been unknowingly downloaded to customers' devices when they accept fake requests or access infected attachments.

Technological advancements also represent enormous cost to companies, but while expensive to implement, such innovation is still considered a worthwhile investment due to its long-term abilities and efficiencies. One such cost that comes with the increase in IT is maintaining a team with expertise in banking and financial services as well as the costs associated with data analysis. While technology is a great enabler, it also presents high-impact risks such as data theft and destroyed files and information. A well-informed team that understands the technology landscape is needed to manage any privacy and/or security challenges that may arise.

## Challenges of Evolving Technology in Banking

Cultural and infrastructural challenges are among the key challenges facing the banking industry with the evolvement of technology. Cultural differences and lack of human/financial/technology/infrastructure resources are factors that impact the diffusion of innovations in banking and its adoption of digital and/or open banking in different countries.[12] Culture can strongly influence inputs and create differences in beliefs and behaviors. As an example, a cultural inclination to avoid uncertainty may prevent technology adoption. Lack of resources may also keep individuals and/or organizations in a country from investing in and adopting innovations in banking technology.

### *Current and Future Trends in the Banking Industry*

After seeing everything that has transpired due to the evolution of technology in banking, it is hard to imagine what the future will hold. How secure is information in the banking industry? Will technology eliminate the need for face-to-face communication employment? To date, there is not sufficient technology present to fully meet the banking industry's needs.

### *Information Security*

Data breaches have the potential to be very costly and are therefore a major concern in the banking industry. Organizations must consider staff, internal processes, information systems, and external factors at a deeper level to ensure that information is secure.[13] For instance, the staff has the potential to maintain confidentiality; however, if not professionally trained on how to handle internally related items, the risk of information being leaked is quite high. In fact, a recent study of information security awareness programs found that most users were aware of risks while using a mobile or computer type of device, but failed to see the threats to themselves of minor errors, such as choosing weak passwords.[14]

A wide variety of Web application threats — such as spoofing, tampering, repudiation, denial of service, information disclosure, and elevation of privilege — lead to the potential for technical breaches and software hacks that threaten banking. General threats for servers and clients include technical attacks (e.g., malware, keystroke loggers, network scanning software, sniffer software), and nontechnical vulnerabilities (e.g., natural disasters such as hurricanes, tornadoes, earthquakes, or fires; or social engineering by which attackers get a victim to comply with a request to divulge sensitive information or provide access to privileged information through manipulation, deception, and influence). Addressing these threats requires organizations to implement proper policies and procedures for backup systems and failover systems, security and risk management security engineering (e.g., cryptography), communications and network security, identity and access management, security assessment and testing, software development security, and security monitoring systems to address incidents and attacks.

### *APIs*

Theoretically, APIs should reduce fees and make the experience more user-friendly (e.g., Apple Pay and Google Pay for contactless payments), but sometimes due to inadequate device security, these efficiencies can instead pose a security threat for the consumer.[15] In providing the customer a simplified experience via APIs, banks must also invest in establishing a secure infrastructure and provide end-to-end data encryption and security for all solutions presented.

## The Future of Banking

While there is enough evidence to show how today's information systems will positively impact parts of the banking industry, the lack of resources in underdeveloped and underbanked countries cannot foresee such changes as quickly. Digital transformation can certainly benefit these countries; however, development will take time and money. Countries in Africa and the Middle

East where microfinancing is prevalent are using AI in some locations to improve data collection and streamline credit decisions. However, since many of these countries are heavily cash-based and only a third of the population have bank accounts, a weak digital infrastructure prevents certain enhancements of financial services, and the human aspect remains critical.[16] The lack of standard processes and weak infrastructures are preventing the shift toward digital banking. The scope is there but change management is limited; therefore, the process will take much money and effort to expand.

Another fintech frontier is investment platforms, where insurgents are pushing forward. For example, the Robinhood app has more mobile monthly active users than the top legacy brokerage firms such as E*TRADE, TD Ameritrade, Edward Jones, and Fidelity, combined. Quarterly downloads of the top investment-based finance apps (e.g., Robinhood, Acorns, Stash, Betterment) have collectively grown 126% from Q4 2015 through Q3 2019.[17] Robinhood's no-fee trading has already forced legacy brokerages to eliminate commissions, and its ease of access and self-service and portable options continue to lead the others. Future opportunities for fintechs, insurtech, and proptech (property technology) companies to thrive include partnerships, serving the gig economy and the underbanked, playing a part in disbursing government aid, or developing entirely new products and services (e.g., Charles Schwab and Fidelity's Slice that allow you to invest in fractional shares), and could have a significant impact on the banking industry.[18] Technology is changing the way the finance industry operates and delivers services. The overall market is undergoing a major transformation leveraging new and cutting-edge technologies. Fintech solutions that leverage data enrichment provide a way for legacy financial institutions to improve customer retention and preference. Fintech companies are now leading the industry and are creating a wide range of new financial products and services (e.g., enhanced loan portfolio diversification) with the purpose of making money management easier and more effective.

## *Impact of COVID-19 on Banking Industry*

The COVID-19 pandemic brought banking transformation and digitization to the forefront due to economic shutdowns and social distancing obligations. Most economists are already predicting an acceleration in the trend toward automation during the post-COVID recovery. In some areas, physical bank locations have closed either indefinitely or temporarily. Reopening of certain locations was expected when cases were significantly less, but this has not yet occurred. Many branch locations, especially smaller banks, are operating by drive-thru only, therefore, limiting the traditional in-bank services provided. Banks will have to continue to embrace digital transformation in all aspects, retail and corporate, to remain competitive. Technology can also fill a growing talent gap and leave investigative teams with more time to focus on value-adding tasks, such as identifying structuring, money laundering, and other illegal activities as well as focusing more on fraud investigations and the improvement of security and control.

Business for PayPal and Square has been turbocharged by consumers that shifted from cash to digital payments during the COVID-19 pandemic; the companies have added record new accounts this year and have seen payments volumes surge. Previously known traditional aspects of banking have been dismissed as options due to the requirements of physical touch, whether at a financial center or an ATM; either of which can increase the chances to transmit COVID-19. Money flow has slowed down for big and small corporations as well as individuals, as the pandemic caused most cities to mandate complete lockdowns and quarantine protocols, with the exception of emergency necessities. Though COVID-19 has rapidly increased technology consumption and decreased face-to-face interactions, it will not altogether eliminate the banking and financial services sector we know of today. Many consumers are still being redirected from online banking interactions to physical locations to sign certain agreements or documents.

While digital transformations have long been a desired goal for banking, COVID-19 made it a necessity and a growing demand of consumers. With sudden changes in businesses and mandatory lockdowns, banks were required to act swiftly to modify operations and processes and accelerate digital transformations and capabilities, not only from a business continuity perspective but also with ongoing support. Fintechs have a well-placed business model with a focus on customer value propositions, key processes, vital resources, and revenue models to sustain the increased demand of cloud-enabled services.

Since the COVID-19 outbreak, we have witnessed major changes in banking in areas such as credit extensions and investment returns. While this may have been a trend already in the making, the pandemic has expedited these changes, leading to some vulnerable situations for both personal and commercial consumers.

In these situations, fintech's experience in digital adaptation combined with existing banking operations may prove beneficial for the transformation of the banking industry, enabling adequate growth and expanded functionality. Technological advancements implemented with the appropriate controls for privacy and security could serve as an opportunity for the banking industry. With constant vigilance, digital forensics, and application of thoughtful controls and defense strategies to counter potential vulnerabilities, organizations can use these technological advancements to succeed in today's banking environment and prepare themselves for the future.

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FOLLOW THE LOOP

# Accelerating the Quest for Alpha with AI:
## Pandemic Highlights AI Advantages

by Joseph Byrum

The post-pandemic world is filled with uncertainty. Entire lines of business, from cinema chains to cruise lines, face real questions about whether they will have a viable business model going forward. This article reviews how utilizing artificial intelligence (AI) tools based on the US military's OODA loop conceptual framework (developed by USAF Colonel John Boyd) can assist investment managers in navigating these difficult times. We examine how they can make more money by maximizing their situational awareness — something that's critical in today's turbulent times.

The present circumstances make the investment manager's *quest for alpha* (i.e., achieving returns that exceed those of other common investment vehicles such as index funds) far more complex. One day, the investment manager sees a series of "worst evers" — worst employment losses, worst earnings reports,[1] worst one-day stock market loss — only to be followed by signs of rapid recovery, including surges in employment on the next. There's no question that the market is radically reshaping itself with changes like the overnight embrace of "working from home," which is likely to stick around for good. None of what happened in 2020 could have been anticipated by anyone making plans in early 2019.

Given the unprecedented nature of today's climate, how does a traditional investment manager know what to do? The usual reliance on what has always worked in the past is certainly not a viable option. AI tools, on the other hand, provide a powerful alternative. They replace the "art" of investing with tools that exploit knowledge and science to help achieve alpha. With decisions bolstered by the machine's analysis of potential options, investors can rest assured that their decisions have a greater chance of success. Decision support tools aren't rattled by unexpected turns in the market. Rather, AI tools are "eager" to make the most of such scenarios to find opportunity — which is exactly what companies needed right now. But this option is only available to those companies willing to undergo the significant cultural changes required to develop and implement this new way of doing things.

## The OODA Loop Philosophy

The first step in building advanced, AI-backed financial decision support tools is to understand, systematize, and optimize the process investment managers use in their work. In the 1950s, the mostly analog world of fighter pilots developed the OODA loop[2] as a conceptual framework for gaining an advantage over adversaries in aerial combat. These techniques can be applied today to complex financial decisions to gain an advantage over adversaries in the modern business world.

It's often said that military plans go out the window once the chaos of battle has begun. This is another way of saying reality is far too complex for any scenario to play out exactly as anticipated. But that's not to say there's no point in creating a plan in the first place. As US President Dwight D. Eisenhower said, "Plans are worthless, but planning is everything."[3] By that, he meant the exercise of creating scenarios and developing options prepared leaders for what was to come, even if none of the events followed the original plan's outline. The leader who fails to engage in planning is unable to work "intelligently" and will not adapt as quickly to the circumstances. As much in finance as the military, the ability to adapt is key to success.

So an investment manager's plan of action is less about predicting the future with perfect accuracy and more about identifying trends and quickly changing course to take advantage of them. The ultimate goal is to beat the competition (i.e., achieve alpha) in the ever-changing chaos of the market. As the market is rooted in human nature and human choices, it's hard to anticipate which way it will go one day to the next. The discipline of the OODA loop framework can help managers develop the mental agility needed to make the most of what happens.

## The Process as Applied to Finance

The four steps of the loop are: observe, orient, decide, and act. In the *observe* stage, one takes in data uncolored by preconceived notions of what the data means. The key is to look at "just the facts" without attempting to apply any analysis. Not every piece of information is going to be accurate, and no one data point will tell the whole story. The idea is to absorb as much high-quality information as possible to gain an understanding of the current situation.

*Orient* is the key stage of formulating models that make sense of the data that has been received. For instance, after taking note that the markets are down but fundamentals are strong, one interpretation would suggest that a rebound is likely because the downturn was temporary. Another might suggest that the markets are down because there's uncertainty about whether recovery is possible at all in the next few months, so a rebound is unlikely. The key skill that determines success is the ability to entertain several of these interpretations, developing new ones as the facts change.

Which interpretation or model is the right model? That's what you choose in the *decide* stage, where you select the explanation and course of action that best fits the data (e.g., "buy the dip" if you think rebound is coming, sell if you think otherwise). The answer changes as the market changes (e.g., online grocery delivery was a flop when Webvan gave it a go during the dot-com bubble,[4] but it's definitely a potentially great business model during today's widespread stay-at-home orders).

Once you've made that call, it's time to *act*, which is the stage where you execute your choice and then evaluate the results. It's called a "loop" because as soon you make your choice, you've changed the market environment. So you need to go back and observe the results and then adjust your response in light of any new data, as needed. The process constantly repeats until you've accomplished what you set out to do. This is a critical aspect of the framework, forcing the investment manager to evaluate and reevaluate situations and measure whether any given strategy is working or not. So, instead of assuming something ought to work, this is a process of continual validation. Ideas that aren't working can be dropped; angles yielding results can be expanded. This way of doing things helps the investment manager adapt quickly to confusing, chaotic, and constantly changing circumstances by developing a greater awareness of what is happening, and why.

Thus, the investment manager must develop agility of mind, and that's also a key factor to use in evaluating investment options. COVID-19 was a systematic risk that shocked the financial system. How companies respond to the crisis offers insight into their prospects for success in the post-pandemic world. The companies that were quick to adapt to the unusual circumstances are likely to fare best. The companies that stick to the old ways of doing things are less likely to succeed in the long run because the market has changed dramatically.

## Applying AI to Optimize Financial Decision Making

AI can help optimize the process that investment managers use to make these judgment calls. The technology's greatest strength is its ability to relieve humans of the tedium of number crunching and pattern recognition. So when it comes to "observing" data, AI can't be beat. It can collect all the numbers in real time and sort them in a usable way.

As a practical matter, however, ingesting the information is no easy task. Large companies, particularly those that are the product of multiple mergers and acquisitions, tend to accumulate systems without replacing them over the years, or even decades. Financial data often lives in multiple computer systems that speak different languages and are formatted in contradictory ways. Legacy systems are so prevalent that the job prospects are bright for Fortran developers and software engineers fluent in half-century-old programming languages like COBOL,[5] both of which are widely used across several industries, even in 2020. Some defend these languages even today, as Fortran[6] is still in active development. But use of legacy systems creates real problems, as government unemployment offices found when their benefit systems written in COBOL couldn't scale to meet the COVID-19 demand. Retirees had to be called back into service to help migrate to newer systems.[7] Nearly three decades ago, the US Government Accountability Office (GAO) warned that sticking with old COBOL programs and mainframes "because they work"[8] was wasting expensive computer resources at federal agencies.[9]

Generally speaking, it's best to avoid falling into the sunk costs trap and invest up front in updating systems to take advantage of all that AI has to offer. The alternative is to go down the frustrating — and potentially more expensive — road of trying to adapt old systems. Starting from scratch ensures the data is

collected in the right way. This can be a major undertaking, one that requires a cultural shift in the organization. In that case, advocates of the old ways of doing things will surely object, defending their particular system as the one that doesn't need to change. Successful companies need to be agile in all respects, and that includes their IT systems. Such systems should never be seen as static, build-once undertakings.

## Creating Market Insight with Textual Analytics

AI systems are dynamic, implementing a continuous process of observing data. For example, they can use natural language processing to absorb written reports and news items that often contain information that is essential to insight-driven businesses like the financial industry. Imagine how much more effective financial analysts and portfolio managers could be if they could enhance their understanding by surveying social media and other rich sources of business information in real time, drawing out the key developments and trends that would inform their choices. AI can also prioritize information flow so that it does not become overwhelming for the investment manager.

No human could possibly read everything, but a machine can. The best you can do with old-fashioned methods is to hire experts to sample a subset of the relevant data and produce written market insight reports. While these studies can be extremely useful, the resulting analysis is constrained by the amount of data sampled. Many companies already use forms of automation to sort through the data with machines, but, in the end, humans still have to read the data and decide what it means. Moreover, AI can help orient the analyst toward discovering what the information really means. Expert systems use cognitive engines that examine why something is happening, presenting possible scenarios to the analyst who will ultimately take the options presented and decide what to do.

The Defense Advanced Research Projects Agency (DARPA) Pilot's Associate program[10] from the 1990s was the first expert system designed to go beyond data collection to assist with decision making. This wasn't an autopilot system. The idea behind the project was to take all the low-level decisions away from the pilot, so that the pilot could focus attention on the higher-level tasks that require human expertise. The system had four components that (1) reported on the status of the aircraft systems, (2) provided an assessment of the external environment, (3) helped plan the mission, and (4) assisted with short-term tactics to fulfill the mission.

The system could, for example, find the nearest airbase within range for landing after the aircraft spent longer than expected performing the mission. Rather than producing a list of every airbase, it would compute all the relevant factors and propose the "best" one — relieving the pilot of the burden of figuring all that out in the middle of a stressful situation. More importantly, it could determine the best path and maneuvers needed to avoid an enemy missile. It did so by making inferences based on knowledge baked into the programming by expert pilots.

Ground-based simulators proved that the technology worked, but DARPA realized at the time that the system envisioned was way ahead of what software and hardware could deliver in an airworthy package. That situation has finally changed, and AI will now be baked into the next-generation of fighter aircraft with the explicit goal of increasing the speed of closing the OODA loop.[11]

In finance, hardware and software are finally powerful enough to fulfill the promise of augmented intelligence. AI offers an information-based, scientific approach that constantly reevaluates and assesses the situation so the investment manager is ready to achieve alpha by taking advantage of the opportunities that others miss. The system leverages the composite of all company, product, and customer experience data, including all unstructured and structured data. It then automates the process of delivering insights by identifying the "what and why" that underlies behavior.

## Man vs. Machine

While AI does a lot, it's neither possible, nor desirable, to automate the process fully. Letting automation loose can create implementation issues, such as those that saw Knight Capital Group implode eight years ago. The company lost nearly half a billion dollars after an out-of-control automated trading algorithm made US $6.7 billion in highly risky trades in a matter of minutes.[12]

As a matter of ethics, humans must remain in control as the ultimate safeguard against colossal error. But even if you could devise an error-free system, human involvement would still offer more value than a fully autonomous system — for a simple reason. The complexity of the market goes far beyond anything programmers could ever foresee. In the absence of artificial general

intelligence (AGI) — if AGI is even possible — machines will never understand in the way a human can.

A machine can't, for example, model unknowns like COVID-19 or the public's response to the crisis. Human experts grasp the situation in ways the machine cannot, and they're able to make judgment calls as the situation unfolds. The machine's role is to supply fuller information about what is happening and to provide enhanced analysis, which allows the human to make better-informed decisions. Thus, the combination of man and machine achieves more than either one could achieve on its own.

## AI's Impact on the Industry and the Importance of Culture

Seasoned practitioners are always going to be in demand to make the most of augmented intelligence systems, but deployment of AI systems will necessarily cause disruption because the roles in an organization necessarily change as the organization reshapes itself.

Startup financial companies have a natural advantage in fielding AI systems that can give them a competitive advantage against incumbent players. Their small size comes with the ability to adapt quickly and reorganize in a way that suits the latest technology developments. But there's still a lot to be said for the incumbents, which have scale on their side. Their development efforts draw on greater resources and a much larger pool of talent. This is a considerable advantage when it comes to developing massive, game-changing AI systems.

But success is hardly a given for big companies, as they need the will to do what it takes to exercise that advantage. As a quote often attributed to Peter Drucker puts it, "Culture eats strategy for breakfast." This means that the leadership and workforce need to all be on the same page to be able to pivot, adapt, and implement changes in the way essential functions are performed. To succeed, a company must be willing to embrace the disruption, which can mean acknowledging when the existing talent pool is not necessarily fit for purpose, and that new talent needs to be brought on board. Experts at a company also need to be willing to abstract the knowledge they have — which many see as their "job security" — and embed it in the AI systems instead of keeping the knowledge locked in their head. That way, everyone in the organization can use the tools and benefit from their wisdom.

In many ways, achieving the intelligent enterprise of tomorrow is as much a problem of culture as it is one of technology. The culture of success is the one that sees investment management as a continuous research project, one that needs a constantly adapting system to make the most of it. AI modeled on the OODA loop provides the framework investment managers need to be aware of the current circumstances and as prepared as possible for the economic disruptions of tomorrow, which could just as easily be just as extreme — but hopefully in a positive direction — as what we've seen so far in 2020.

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THE PATH FORWARD

# Ireland Post-Pandemic:
## Utilizing AI to Kick-Start Economic Recovery

by Denis Dennehy

As countries emerge from national and regional lockdowns due to the COVID-19 pandemic, economies are on the brink of a deep global depression, and societies must learn to navigate the unchartered "new normal." Despite these challenges, the pandemic presents an opportunity for business leaders, entrepreneurs, policy makers, politicians, funding agencies, academics, and society as a whole to reflect on how artificial intelligence (AI) can be utilized for economic gains and social good. This article moves beyond the hype that surrounds AI by taking a look at real-world examples of indigenous Irish companies and multinationals that have established an AI presence in Ireland. These case studies reveal four key strategic areas that can kick-start the economy and transform how people live and work: (1) agriculture, (2) smart manufacturing and supply chains, (3) education, and (4) smarter products and services. We conclude the article by issuing a call for action for the development of a national AI and data strategy and share implications for other countries.

## Ireland's Economic Context: Past, Present & Future

As the Irish economy shifts from recession to depression, public figures will likely draw on lessons learned from previous "boom and bust" cycles and use Ireland's low tax regimes to attract foreign direct investment to kick-start economic growth. But we must wean off our dependency on creative accounting and build an economy that is itself creative and innovative. AI-powered innovation can address many economic and societal problems in the midst of this depression, from better healthcare to improved public services, from higher productivity to efficient manufacturing, and from cleaner transport to sustainable energy.

The recovery won't be V-shaped, but it could be AI-powered. The impact of COVID-19 on global economies is potentially catastrophic, behaving like a "once-in-a-century pathogen."[1] In fact, much of the hospitality industry in Ireland remains in lockdown, with severe ramifications in other sectors and in public finances. The retail sector is also extremely challenged, with downstream impacts on manufacturing and other areas of the supply chain.

Forecasts of V-shaped recoveries are already proving to be overly optimistic, but AI could prove critically important to Ireland's emergence from the pandemic-induced recession. Far from leading to the destruction of jobs, AI could lead to a renaissance in the Irish economy with strategic investment in this powerful suite of technologies and its application to key areas such as agriculture, education, and manufacturing. COVID-19 currently presents a tremendous, paralyzing threat to our very existence as a society, and AI is a potential tool for resuscitation.

The real benefits of AI are frequently overshadowed by the concerns surrounding weaponizing of AI for military use, invasion of privacy, job losses, and bias algorithms. Ironically, we must move beyond our bias thinking about AI. This requires us to shift our thinking about AI as a growing niche area to using it as a foundation of the Irish economy. We must move past parochial politics by asking how we can utilize AI to benefit Irish society.

While it is true that AI will eliminate the need for many different kinds of jobs in many different industries, it will also create new jobs in other categories (e.g., data scientists) as well as more roles that have not yet been discovered. A recent World Economic Forum report estimates that "75 million jobs may be displaced by a shift in the division of labor between humans and machines, while 133 million new roles may emerge that are more adapted to the new division of labor between humans [and AI]."[2] These new roles include AI specialists, big data specialists, process automation experts, information security analysts, user experience and human-machine interaction designers, robotics engineers, and blockchain specialists.

AI will also enhance and redesign the activities of other professions, including accountants, educators, doctors, secretaries, and financial specialists. Experts will be needed to determine the best type of AI (e.g., expert systems or machine learning [ML]) to use for a particular application, to develop and train the models, and to maintain the systems as needed. In fields such as security, where vendors have AI-empowered security software, it's up to users — the security analysts — to understand the new capabilities and put them to the best possible use. At its most basic level, AI is a collection of technologies that combines large quantities of data, algorithms, and computing power to focus on a single task (e.g., face recognition and content recommendations, such as videos on Netflix), known as "narrow AI." At another level, AI technologies aspire to replicate human behavior (known as "artificial general intelligence," or AGI).

History has shown that new technologies create a plethora of new jobs. For example, from Web technologies in the mid-1990s emerged new roles and careers such as Web designer and online marketer. In a 2010 study by the University of California, Berkeley, Professor Enrico Moretti found that, while there are fewer new jobs created directly by technological advances, one additional technology job creates around five new, complementary jobs in the local, non-tradable sector.[3] History has also shown that technology, by itself, does not lead to a profitable enterprise. (Let us not forget the dot.com crash in 2001.) An unambiguous strategy, visionary leadership, and clear use cases of AI will drive digital transformation.

New technology is not a new phenomenon. In fact, we can trace the roots of modern AI back to the legendary Greek scientists and their efforts to track and predict the lunar and solar eclipses, as well as solar, lunar, and planetary positions. Known as the "Antikythera mechanism," it is the "world's first computer" and is more than 2,000 years old.[4] This astronomical calendar, or calculator, was discovered in a shipwreck off the coast of Crete in 1901 and predates other known examples of similar technology by more than 1,000 years.

Just as the ancient Greeks believed that AI imbues civilization with more rather than less power, Ireland can utilize AI for economic gains and social good. Ireland, like other countries, exists within a global data ecosystem, where data is generated and consumed beyond the imagination of those Greek scientists. As an example, on each day in 2019, Europeans sent 500 million tweets, delivered 294 billion emails, wrote 65 billion messages on WhatsApp, and made 5 billion online searches.[5]

Indeed, AI is increasingly seen as a great transformative technology, but it has been overshadowed by ethical controversies such as predictive policing, facial recognition, and biases in algorithms that can result in discrimination and exclusion. Rigorous research into governance and auditing frameworks that support the responsible development, deployment, and use of AI systems largely remains understudied and undervalued as there is an absence of public engagement and discourse.

## AI for Social Good

Most of us already encounter AI in our daily lives with services such as Netflix and Amazon using AI and predictive technology to analyze billions of records to suggest films, books, and other items we might like based on our previous reactions and choices and those of others like us. But the potential of AI goes far beyond entertainment and shopping services.

Even before turning to AI to fight the global spread of COVID-19, the technology had been used to fight other virus outbreaks. For example, IBM's Research Science for Social Good initiative, in collaboration with the Cary Institute of Ecosystem Studies, developed an AI-based model that helps stop the spread of the deadly Zika virus. The ML model analyzes data on viruses and the primates that carry them then, comparing these traits to 364 primate species around the world, it identifies known carriers with 82% accuracy, assigns risk scores to other likely Zika carriers, then produces an interactive map showing where people are most at risk.[6]

In another example, in an effort to anticipate flu outbreaks, GlaxoSmithKline created targeted advertising campaigns throughout Indonesia for its vitamin products. The AI-empowered geospatial data model, which cost around US $105k to develop, analyzed multiple data sources (i.e., social media, weather, historic prescription information) and could accurately predict flu outbreaks four to five days before they became known to local authorities. The model was later provided free to the UK National Health Service to predict cold and flu outbreaks in an effort to improve management of urgent care waiting times.[7]

These use cases showcase the many, often hidden, ways that AI is making the world a better and healthier place.

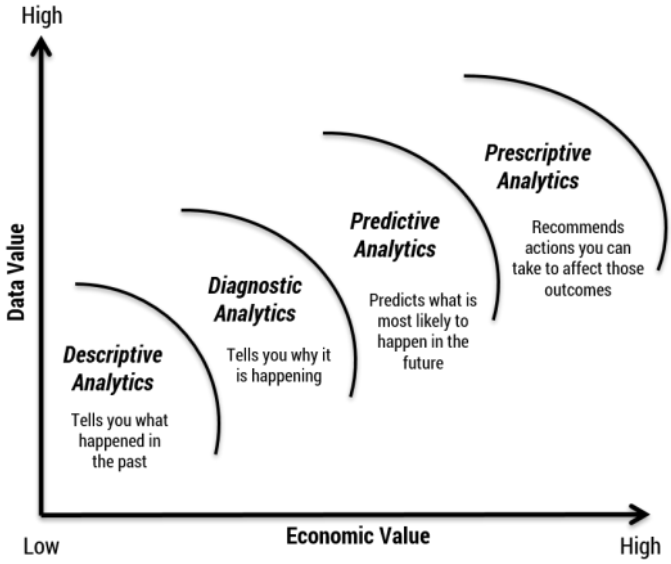


Figure 1 — Economic value of data innovation.

In response to the COVID-19 pandemic, much attention has been directed to understanding *what* happened, by using descriptive analytics (see Figure 1), and *why* it is happening, by using diagnostic analytics to build a COVID-19 model. Yet, the real value of AI is that we could use it to predict more accurately what will happen in the future and even prescribe actions to arrest the spread of the deadly virus.

## AI-Powered Innovation & Economic Growth

The scale of the opportunity is breathtaking. Predictions show that global spending on AI will reach nearly US $98 billion in 2023, more than twice the $37.5 billion that was spent in 2019.[8] Market intelligence firm Tractica recently estimated that the AI software market will reach over $126 billion in annual worldwide revenue by 2025, a massive increase from the $10.1 billion spent in 2019.[9] PwC predicts that AI could contribute $15.7 trillion to the global economy by 2030,[10] and a recent report by KPMG on the transformational power of AI on the enterprise concludes that:

> AI will continue to play a major role in the development of new business, financial, and operating models in the 21st century. The investments being made today by some of the world's largest companies will have an enormous influence on both the global economy and its workforce and has the potential to create new winners and losers.[11]

Looking to Europe, the European Commission's European data strategy forecasts the value of the data economy to the EU to reach €829 billion (5.8% of EU GDP) and generate employment for over 10 million data professionals by 2025.[12]

In Ireland, AI-powered innovation can address many of our societal problems in the midst of the current depression — from better healthcare to improved public services, from higher productivity to efficient manufacturing, from cleaner transport to sustainable energy, and from basic descriptive analytics to real-time predictive and prescriptive analytics. Ireland has the potential to establish itself as a global leader in the development and application of AI in several strategic areas, including agriculture, smart manufacturing and supply chains, education, and smarter products and services. Let's take a closer look at each of these areas.

### *Strategic Area 1: Agriculture*

Irish agriculture faces a near-existential crisis as a result of climate change and the actions proposed to address it. The deployment of AI-powered solutions on Irish farms can increase agricultural productivity while at the same time address climate impacts such as greenhouse gas emissions.

AI holds the promise of driving an agricultural revolution at a time when the world will need to produce an estimated 50% more food by 2050.[13] AI applications in agriculture — ranging from analyzing the soil, to predicting which crops will deliver the best returns, to predicting changes in the weather — help farmers optimize crop yields while using resources more sustainably. Embedding AI capabilities into Irish agriculture will safeguard the economy from interruptions to food supply chains and enable the farming sector to tap into the anticipated growth in food consumption.

AI is already being used to control autonomous farm machinery to optimize fertilizer applications, and robotic milking is now a feature of dairy farming. Even more exciting is the use of AI to assist with cattle genomics to breed animals that produce fewer greenhouse gas emissions.

There exists a very real opportunity for Ireland to become a center of excellence for the development of AI-powered smart agriculture solutions that could be exported around the world.

## Strategic Area 2: Smart Manufacturing & Supply Chains

Manufacturers have seen a rapid reshaping and reengineering of global supply chains as a result of the disruption caused by COVID-19. We are already seeing evidence of a trend toward reshoring and near-shoring of certain critical manufacturing activities. Ireland will be able to compete for these investments against lower-cost European competitors by embracing what has become known as the Fourth Industrial Revolution (aka Industry 4.0) and deploying AI to create highly automated smart factories. The same technologies can also be utilized to make existing manufacturing even more competitive, thus insulating it from increasing global trade turbulence.

Industry 4.0 opens up new concepts in manufacturing using cyber-physical systems on the factory floor. Machines can communicate with each other through the Internet of Things, making smart decisions during the process and potentially communicating with the products they are making. These technologies will also enable Irish manufacturers to join the highly lucrative mass customization market. Instead of mass production where everything is the same, factories will be able to produce individualized products for consumers in tailored sizes, colors, and so on. In this new world, the consumer will become part of the design and manufacturing process and pay a premium price for that involvement.

Despite the importance of the manufacturing sector to the Irish economy, IDA Ireland CEO Martin Shanahan notes that Industry 4.0 changes create both challenges and opportunities for Irish industry. "There is an opportunity for Ireland to be a global leader in advanced manufacturing," he said. "But Irish companies must evolve and adapt new technologies and skill sets."[14]

Of concern is that Ireland has historically ranked amongst the lowest of the 26 EU countries in density of industrial robots, despite them being a critical determinant of productivity growth.[15] Also of concern is that Ireland was not ranked as an "innovation leader" in the European Innovation Scoreboard 2020, even though it leads in the employment impacts of innovation in small and medium-sized companies.[16]

The winners in Industry 4.0 will be those countries that embrace AI technologies to the maximum extent, and Ireland must ensure that it is in the front rank.

## Strategic Area 3: Education

Perhaps the greatest single opportunity for Ireland lies in transforming the country into a digital isle of saints and scholars. The national lockdown forced secondary and third-level educators to shift from face-to-face teaching to online platforms, and they did so with remarkable speed.

Ireland can become a global center of excellence in AI-powered education, training, and learning. But it will require significant investment in AI-based educational software that can assist in the delivery of personalized content and pathways for student learning and assessment, while also significantly reducing the workload of educators through automated assessment and marking. For example, UK-based company Century offers AI-based educational software that combines AI and neuroscience for secondary and third-level education.[17] Rather than rely on the traditional English examination test centers, third-level colleges could use AI-based English language software such as DynEd's English language learning software, which uses intuitive, AI-powered self-study courses and adaptive tests to identify a learner's areas of strengths and weaknesses and to set individual study paths.[18]

These tools have the potential not only to transform the way education and training is delivered to Irish people but to establish the first global digital university in Ireland. This digital university would offer courses tailored to the strengths, weaknesses, and specific needs of individual students around the world who would be able to avail of dynamically individualized, AI-powered tutorials to augment online lectures and other digital materials.

## Strategic Area 4: Smarter Products & Services

While companies have traditionally utilized data to improve processes or even benefit by selling their data to third parties, a research scientist at the MIT Center for Information Systems Research (CISR) suggests an emerging approach to data monetization, known as "data wrapping."[19] Data wrapping is essentially about embedding products with analytic features and experiences to enhance customer experience, helping customers understand the product and service offering as well as increase profits. The data-wrapping approach is starting to creep into the global markets. For example, Spanish multinational financial services company BBVA uses data wrapping in a personal finance management

app that uses ML algorithms, organizing customer transactions into household budgeting categories (e.g., rent, food) and providing a simple chart that displays a customer's expenditures.[20] Similarly, in 2019, PepsiCo launched Pep Worx, a suite of data analytics capabilities that help customers successfully launch and manage innovative marketing programs, optimize total store space, and help retail customers increase product turnover and profits.[21] PepsiCo transformed the nature of its retail customer relationships from transactional to collaborative. AI is also revealing new opportunities for investment management firms, extending beyond cost-reduction and cost-efficient operations. In this context, AI use cases range from portfolio management and client enablement to front-, middle-, and back-office efficiency.

Ireland is fortunate to already have over 25 years of AI research with a national R&D infrastructure in the form of Science Foundation Ireland (SFI) research centers such as Lero; Enterprise Ireland–backed technology gateways and centers; IDA Ireland; Ibec (formerly Irish Business and Employers Confederation); and Irish-owned companies such as Boxever, PlanDomino, VRAI, EdgeTier, AudioSourceRE, Nuritas, and Unitek.AI, which all have AI at the core of their business propositions. A number of multinationals have an established AI presence in Ireland as well, including Dell, Intel, IBM, Veritas, and Xilinx.

And this could just be the beginning. In early 2020, the *MIT Technology Review Insights* report identified that the top AI use cases today are in the areas of quality control, customer care, and cybersecurity. According to the report:

> Around six out of 10 manufacturers and pharma companies are using AI to improve product quality. Nearly half of consumer goods and retail firms (47%) are using it in customer care. Over half (51%) of energy firms are leveraging AI for monitoring and diagnostics, 58% of financial services providers for fraud detection, and 52% of tech firms to strengthen cybersecurity.[22]

## Call to Action: A National Ethical AI & Data Strategy

AI has very real potential to power Ireland's economic recovery. Realizing this potential will require a shift in thinking about AI and analytics in general — from it being just a growing niche area to using it as a foundation for the new Irish economy. This is a view echoed by Bill Schmarzo, CIO at Hitachi Vantara and Honorary Professor at J.E. Cairnes School of Business & Economics, National University of Ireland (NUI) Galway:

> Governments need to understand how AI and data can transform the economic value curve; to do more with less with hyper-focusing and prioritization of those business, operational, and policy decisions that have the biggest society and economic impacts. Essentially utilizing AI and data to create new sources of citizen, society, commercial, and environmental value.[23]

Positioning Ireland as a global leader in these strategic areas and ensuring the potential benefits of AI technologies are realized will require a cabinet-level committee (with non-political appointees) in the government, similar to the Irish Banking Culture Board. The remit of this committee would include education, coordination, promotion, and collaboration between the government, industry, universities, and nongovernmental organizations to develop and implement an ethical AI strategy and a dedicated AI portal that benefits the Irish economy and to showcase AI-related advancements in Ireland. Such an approach has been adopted by the government of India, which offers a dedicated AI portal, designed to support the country's AI development capabilities by providing resources such as case studies, research reports, and investment funding calls (job opportunities in the field were launched in early 2020).[24] Another example comes from Finland, where Business Finland is funding a multimillion Euro research project, led by Dr. Matti Mantymaki at University of Turku, that focuses on the development of governance and auditing mechanisms for the responsible use of AI.[25]

## Conclusion

One prediction is clear: after the COVID-19 pandemic, the old world is not coming back, and there will be a different status quo. Rather than fear this new world, we can embrace it and utilize what AI can offer to economies and societies across the globe, including:

- An apolitical platform for discussion and decision making
- A rapidly maturing approach to see into the future
- The opportunity for small countries like Ireland to deploy AI, as a microcosm of the world, and position themselves as a center of excellence for utilizing AI for both economic and social good

Rather than implement draconian cost-cutting measures to kick-start an economic recovery, we need investment in both AI and people. And we need to build on this solid foundation to prepare for the post-COVID-19 world. By tapping into the creative talent that already exists in Ireland, we are uniquely positioned to utilize AI to kick-start an economic recovery that can benefit both the economy and society.

Finally, although we used Ireland as a case study in this article, there are implications for other countries, regardless of size of economy. AI is neither a technical fad nor is it confined to dystopian science fiction Bollywood or Hollywood films like *Ex Machina* or *I, Robot*. Ironically, while there is awareness about AI, regardless of whether it is based on true or fake news, awareness without action is only fantasy. Responsible design and use of AI raise critical "crossing the Rubicon" kinds of decisions that need to be made collectively by governments, business leaders, academics, and all sectors of society.

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ACTION REQUIRED!

# Fueling Post-COVID-19 Growth with Blockchain & Gig Economy Strategies

by Zion Schum, Isaiah Morales, and Roger Yin

Innovative technologies, in conjunction with drastic changes in people's responses and mindsets, are often the impetus behind business growth that follows economic downturns. That is likely to be the case as well post-COVID-19. Although the present circumstances may appear bleak, there is no better time for businesses to capitalize on the shifts taking place. When uncertainty is high, opportunity routinely stands on equal footing. For many, the global pandemic has unveiled vital areas for improvement that, if enhanced, could generate lasting competitive advantage. Existing and newly established firms are encouraged to design new business models aimed at converting the current adversities into opportunities. Blockchain's novel technology and the freshly minted pool of gig economy entrepreneurs offer a timely and robust base from which to craft and enable these winning models.

The objective of this article is to provide readers with a working understanding of blockchain, blockchain-enabled technologies, the gig economy, the current consumer environment, and a business model application framework so that they may develop innovative and adaptive business models to facilitate post-COVID-19 growth. We share fundamentals, definitions, and examples that will translate to real-world applications using the Operation/Service-Oriented Application Framework. We also introduce blockchain-enabled technologies leaders can use to create winning business models. Finally, we outline the current challenges associated with blockchain and the gig economy along with how existing incumbents are addressing them.

## Understanding Blockchain

We begin with blockchain. For those who lead, work for, or invest in any business, a greater understanding of blockchain could be beneficial. Blockchain originated amidst the Great Recession in 2009 from an unknown creator, Satoshi Nakamoto, who used it to invent a cryptocurrency called Bitcoin. Blockchain has since proven to be an innovative technology with multiple applications. It has flipped many industries on their heads and caused startups across the globe to create the next generation of business models using state-of-the-art tools like smart contracts. One example is slock.it, which allows businesses to automate sharing, payments, and rentals using smart contracts. In the same vein, multibillion-dollar corporations such as Unilever and Ford are also implementing and iterating on blockchain solutions. Ford, for example, is using blockchain to trace and validate ethically sourced industrially mined cobalt for its vehicles to uphold environmental protection and human rights.[1] Early adopters of this technology will likely secure increased value and competitive advantage.

At its core, blockchain is a decentralized, immutable, transparent (if one wants it to be), and trustless digital ledger: there is no central point of failure or weakness in the network; transactions cannot be reversed once confirmed; each participant in the network can validate or audit any transaction; and one person can transact with another without needing to trust that party. The word "transaction" here does not refer to monetary transactions alone, but rather the transfer of data from one person to another. This data could be money, but also storage, inventory, or any other type of data. The vast number of possibilities and opportunities become apparent once one recognizes that virtually anything can be secured and enhanced on blockchain. This is why many believe it to be the next Internet. Billions of dollars are invested into its growth, the technology has expansive capabilities, and some of the world's best and brightest are migrating and diversifying into blockchain and cryptocurrency from a myriad of industries.

Blockchain's current applications range from decentralized finance (DeFi) to real estate. Like other innovative technologies in their early stages, blockchain and its applications receive periodic criticism. Among common critiques of the technology that should be dismissed is the notion that it is "a solution looking for a problem." That is equivalent to saying artificial intelligence is a solution looking for a problem since we already solved

how to play checkers with it. The original application of blockchain was a solution to the problem of digital asset transference between two peers without an intermediary, and Bitcoin served that purpose well. But society would likely be worse off if it were to limit blockchain to solving that single problem. Each engineer building applications and/or protocols for, on, or leveraging blockchain expands the playing field of possibilities for others. Ethereum's dApp (decentralized applications) platform provides a perfect example here because the open source nature of dApps built on it allows developers to examine code used to solve a problem, discover ideas, and learn. Additionally, blockchain's distinct features, in combination with the gig economy, make it a prime tool to handle countless dissimilar problems.

## The Rise of the Gig Economy

The gig economy offers benefits as well to those businesses that leverage this "labor market characterized by the prevalence of short-term contracts or freelance work as opposed to permanent jobs."[2] According to the European Commission, 20%-30% of the working-age population in Europe and the US engage in some form of independent work.[3] Since COVID-19 struck, there has been a massive influx of people searching for alternative income streams outside of their regular sources. These fresh gig workers and experienced gig professionals supply businesses with the means to reduce their overhead, increase scalability, and maximize efficiency.

Outsourcing business operations to the gig economy can be an effective business strategy — in both the short and long term. Gig worker support frees up time for employees and allows businesses to get more work done internally. Moreover, engaging gig workers avoids costly workplace integration overhead such as physical space, IT equipment, software, cell phones, travel, and other resources. This leaves management with more time to focus on achieving key performance objectives. Louis Cross, a Certified Contingent Workforce Practitioner (CCWP), points out that firms can utilize managed service providers to manage gig economy sourcing.[4] These take on the responsibility of engaging gig workers, allowing businesses to outsource any employment or tax risks by avoiding direct engagement. Although most repercussions from COVID-19 have been negative, the increase in the pool of gig workers could prove a tremendous benefit for businesses of all sizes.

## COVID-19: Time to Take Action Amid a New Normal

The worldwide pandemic has brought challenging implications to our economy, societies, and businesses. Although the damage has been catastrophic, we can look at some current adversities as opportunities. Many of the world's greatest companies, including Uber and Airbnb, have sprouted from challenging economic times. Thus, existing organizations have the chance to come out of this in much better shape than they were in beforehand, and new businesses just starting out may blossom into efficient, fully formed organizations.

*Gig workers and experienced gig professionals supply businesses with the means to reduce their overhead, increase scalability, and maximize efficiency.*

For existing companies, COVID-19 has revealed business model weaknesses such as a lack of resiliency and efficiency. While dissecting these problems and strategizing a game plan is important, equally key is understanding consumers' shifting mindsets that can coincide with your new business model. The largest shift shows more purchasing online versus shopping in-store. In addition, according to Google's *Think with Google* blog,[5] more people are living off-schedule, an increasing number of people are focusing on their well-being, more searches are being done for "easy" ways to do things, people are craving more humor, and more folks are searching for DIY ways to get things done. Business decision makers can evaluate segments of their business model like key activities, channels, customer relationships, and others to align themselves with these fresh consumer mindsets and strengthen their resiliency and efficiency.

## Business Modeling for Competitive Advantage

Business modeling is an ever-evolving concept. Indeed, several interpretations exist online for defining and visualizing business models. Pattern recognition can lend a helpful hand here by identifying the commonality amongst these numerous interpretations. Most

definitions discoverable online outline the central theme as "how a business makes money." For our discussion, we will assume a business model is the mechanism used to create, deliver, and capture value in economic, social, cultural, or other contexts.

One of the most widely accepted, comprehensive business model frameworks, the Business Model Canvas, originated from Alexander Osterwalder and Yves Pigneur in their book *Business Model Generation*,[6] where they flesh out nine critical building blocks every entrepreneur or intrapreneur should thoroughly understand. Each block is individually important and represents a potential area to establish competitive advantage. But let's be clear, a firm would be ill-advised to focus solely on a few areas at the expense of others. For example, a business could have strong customer relationships, robust revenue streams, and catalyzing strategic partners that give rise to millions of dollars in revenue each month, but if its cost structure is ineffective, it could consistently lose large sums of money. The optimal approach is to lay down a solid foundation in each segment of a business model and then subsequently shift focus to carving out and elevating competitive advantages in one or two areas.

## *Next-Generation Innovative Business Modeling*

The next generation of business and associated business models is being ushered in by blockchain's versatility in creating and exchanging value. The opportunities are boundless, but first we must transition from our current infrastructure. Today, the data network protocols establish the rules of the Internet and facilitate its use. Most of the value these protocols create is absorbed by just a few companies — either by operating and distributing Internet access or governing the applications that make it easier to use. Only recently has blockchain emerged to offer businesses the chance to capture the value that will come from next-generation Internet protocols. The first opportunity lies in cryptocurrency.

### Seeking Value from Cryptocurrency

The first opportunity in the next generation of business models is cryptocurrency. The prefix "crypto-" in the word cryptocurrency is derived from cryptography, an underlying data encryption mechanism used in blockchain to achieve security and protect information. "Cryptocurrency" is an umbrella term people use to describe all digital tokens that exist in the cryptocurrency ecosystem. Today, there are over 6,400 unique tokens. Most live on a blockchain and serve a specific purpose. Their functions range significantly — from use as money to reduction of fees on exchanges. Businesses can benefit from cryptocurrencies by lending them, staking them, transacting with them, utilizing their functionality, or creating their own. Business model components that could be improved using cryptocurrency include revenue streams, customer relationships, value proposition, and key activities.

### The Benefits of Smart Contracts and Tokenization

The second and third opportunities for businesses come in the form of smart contracts and tokenization. A smart contract is a snippet of code that automatically executes certain actions when the terms of the contract are met. For example, today, if a supplier wants to get paid for sending supplies to a manufacturer, it may have to wait a while to get paid due to paperwork, human intervention, and other constraints. Smart contracts can expedite the execution of the contract by automatically sending payment upon receiving inventory. This saves time, money, and can even strengthen supplier-manufacturer relationships. Businesses could benefit from incorporating these incredibly flexible and efficient tools into their business to enhance their key partner and customer relationships while positively impacting their cost structure and key resources.

On a related note, tokenization is the process of converting rights and properties of a real-world asset into digital tokens. This is done by placing all the properties of the asset in a smart contract and storing it on the blockchain. One application of tokenization that can benefit companies in search of liquidity is fractional ownership. This allows them to convert and sell portions of their assets without selling them outright. For example, if a company owns several servers worth US $500,000 and only needs $100,000 for some expense, it might tokenize a portion of the servers and sell them. This way, the business could still retain some of its assets while taking advantage of liquidity created through tokenization. Moreover, the process of tokenization could also help businesses reach customers through a new channel, as their digital tokens could be distributed online.

### Strengthening the Organization with dApps

Yet another opportunity for bolstering a company is with the use of dApps. Existing businesses can use these similarly to how they might use regular Web or mobile applications, but with the benefit of

decentralization and the opportunity to earn money while doing so. This, in turn, can add to the revenue stream component of their business model. Additionally, firms can create a dApp and pre-allocate some of the platform's tokens to themselves, which they can work toward increasing the value of in the future. The tokens' value will depend on the demand for the underlying network and accompanying product or service.

## Operation/Service-Oriented Application Framework

Positioning a business for post-COVID-19 growth leveraging blockchain and the gig economy doesn't need to be difficult. Simply breaking down the current business model to find available opportunities is all it takes (see Figure 1). As mentioned earlier, one approach is to carve out and elevate a competitive advantage in one or two areas. To focus on a specific operation or service, start by going through each section of the business model (i.e., value proposition, cost structure, and others) and write down the costs associated with each element. For example, how much does it cost for one key activity? Second, identify and quantify revenue streams using the same approach. Last, determine where friction exists within the organization. This friction could be a slow operation or an activity that frustrates or impedes management from focusing on key objectives. Talk to management and employees to collect first-hand insights. These three steps will parlay right into solution implementation.

This process should illuminate how money flows in the organization and what slows down progress. Pick one or two of these areas to concentrate on and choose a solution from all possible options. Smart contracts, cryptocurrency, tokenization, dApps, and the gig economy can all be utilized in this stage. If revenue streams are a focus and if capital is available, lending some of it through cryptocurrency projects like Nexo could generate an additional income stream. Nexo boasts that it has the best insurance policy on the market, with up to $100 million in asset coverage. Interest rates on platforms like Aave, Nexo, and others can vary from .14%-100% APY with the ability to remove one's assets at any time. These rates can vary, but one can find consistent, strong cryptocurrency lending rates around 8%-10%.

Additionally, as mentioned before, dApps can also help businesses generate revenue. The biggest, but most technically challenging, opportunity in this arena lies in creating a dApp and platform cryptocurrency to accompany it. This is equivalent to creating and launching a new innovative product and business model. Like the value of a traditional business increasing over time, the value of cryptocurrencies running on dApps can rise over time. Considering the specific knowledge necessary to develop these types of applications and coins, firms may want to combine smart contracts and the gig economy and hire freelance smart contract developers from a platform like Toptal or Upwork to get the job done. Alternatively, businesses keen on retaining this level of talent can hire full-time developers and other staff to build the application and stay upon completion. This may be more beneficial in the long term as businesses can incentivize employees with a portion of the cryptocurrency that they can work toward increasing the value of over time. Creating a dApp and cryptocurrency is resource-intensive but can be incredibly lucrative as there is no upper limit to how valuable a dApp cryptocurrency can become.

In a similar vein to creating cryptocurrencies to generate new value, companies can also tokenize tangible assets, regulated financial assets, or intellectual property (IP) they own to generate security tokens


Figure 1 — Implementing blockchain to increase revenue.

they can sell. Tokens are deemed security tokens if they pass the Howey test[7] set forth by the US Securities and Exchange Commission (SEC). These are sold in a security token offering. Tokenizing regulated financial assets such as equities or loans, tangible assets like real estate, art, or precious metals, or IP such as copyrights allows companies to access a large pool of buyers and benefit from increased liquidity and fast settlement. Businesses interested in security tokenization can work with companies like AlphaPoint, Harbor, or LimeChain to help them develop the token and token economics, assist with issuance and legal requirements, and develop applications to support the tokens.

If management is looking to reduce costs, consider outsourcing some operations to the gig economy or implementing smart contracts (see Figure 2). One advantage here is that management can hire the best-quality gig workers for an important project and not have to pay them a high annual salary to keep working after the project is complete. This positively impacts the cost structure of the business by eliminating annual overhead salaries. In the same vein, smart contracts can remove unnecessary costs associated with delivering value to customers by cutting humans out of the equation while also shortening times to get things done, making operations significantly more efficient.

## Addressing Current Challenges of Blockchain & the Gig Economy

As with the genesis of the Internet, blockchain faces scaling challenges every step of the way. Latency and scalability are the two garnering the most attention. Currently, Bitcoin and Ethereum, the largest blockchains by market capitalization, can only process about 5 and 15 transactions per second (TPS), respectively. This is clearly too low to sustain global adoption and usage. Fortunately, developers like the ones on Ethereum are exploring approaches like sharding[8] to increase TPS and thereby improve scalability and latency. Other blockchains, like EOS, trade off decentralization to achieve a higher TPS. Businesses using applications or transacting on a blockchain should understand their transaction throughput needs and which blockchain serves those.

The set of hurdles for the gig economy is slightly different. Two key challenges for employers of gig workers include unpredictable performance and team collaboration difficulties. Companies like Upwork focus on solving unpredictable performance through a reputation system on their platform consisting of success rate, number of jobs, total hours worked, employer comments, and more. They could potentially further improve their strategy through the usage of an immutable, transparent blockchain record of gig worker reputations.

The team collaboration dilemma facing gig employers diverges from the unpredictable performance problem because it can be addressed internally. Currently, gig workers can have a difficult time collaborating with full-time employees at an organization due to goal misalignment. Typically, full-time employees are vetted in the hiring process to align with the long-term goals of the business. Conversely, gig workers are inherently short-sighted due to their lack of long-term commitment to the company and its incentive structure. As an organization, management can address this problem by vetting gig workers for alignment with their long-term goals if that is applicable for the respective project. Additionally, leadership can work to align the incentive structure of gig workers with the team they're working with. This will ensure everyone is working toward a common objective.

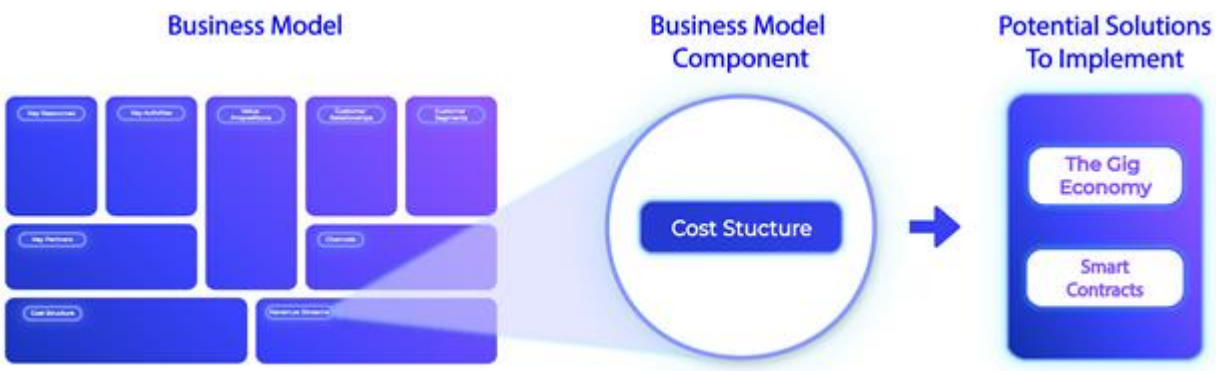


Figure 2 — Implementing blockchain to reduce cost.

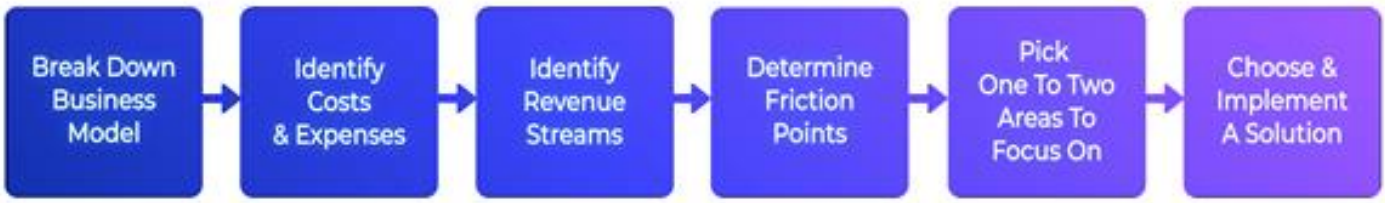


Figure 3 — The Operation/Service-Oriented Framework: solution implementation flow chart.

## Conclusion

Although COVID-19 has packed a punch for many, reimagining a business model could be all it takes to reach new heights in the near future. Applying the Operation/Service-Oriented Framework is as simple as breaking down the business model; identifying costs, revenue streams, and friction points; picking one or two operations or services to focus on; and choosing and implementing a solution (see Figure 3).

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[8]Sharding is a database technique where databases are horizontally partitioned into rows based on their characteristics. Each row is a shard. So, instead of having each individual node always store all states of the network, certain responsibilities can be delegated to certain shards to speed up transaction processing. Vitalik Buterin, cofounder of Ethereum, has stated that sharding and other second-layer solutions could improve transaction throughput to 1 million TPS.

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THIS OR THAT?

# Are Americans Nowadays More Willing to Use Bitcoin-Like Cryptocurrencies?

by Manjul Gupta, Carlos M. Parra, and Eduardo Salcedo

Since the launch of Bitcoin in 2009, its adopters and those of other cryptocurrencies (investors, consumers, retailers, etc.) have been expecting, and/or wishing for, increases in its adoption as a new, more secure and disintermediated digital payment system. Today, numerous retailers (e.g., Overstock, Microsoft Store on Xbox, and Newegg) accept digital payments using cryptocurrencies. But the estimated number of global Bitcoin users in 2019 (approximately 5.8 million) is still miniscule compared to the 736 million users of Visa (credit card/debit card) in the US alone.[1] This begs the question: how do Americans currently feel about adopting cryptocurrencies as an alternative digital payment system? Specifically, given an option, would potential customers be willing to complete transactions using cryptocurrencies in place of other digital payment systems such as credit cards? Would the type of product or service to be purchased affect this disposition? What qualitative factors could influence this decision? A decade since the inception of Bitcoin, these questions still seem very relevant today.

*Our aim was to gauge whether individuals are now more or less amenable to using cryptocurrencies compared to the more widely used and traditional digital payment system.*

We embarked on a study to attempt to answer these questions by means of a survey of 195 US consumers. In addition to asking the extent to which participants would prefer cryptocurrencies to credit cards, our survey asked respondents to enter text responses explaining their reasons (i.e., perceived benefits and concerns) for considering using or not using cryptocurrencies for their digital payments. Our aim was to gauge whether individuals are now more or less amenable to using cryptocurrencies compared to the more widely used and traditional digital payment system (i.e., credit cards) to complete a variety of e-commerce transactions. In this article, we begin with an examination of digital payment systems and then describe the survey and its participants as well as the results we obtained.

## Digital Payment Systems

At the foundation, digital payments implicate digital finance, which in turn encompasses online loans, mobile payments, Internet finance, Internet insurance, and other kinds of innovative fintech products and services — all of which have been shown to help stimulate household consumption.[2] For countries like China, desperate for ways of increasing internal demand to generate additional economic growth and diversify its export-oriented model (even before the current pandemic), digital finance and associated payments are essential. The realm of digital payment systems involves a wide array of types, according to a 2018 GlobalData survey, including:[3]

- **Traditional digital payment systems** — such as credit/debit cards or payment cards, which dominate e-commerce payments in America and Europe, with a share of 53% and 49%, respectively.
- **Digital payments** — involving bank transfers, which account for less than 15% of e-commerce payments globally, as well as cash payments amounting to around 7%.
- **Alternative digital payments** — not involving bank transfers but comprising mobile wallets, mobile banking, cryptocurrencies, and so on. These alternative digital payment methods already account for 51% of total e-commerce sales in Asia Pacific.

The anomaly seen in Asia arguably may be attributed in large part to India's demonetization efforts, which have already been examined in detail from the digital payments transition perspective with a level of granularity that has allowed researchers even to compare the adoption of alternative digital payments against each other.[4] For the purposes of our study, this situation provides additional justification for comparing credit

cards (as a prominent traditional digital payment system) to cryptocurrencies (as an alternative digital payment system). This is true especially because credit cards continue to dominate e-commerce payments in the US while alternative digital payment systems appear to be the leading form of payments in Asia Pacific. Furthermore, the type of blockchain token considered for this study is that of a cryptocurrency archetype striving to become a widespread digital form of currency.[5] In essence, the type of cryptocurrency considered here ought to be one that is comparable to, and could eventually replace, the most commonly used digital payment system currently used in the US (i.e., credit cards).

## Participants & Survey

Our survey used a sample of 195 US participants, recruited using Amazon Mechanical Turk, with a mean participant age of 37.4. They first read a definition of "DIGIcoin," a fictional blockchain-based cryptocurrency that we devised for the purpose of our study. Industry executives with knowledge of cryptocurrencies contributed to the definition of DIGIcoin we provided. This definition explained that DIGIcoin is a digital currency that uses peer-to-peer technology to facilitate instant payments. And, while transactions made through credit cards and banks require an intermediary (e.g., Visa/Mastercard, Bank of America) to verify the payment between the two parties, DIGIcoin transactions do not. The definition also specified that DIGIcoin payments are verified using blockchain technology in which a decentralized network of computers securely manages a digital record of unchanging transactions. Finally, the fictional DIGIcoins are difficult to counterfeit and are not issued or backed by any banks or governments.

Aware that some survey participants may not have easily grasped the definition we provided, we required them to rate their own understanding of the DIGIcoin definition before we asked any disposition questions. They answered the statement "I understand the definition of DIGIcoin" using a five-point Likert-type scale (with 1 meaning "strongly disagree" and 5 meaning "strongly agree"). Of the participants, 25 answered 1, 2, or 3. These respondents were removed from the analysis, so only responses from participants with a sound understanding of the topic were considered in our analysis.

We next presented participants with a variety of scenarios and asked them to rate the extent to which they would be willing to use DIGIcoin to pay for 11 different products or services (see Table 1) on a five-point scale (with 1 being "highly unlikely" and 5 being "highly likely"). Each scenario alluded to a product or service offered by an existing online store that accepts payments in cryptocurrencies.

*We found that Americans still prefer using credit cards over cryptocurrencies in all 11 scenarios or purchasing contexts we presented.*

As shown in Table 1, scenarios alluded to purchasing physical products (e.g., furniture and jewelry) and digital products (e.g., software, mobile apps, digital newspapers/magazines), along with services (e.g., satellite television/Internet services, booking air travel/hotels/car rentals, online dating, movie tickets) and philanthropic donations (e.g., to a free nonprofit online encyclopedia or to an international nongovernmental organization that promotes children's rights, provides relief, and helps support children in developing countries). Scenarios were presented to participants in random order.

Similarly, we assessed participants' disposition to making payments for the same products or services using credit cards. We developed the scenarios following approaches used in studies that have explored the role that culture plays, for instance, in individuals' willingness to participate in the sharing economy,[6] or in their perceptions of inappropriate social network behaviors.[7] Finally, participants were asked to provide text responses explaining their reasons for potentially adopting (or not adopting) DIGIcoins as a new digital payment system.

## Purchasing Contexts & Digital Payment System Preferences

In our research, we found that Americans still prefer using credit cards over cryptocurrencies in all 11 scenarios or purchasing contexts we presented (see Figure 1). In particular, the contexts in which they showed they would be most inclined to use credit cards over cryptocurrencies were for booking air travel/hotels/car rentals and purchasing furniture, and they were less partial to using credit cards over cryptocurrencies for making donations to free nonprofit online encyclopedias and for procuring dating services.

| Scenario | How likely are you to use DIGIcoins? | Online store example that accepts cryptocurrencies (*This column was not included in the survey.) |
|---|---|---|
|  | For buying furniture from an online store that sells home decor, furniture, bedding, and other household goods | Overstock |
|  | For buying software from an online retailer that sells computer hardware and software | Newegg |
|  | For availing services from a satellite television and Internet service provider | Dish Network |
|  | For buying jewelry from an online store that sells diamonds, engagement rings, wedding bands, charms, watches, gemstones, and gold | Reeds Jewelers |
|  | For booking future air travel from an online travel booking company that allows individuals to book air travel, hotels, and car rentals | Expedia |
|  | For availing a service from an online dating and friendship website that features multiple-choice questions to match members | OkCupid |
|  | For buying an app from an online smartphone app store that sells mobile apps and games | Zynga |
|  | For donating to a free nonprofit online encyclopedia, created and edited by volunteers around the world | Wikipedia |
|  | For subscribing to an online newspaper that delivers political and financial news from around the world | Bloomberg |
|  | For booking movies from an online movie-ticketing website that sells theater tickets of upcoming movies | MovieTickets.com |
|  | For donating to an international nongovernmental organization that promotes children's rights, provides relief, and helps support children in developing countries | Save the Children |

Table 1 — Scenarios used to assess individuals' willingness to use cryptocurrencies as a new digital payment system over credit cards.

Americans showed the greatest willingness to use cryptocurrencies for buying smartphone apps and the least inclination to use them for purchasing jewelry. Interestingly, their highest average willingness to use cryptocurrencies (i.e., for buying smartphone apps) is the same as the lowest average willingness to use credit cards (for procuring dating services). This reveals the kind of risk aversion US consumers associate with cryptocurrency use.

We conducted paired t-tests comparing dispositions to credit card and cryptocurrency use. We found the smallest mean differences in willingness to use credit cards over cryptocurrencies were in relation to donating to nonprofit organizations and procuring dating services. Meanwhile, the largest mean differences were in relation to booking air travel/hotels/car rentals and buying furniture.

In sum, making philanthropic donations and procuring dating services are at the end of the willingness spectrum where Americans' preference for credit cards over cryptocurrencies is smallest, while procuring vacation services and purchasing physical products (e.g., furniture and jewelry) stand on the opposite end, where the preference for credit cards over cryptocurrencies is strongest. Thus, it seems Americans are more willing to use credit cards over cryptocurrencies for purchasing vacation services and physical products and less set on doing so when making philanthropic donations and procuring dating services. On the one hand, this may be a result of the insurance products and

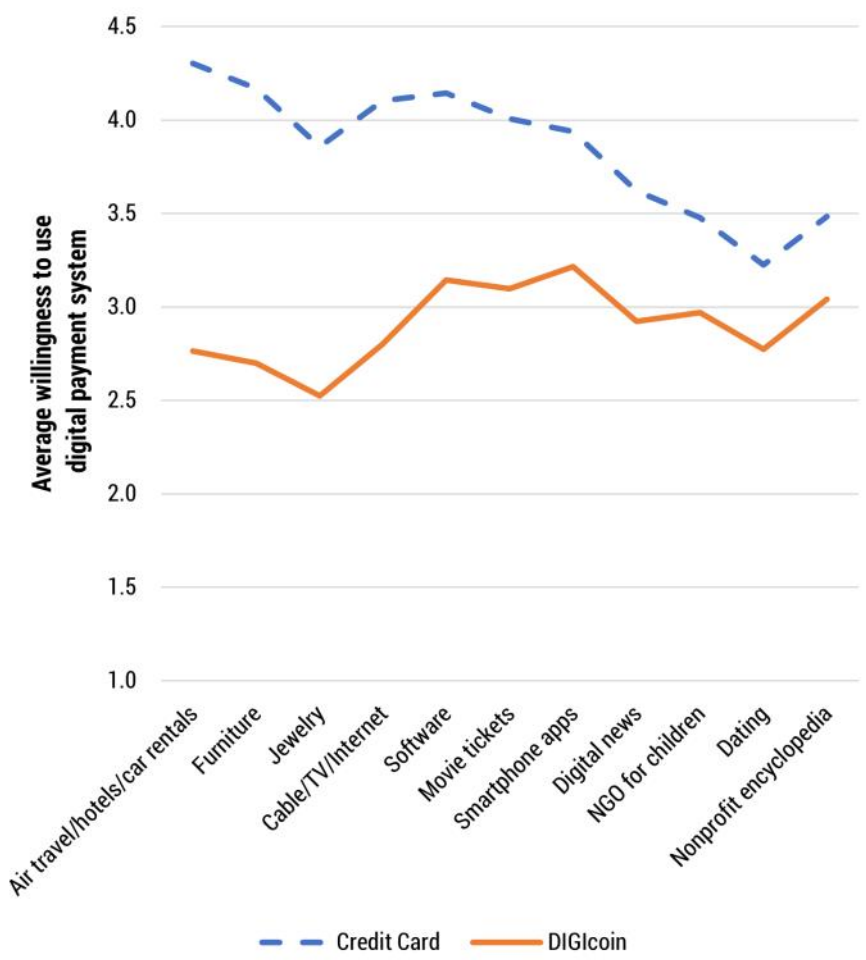


Figure 1 — Americans' willingness to use credit card vs. DIGIcoin in 11 purchasing contexts (on a five-point scale).

intermediation services some credit cards offer when vacation services and physical products are purchased. Or it may be due to privacy concerns around making donations and/or procuring dating services. Both factors (intermediation and privacy) were in fact brought up in the qualitative responses the study participants provided (more on this next).

## What Influences Americans' Willingness to Use Cryptocurrencies?

Table 2 details the reasons survey participants provided for using (or not using) cryptocurrencies in the scenarios we studied. Overall, the most frequently mentioned reason for participants' willingness to use cryptocurrencies as a new digital payment system was "ease of use," with one out of every three participants bringing it up. This was followed by "highly secure," which was cited by approximately one out of every five participants. Cryptocurrencies' ability to disintermediate financial institutions was cited by 12%. Below are some examples of participants' comments regarding reasons for potentially adopting cryptocurrencies as a new digital payment system:

- **Ease of use.** "It would take the hassle out of having to give your credit card number."
- **Highly secure.** "It seems like there are fewer parties involved, which in my mind would mean fewer chances of my payment information being stolen."
- **No intermediary.** "I like the idea of a truly democratic form of currency, not tied to any government."
- **Transaction speed.** "I feel it would be quick and easy not having to wait for bank clearance and make purchasing online a lot easier."
- **Privacy.** "The primary reason would probably be privacy considering companies collect, store, analyze, and/or sell massive amounts of information on their customers."
- **Other reasons.** "It is a novel and interesting way to pay for things"; "Since there is no middle party,

| Reasons for Using DIGIcoin | Percentage Participants Bringing Up Reason | Reasons for *Not* Using DIGIcoin | Percentage Participants Bringing Up Reason |
|---|---|---|---|
| Ease of use | 40% | Hackable | 39% |
| Highly secure | 19% | No intermediary | 15% |
| No intermediary | 12% | Price (exchange rate) volatility | 13% |
| Transaction speed | 11% | New currency (with no past record) | 7% |
| Privacy | 14% | Low acceptance among retailers | 9% |
| Novelty/future | 5% | Refunds/recourse in case of failed transaction | 7% |
| Lower fees | 5% | Do not trust the technology | 2% |
| Blockchain | 1% | Illegal use | 1% |
| Better than other forms | 1% | So many similar currencies | 1% |

Table 2 — Qualitative factors affecting Americans' willingness to use (or not use) cryptocurrencies as a new digital payment system.

this might prevent some fees, which banks charge"; "It seems easy to use and better than traditional methods"; "If I had to, it would be because it is verified using blockchain technology."

Regarding participants' text responses for *not* being willing to adopt cryptocurrencies as a new digital payment system, the top concern was that cryptocurrencies could be hacked — a concern suggested by 39% of participants. This was followed by the lack of intermediaries, which 15% mentioned. Thirteen percent reported "price (exchange rate) volatility" as a reason. In addition to these, other concerns included new currency with no past record, low acceptance among retailers, how to apply for refunds, trust, illegal use, and the presence of a number of competing cryptocurrencies. Below are some sample text responses regarding reasons for *not* adopting cryptocurrencies as a new digital payment system:

- **Lack of security (hackable).** "It is a decentralized network; hackers may hack the system any time."
- **No intermediary.** "It's not backed by any banks or governments, which means if anything was to happen, I'm out of luck"; "Actually, I feel better about some kinds of purchases when there is an intermediary."
- **Price.** "I have seen the crypto markets swing wildly and that is not something I want to deal with in a currency I use for everyday use."
- **Other concerns.** "It is new and unproven"; "I am concerned because I do not think most institutions will accept this currency"; "I am concerned about the facility for refunds"; "Will bring black money in circulation and economy"; "It may not be taken seriously in the market, since there are so many existing competitors."

Participants' concerns about the lack of intermediation for "certain kinds of purchases" and being "out of luck" if something were to happen led us to realize that the insurance that credit cards offer (e.g., when purchasing physical products or vacation services for when an incident occurs while the payee is traveling abroad) could affect individuals' willingness to use cryptocurrencies as a new digital payment system. In fact, blockchain-based insurance services (e.g., Etherisc, which leverages smart contracts to offer flight delay insurance) do exist. These smart contracts function as instant-payment (no paperwork) insurance policies that cover flight cancellations.

Americans may not yet have a comprehensive enough understanding of cryptocurrencies, as it is still an emerging and evolving technology. It may also be the

case that Americans doubt the capabilities of cryptocurrencies to appropriately support them (or the technology risks not being taken seriously) in cases in which formal intermediation could be required (e.g., in disputes or in the guaranteed provision of complementary services). Still, Americans exhibit ambivalence regarding the need for intermediation and the decentralized nature of cryptocurrencies, which was cited by 15% of participants as the second most common reason for not using cryptocurrencies as well as by 12% as the third most common reason for actually using them.

These findings may relate to the issue of privacy. It may be inferred from Figure 1 and Table 2 that when participants are more concerned about intermediation (e.g., when purchasing physical products or vacation services), they are much more willing to use credit cards over cryptocurrencies. However, when participants are more concerned about privacy (e.g., when making philanthropic donations and procuring dating services), their preference for credit cards over cryptocurrencies decreases. In essence, there appears to be a tradeoff between privacy and intermediation. Delving into the reason for this ambivalence and tradeoff should be the focus of future work.

## Could the Pandemic Affect Americans' Willingness to Use Cryptocurrencies?

COVID-19 appears to be accelerating the transition toward contactless payments and a cashless society.[8] This is the case because, thanks to the pandemic, both consumers and merchants are increasingly adopting digital payment systems due to the health and safety concerns associated with using cash and coins. It seems reasonable to assume that an increased preference for cashless payments will increase the use of traditional as well as alternative digital payment systems. In particular, regarding cryptocurrencies, it appears that governments and even the Bank for International Settlements think it is probable that central banks will have to issue their own digital currencies.[9] If this is the case, consumers' ambivalence regarding intermediation (and related privacy tradeoffs) identified in our research is likely to be exacerbated.

## Study Limitations

As a result of our study, we conclude that future research should include a broader sample of individuals from countries outside the US to increase the generalizability of findings. For example, we would like to corroborate higher receptiveness (primarily in Asia) to alternative digital payment methods in areas of low credit card use in general,[10] and specifically how much of that is due to India's demonetization policies. Furthermore, future studies exploring attitudes toward cryptocurrencies should focus on discerning the effect of purchasing scenarios (e.g., physical products, digital products, services, donations) on the choice of digital payment system. In fact, the disposition to use cryptocurrencies may be affected not only by purchase context but also by the device being used to complete the transaction (e.g., desktop, laptop, tablet, smartphone, and/or smartwatch). This could be analyzed in terms of the multifunctionality and distinctiveness associated with alternative digital payment systems.[11] In sum, we believe attitudes toward cryptocurrencies must be better understood, since their adoption could have a major impact on the future of global payment systems.

*COVID-19 appears to be accelerating the transition toward contactless payments and a cashless society.*

## Conclusion

Our results suggest that Americans continue to be skeptical about completing transactions using cryptocurrencies across the scenarios we considered. This is somewhat surprising, since Bitcoin has already been around for more than a decade. We also found that the product or service to be purchased affects Americans' willingness to use cryptocurrencies. High-ticket items, such as physical products and vacation services, exhibited the largest mean differences in continued preference for credit cards (over cryptocurrencies) as the digital payment system of choice. This indicates that price may also be a key factor affecting Americans' willingness to use cryptocurrencies. When looking at the reasons for deciding to use (or not to use) cryptocurrencies, participants pointed to "ease of use" as the most frequently mentioned response, followed by security, and the absence of financial intermediaries. Interestingly, security concerns were also the most common reason participants cited for *not* using cryptocurrencies, followed by the lack of intermediaries and price (exchange rate) volatility.

While the popular press is rife with articles describing how blockchain-enabled technologies (particularly cryptocurrencies) provide an innovative mechanism for fostering trust between parties without the need for intermediation, our findings suggest ambivalence toward their decentralized nature, along with tradeoffs underscored by privacy concerns. Moreover, study participants tended to perceive cryptocurrencies as less secure and prone to hacking. On the other hand, features such as not needing to carry credit cards or not having to share personal information (e.g., name, address), which again point to privacy concerns, do appear to generate enthusiasm for adoption. In order to increase Americans' willingness to use cryptocurrencies and thus promote their adoption, cryptocurrency advocates should leverage privacy concerns and further highlight ease of use, while initially focusing on purchases for which privacy (and also perhaps frictionless payment completion) ought to be of paramount importance (such as when supporting philanthropic causes and procuring dating services).

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WHAT'S YOUR FEELING?

# Online Classified Marketplaces:
## Driving Growth with a Secure Payment Solution

by Luke Merriman

Since the beginning of the COVID-19 pandemic, we have witnessed the disruption of industries across the globe. Many businesses have had to make significant changes to their day-to-day processes and business models to compete and meet the needs of consumers. The surge in e-commerce seen throughout 2020 as a result of consumers switching from shopping in-store, to shopping online illustrates this change. Indeed, data from one study shows that 63% of US consumers have recently increased their online purchasing to avoid stores, with 81% of those surveyed citing health concerns associated with the pandemic.[1] According to the US Census Bureau, e-commerce "grew as much in three months as it had over the past five years combined."[2] This trend is illustrated as well by Amazon's reported US $88.9 billion in revenue from Q2 2020, a 40% increase above its $63.4 billion revenue figure for Q2 2019.[3]

This sudden shift toward buying online has created new opportunities for businesses to remodel and capitalize. This is particularly evident with online classified marketplaces (websites that connect buyers and sellers online).[4] The concept of these marketplaces arises from classified advertising, where a person places an advertisement (in newspapers, traditionally) for an item they're selling at a low cost or for free. The eBay classifieds group — the owners of a variety of large online classified marketplaces, such as Autotrader, eBay Kleinanzeigen, and Gumtree — specializes in connecting people locally to buy and sell used goods. The group reported $201 million in revenue for Q2 2020, a 26% increase on its revenue figure for Q2 2019.[5] This jump in revenue suggests that the general surge in buying goods online as a result of COVID-19 has also resulted in a large volume of consumers looking to purchase goods from sellers in classified marketplaces as well as from online retailers.

While increased interest presents an opportunity for online classified marketplaces around the world, some must make significant changes to their business models and day-to-day processes to capitalize on the growth of e-commerce during the pandemic. The objective of this article is to highlight these changes. We begin by examining ways some existing online classified marketplaces have adapted to compete and grow. We also share the results of a recent survey by Trustap, an Irish startup specializing in escrow-style payments for online marketplaces. Based on these survey results, we conclude with suggestions on how to capitalize on recent e-commerce growth.

*This sudden shift toward buying online has created new opportunities for businesses to remodel and capitalize.*

## Adaptation of Online Classified Marketplaces

Within classified marketplaces, verticals refer to the specific market sectors or product categories the marketplace targets.[6] One of the largest of these verticals is found in the automotive sector and broadly refers to the buying and selling of used vehicles online. Companies in this industry, including San Francisco, USA-based used-car marketplace Shift, have experienced enormous volatility during the pandemic. In a recent interview, Shift Co-CEO Toby Russell explained how Shift set itself apart from its competitors by delivering vehicles directly to its customers to test drive.[7] Other online classified marketplaces in the automotive industry have introduced similar ways for their customers to continue purchasing both new and used vehicles despite limitations caused by lockdowns and social distancing. AutoNation, a US retailer of new and pre-owned vehicles, recently reported that it has used new ways to allow customers to buy and sell online; for example, with a "store-to-door" delivery option, allowing customers to buy vehicles from their homes while fully complying with COVID-19 restrictions.[8] In the same report, AutoNation announced an

all-time quarterly profit, up 18% on last year, with used vehicle retail volume 14% higher in June 2020 than in June 2019. These initiatives highlight ways online classified marketplaces have made changes to operate at scale and meet the needs of customers during the pandemic.

Another example illustrates how the inclusion of an online payment system can help marketplaces adapt and facilitate customer needs during the pandemic. During the strict lockdown in the UK and Ireland, used cars marketplaces in Northern Ireland that connect used-car dealers and customers began accepting deposit payments for vehicles online. By allowing customers to reserve vehicles online via a deposit payment, customers were not required to visit the dealerships in person to make the payment or reserve the vehicle. This helped both the dealers and the customers to comply with the restrictions imposed by the lockdown, despite the dealerships being closed to the public.

An online payment system may seem like an obvious feature for any website that facilitates the buying and selling of used goods but is often not provided. Many online marketplaces serve the purpose of allowing sellers simply to list items for buyers to view and purchase. If a buyer decides to make a purchase, the buyer must contact the seller and arrange for payment. This is true with many large classified marketplaces, including Facebook Marketplace, Gumtree, Craigslist, AutoTrader, and Zillow. Because the payment is handled separately, buyers and sellers from the marketplaces often must meet in person to pay for items or struggle to make the payment securely online. As a result, buying items from online marketplaces that don't facilitate online payments on the platform can be difficult with COVID-19 restrictions. In addition, the potential for scams or fraud is far higher when payments are made separately from the platform. Providing a secure, online payment solution can help marketplaces capitalize on the surge in buying and selling online related to the pandemic and protect their users from fraud or scams at the same time.

## Trustap Market Research: Buying & Selling Online — and the Risks

A recent survey by Trustap explores UK consumers' attitudes toward buying and selling online and the associated risks.[9] The survey was completed by a representative sample of 500 UK residents (see Table 1). To determine social grade, the survey presented respondents with a list of job types from which they were asked to select the one that best fit the person with the highest income within their household. (The social grade demographic is used to ensure the sample is representative of social classes in the UK.) The semi-structured survey used built-in logic around respondents' answers to determine whether additional questions were required. For example, if a respondent selected "Other" when asked what category of items they had bought or sold online in the last 12 months, they would be prompted to describe the item in a

| | | |
|---|---|---|
| **Total respondents** | 500 | |
| **Gender split** | Male - 48%<br>Female – 52% | |
| **Respondents per region** | London – 13%<br>South East – 13%<br>North West – 12%<br>South West – 10%<br>West Midlands – 9%<br>Scotland – 8% | Yorkshire and the Humber – 8%<br>East of England – 7%<br>East Midlands – 7%<br>North East – 6%<br>Wales – 5%<br>Northern Ireland – 2% |
| **Respondents' age range** | 18-24: 12%<br>25-34: 16%<br>35-44: 19% | 45-54: 18%<br>55-64: 23%<br>65+: 12% |
| **Respondents' social grade** | A – 7%<br>B – 22%<br>C1 – 27% | C2 – 17%<br>D – 10%<br>E – 17% |

Table 1 — Summary of respondents' demographic data.

follow-up question. Otherwise, the follow-up question would be skipped.

Researchers analyzed and grouped answers to multiple-choice questions as an overall percentage of total answers. Typed or open-ended questions were analyzed manually. The answers were grouped by category and reviewed to see which category was most popular among respondents' answers. For example, when asked which type of items respondents had bought or sold online in the last 12 months, researchers created categories such as "homeware" or "food and drink" to group the answers.

Of respondents, 80% cited they had *bought* an item or paid for a service in the previous 12 months, and 51% said they had *sold* an item or received payment for a service during the same period (see Figure 1). Extrapolating the results to all of the UK, these statistics highlight that more than half of UK consumers both buy and sell online. At the same time, however, the survey also revealed that a significant portion of people are uncomfortable doing so. Of respondents, 45% indicated they were deterred from buying or selling online due to the risks involved. Of those, the majority mentioned that they were afraid of being scammed, afraid of fraud, or that they had heard of others being scammed. A large portion of the respondents said they were deterred because they couldn't verify the seller or the item being sold. Other reasons for apprehension about buying and selling online included websites that appeared unsafe, a lack of trust in the delivery service, bad reviews, an unwillingness to share personal information, a lack of trust in the payment method, and not wanting to meet in person due to COVID-19. When asked specifically about scams, 22% said that they had been scammed previously online.

Interestingly, the majority of the 45% of respondents who mentioned they were deterred from buying or selling online due to the risks involved were in the youngest age group: 37% were aged between 18 and 35, 35% were between 35 and 54, and 28% were older than 55. Similarly, most of the 22% of respondents who said they had been scammed online were in the youngest age group: 45% were between 18 and 35, 34% were between 35 and 54, and 21% were older than 55 (see Figure 2).

In an attempt to address this issue, Trustap offers protection from fraud or scams to people who are buying and selling online, employing a payment platform similar to traditional escrow payments, where protection is offered to both the buyer and seller. If a buyer decides to use Trustap, they make the payment directly to Trustap. For the seller to receive these funds, they must first send or hand over the item in question to the buyer. Once the buyer receives the item, they have a certain amount of time to review the item and make sure they're happy with it. Once this period elapses, the funds are released to the seller. In comparison, traditional payment platforms manage just the payment in a transaction; the delivery of the item or service involved is always separate and does not influence the payment.

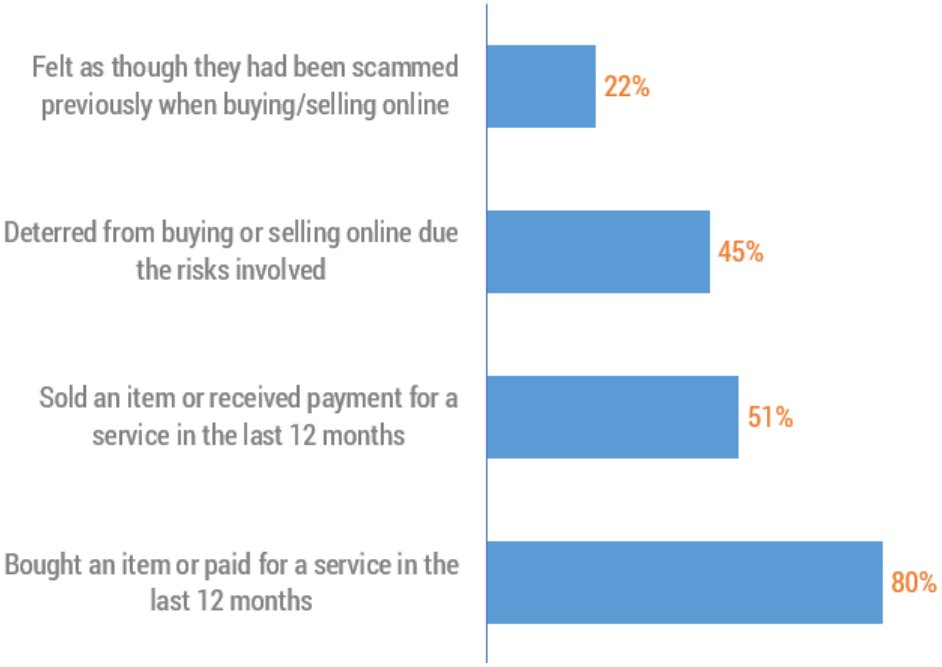


Figure 1 — Tendency to buy and sell online and attitudes toward scams and fraud.


Figure 2 — Percentage of respondents who were deterred from buying and selling online and respondents who were scammed online, by age.

From a buyer's perspective, if funds are held until they confirm they're happy with the item in the transaction, this solution eliminates the need for trust in the seller, removing the chance of fraud or being scammed. Similarly, a seller has full visibility over any payment made by a buyer in a transaction. This visibility protects the seller, who can see that a payment is made by a buyer before sending or handing over an item.

## Consumer Attitude Toward Trustap Solution

The survey included two videos demonstrating how Trustap works. The first video gave a broad overview of how the payment process works, showing that the buyer's funds are held until they have received the item in question and verified that they're happy with it. The second video provided a more detailed walkthrough of a transaction using screen recordings to show exactly how both a buyer and seller would complete a transaction from start to finish.

In the event of a dispute between the buyer and seller, Trustap offers third-party arbitration, which was also described to respondents. As part of that process, if a buyer wants to return an item and be refunded, they are required to deliver the item back to the seller and submit the delivery details to Trustap. Once the seller receives the item, they have 24 hours to verify that they're happy with it. In the event of a dispute between the buyer and seller, Trustap will gather evidence from both parties in the transaction, such as photos of the item, screenshots confirming delivery, and so on. Trustap partners with a third-party arbitrator who then reviews the evidence provided and apportions the funds to the buyer and seller according to their decision.

When asked, "If you were selling something online and the buyer wanted to use Trustap, would you be happy to use it?" respondents revealed a keen interest in using such a payment platform, with 81% saying that they would be happy to (see Table 2). They were then asked to explain why they would be happy to use such a platform, and 47% mentioned that using it would make transactions more "trustworthy, reliable, or secure." Respondents also reported the solution as "useful or good" (17%) and that it offers "buyer and seller protection" (16%). These results emphasize consumer desire for protection for both buyers and sellers online. Additional responses noted that the solution seemed easy to use and offered privacy and credibility. Responses also indicated that using Trustap would allow respondents to easily identify genuine interest from buyers.

When asked why respondents would *not* be happy to use Trustap when selling online, 33% said they didn't recognize it, know it, or haven't used it. Another 24%

| Yes – 81% | | No – 19% | |
|---|---|---|---|
| **Why?** | | **Why not?** | |
| It's trustworthy/reliable/secure | 47% | Don't know/recognize/haven't used it | 33% |
| The solution is useful/good | 17% | Don't understand it | 24% |
| Buyer/seller protection | 16% | Happy with an alternative | 22% |
| If the buyer wanted to | 12% | N/A | 15% |
| Easy to use | 9% | Don't like the process | 11% |
| N/A | 8% | Not interested | 6% |
| Protects money and personal details | 7% | It's unnecessary | 5% |
| It gives credibility | 3% | Fees | 1% |
| It's efficient | 2% | | |
| It shows genuine interest | 0.5% | | |
| Fees | 0.2% | | |

Table 2 — If you were selling something online and the buyer wanted to use Trustap, would you be happy to use it; why or why not?

suggested that they didn't understand it. These results imply that, in time, more brand awareness and a positive brand reputation could increase the number of online sellers happy to use a payment platform like Trustap.

When respondents were asked whether they would be happy to use Trustap to buy something online, 79% said yes (see Table 3). When asked why, 53% mentioned that it would make the transaction more "trustworthy, reliable, secure, or fair." These responses were similar to those by participants who said they would be happy to use Trustap to *sell* online, suggesting that protection from scams and fraud via a payment solution is of significant value to UK consumers. Other reasons aligned with this finding as well, with respondents mentioning "buyer protection" (20%), "ease of use" (20%), seemed like a "good/useful solution" (12%), and "money protection/refunds" (10%). Respondents also mentioned fees and that they would be happy to use it if the seller would.

Of the respondents who said they *wouldn't* be happy to use Trustap as a buyer, 25% indicated that they didn't recognize or know the brand, 20% said they're already happy with the solution they currently use, and 24% said "not applicable." Other reasons occasionally cited for not wanting to use Trustap included: a lack of trust, fees, a lack of interest, concerns about handing over details or setting up an account, that it seemed unnecessary, and that they didn't like the process. Again, based on these answers, it is reasonable to speculate that an increase in brand awareness and brand reputation could increase the number of buyers happy to use Trustap as a payment solution.

## Conclusion

Online classified marketplaces must make changes to their practices to capitalize on the growth of e-commerce during the COVID-19 pandemic. Insights from Trustap's market research suggest the need for online classified marketplaces to provide their users with secure, online payment solutions. By offering this option to a large portion of consumers who are apprehensive about buying and selling online, these marketplaces can grow their user bases. The marketplaces can also use secure payment solutions to significantly improve brand reputation and build trust with users and website visitors.

Online classified marketplaces have the option to partner with existing payment processors such as Trustap rather than building one themselves. Naturally, this requires far fewer resources than building a payment system from scratch and can be added to websites very

| Yes – 79% | | No – 21% | |
|---|---|---|---|
| **Why?** | | **Why not?** | |
| It's trustworthy/reliable/secure/fair | 53% | Don't know/recognize it | 25% |
| Buyer protection | 20% | N/A | 24% |
| Ease of use/it's efficient | 20% | Happy with an alternative | 20% |
| It's a good/useful solution | 12% | Difficult/lengthy/confusing | 16% |
| Money protection/refunds | 10% | Don't trust it | 7% |
| N/A | 8% | Fees | 4% |
| Would try if others wanted | 6% | Not interested | 3% |
| Fees | 0.5% | Don't want to hand over details | 3% |
| | | It's unnecessary | 3% |
| | | Don't like the process | 2% |

Table 3 — Would you be happy to use Trustap to buy something online; why or why not?

quickly. Additionally, payment platforms like Trustap are designed to provide marketplaces with detailed analytics. By giving users the option to make payments via the website, the payment platform can accurately determine the volume of items sold. Without a payment solution, marketplaces must use metrics such as the number of listings and the turnover of listings to make far less accurate estimates about sales volumes. Additionally, transaction values, the popularity of certain items, and so on, become available to the marketplace via the payment provider to make more informed decisions around the user experience, marketing, and strategies going forward.

A large portion of online consumers are apprehensive about buying and selling online due to a lack of trust and a fear of being scammed. However, most consumers have also shown a willingness to buy or sell online using a payment solution specifically designed to protect consumers from scams or fraud. By offering a secure, online payment solution, marketplaces can provide a more complete user experience — one that is reliable, secure, and trustworthy, ultimately creating an opportunity to capitalize on the growth in e-commerce caused by the COVID-19 pandemic.

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