Perspective from
Franklin Templeton Equity Group

DISRUPTIVE COMMERCE: UPENDING ECOSYSTEMS AND UNLOCKING INNOVATION

February 2021

LETTER TO INVESTOR

We have been investing in innovation for over a half century here in Silicon Valley. Over this time, our philosophy has been that innovation creates wealth in the economy, and therefore we should focus our investment on innovation to outperform the market over the long term. Within this philosophy there are three core tenets that we have found to be foundational; innovation in the economy is accelerating, investing in innovation demands active management, and innovation is everywhere.

As it pertains to the last point—innovation is everywhere—we have highlighted five platforms we see developing concurrently in the economy: disruptive commerce, genomic advancements, intelligent machines, new finance and exponential data. These five platforms are not intended to be an exhaustive list nor are they static; rather, they are an attempt to distill, explain and categorize many of the changes occurring around us. We expect that over the next several decades, different platforms based on new innovations and advancements will emerge just as some of the current platforms will fade. As growth investors, a flexible mindset is critical.

This paper focuses on one of these platforms, disruptive commerce. It is a topic that is deceptively broad and deep. Disruptive commerce refers to the ecosystems of companies and industries that have been impacted by the global shift to digitalized commerce, or e-commerce. Any discussion about e-commerce today starts with retail, and e-commerce will continue to disrupt retailing as it moves into increasing number of verticals. Although consumers purchase books, office supplies, toys and travel predominately online, there are still large, untouched profit pools. Autos, real estate, health care, and groceries, just to name a few, are only starting to develop online. Many of these new verticals will benefit from technological advancements we have seen over the past 20 years that have led to a Cambrian explosion of new business models and creativity. The sharing economy, fun social group buying, website development, checkout lending, micro influencers, location-based recommendations and even virtual dressing rooms push technology forward and allow us to purchase and sell products and services more conveniently than ever before. Furthermore, disruptive commerce is not only a story about the retail sector, it has massive ramifications on industries such as finance and payments, media, cyber security and even transport. The innovations in commerce have been disruptive to many businesses, but they have also created a tremendous amount of value, globally.

This paper has been a joy to produce. As avid readers of history, we enjoy studying how and why we are at this juncture in e-commerce. We hope the paper highlights the value and perspective a generalist can bring to a topic. We also hope it conveys how the simple idea of driving additional convenience and price transparency for consumers can catalyze broad-reaching implications in many different sectors of the economy, including: finance, transportation, communications, media and technology. As investors, we are excited to see whether our hypotheses of how this platform will evolve will come to pass. The unprecedented changes in consumer behavior we are experiencing within the COVID-19 world makes it the perfect time and place to discuss changes we see in the economy.

Matthew Moberg, CPA
Senior Vice President, Portfolio Manager
Franklin Equity Group

KEY TAKEAWAYS

- Global e-commerce is an area of tremendous opportunity, as the disruption we see is only just beginning.
- Industry vertical adoption of e-commerce varies significantly. While some industries have seen meaningful e-commerce penetration, others have barely scratched the surface. Real estate, autos, furniture, and health care are examples of underpenetrated verticals.
- The explosive growth of e-commerce has created entirely unforeseen business models, such as those built around sharing economies, auctions, artisanal products and social influence marketing.
- Technological advancements will continue to unlock new business models, new retail verticals, and new methods of interaction that we have never seen before. In many cases, e-commerce will be the economic driver of technological advancements.
- COVID-19 has been an accelerant of the changes outlined in this paper. For the first time in history, we saw an acceleration in e-commerce adoption despite gross domestic product declining globally. The pandemic is creating some of the greatest retail, payment and distribution challenges in our lifetime, and e-commerce is responding with agility, speed and continuous innovation.
- As a team, we study, discuss, monitor and invest in a broad range of industries that reach far beyond traditional retailing as we see e-commerce's effects in almost every facet of the economy. We believe this provides us with a broad and differentiated view of e-commerce that allows us to invest more effectively and holistically in this disruption.

E-COMMERCE: SHIFTING THE RIVER OF ECONOMIC DEMAND

On a fundamental level, our economy is driven by demand, and every part of the system is built to satisfy that demand. An analogy we have used on our team is to think of demand as a river. Over seasons, the river might ebb and flow in strength and volume, but it never fully ceases, and where the river goes, life and biodiversity follow. The same is true with demand in an economy—where there is demand, there is opportunity, leading to innovation, growth and prosperity.

With gravity the river flows downhill, but the path it follows may alter over time due to disruption, bringing life to new areas while leaving the original riverbed dry. For centuries, humans have used technology to divert rivers, either partially or completely, for their benefit. Similarly, the "gravitational force" of greater convenience has guided demand in the consumer economy, but it is e-commerce that has fundamentally disrupted the economy's trajectory. E-commerce has created new profit pools, as demand has been meaningfully channeled away from historical patterns.

Some of these technological advancements are so dramatic that they can rapidly shift huge portions of demand to a completely new market, leaving old markets reeling. Take, for example, the advent and rise of the ridesharing business model, which sparked protests nationwide as traditional taxi drivers saw their business decline 75% from less than a decade ago.[1]

Human intervention is not the only way to alter the path of the river—nature can as well. Consider the lasting and dramatic effect the COVID-19 pandemic is having on the economy and consumer habits. Though globally devastating, the pandemic has been a tailwind for e-commerce at a level unseen since the advent of mobile phones. In a matter of months, the pandemic catapulted the industry forward, accelerating the adoption of online shopping, COVID-19 serves as a testament to our adaptability, as we are seeing e-commerce expand in remarkable and ingenious ways.

digital communications, website creation and other industry trends at a pace that had previously taken years. If nothing else, COVID-19 serves as a testament to our adaptability, as we are seeing e-commerce expand in remarkable and ingenious ways.

Today, the range of goods and services that can be obtained virtually is dizzying. Of course, cleaning supplies, toys, books, clothing, tools, furniture, cars and groceries are well-represented and available. However, offerings have expanded to include services such as virtual veterinarians, e-learning, digital exercise classes with a social media element, at-home blockbuster movie launches, malls in the metaverse, virtual dating, online live concerts, and new browsing experiences designed for discovery. Or, as one company puts it in their "S-1," combining "Costco and Disneyland" into one's shopping experience. We see opportunities everywhere, and yet, consumers have only begun to tap the potential of this new global digital marketplace.

As investors and students of innovation, we are constantly looking for change. We are dispassionately appreciative that we cannot change the flow of the river—but we can potentially profit from it. We view change as inevitable, and disruption as indicative of an opportunity ahead.

HOW THE EVOLUTION OF THE INTERNET IMPACTED THE DEVELOPMENT OF E-COMMERCE ECOSYSTEMS

We are witnessing a sizable and lasting shift to e-commerce across the economy, a movement entirely catalyzed by a single, revolutionary technological advancement—the emergence of the internet. The internet made it possible for businesses and individuals to buy and sell items and services online, and in a very short period of time, consumers had the convenience of almost unlimited selection available to them from the comfort of their homes, 24/7, with just a few clicks of a button.

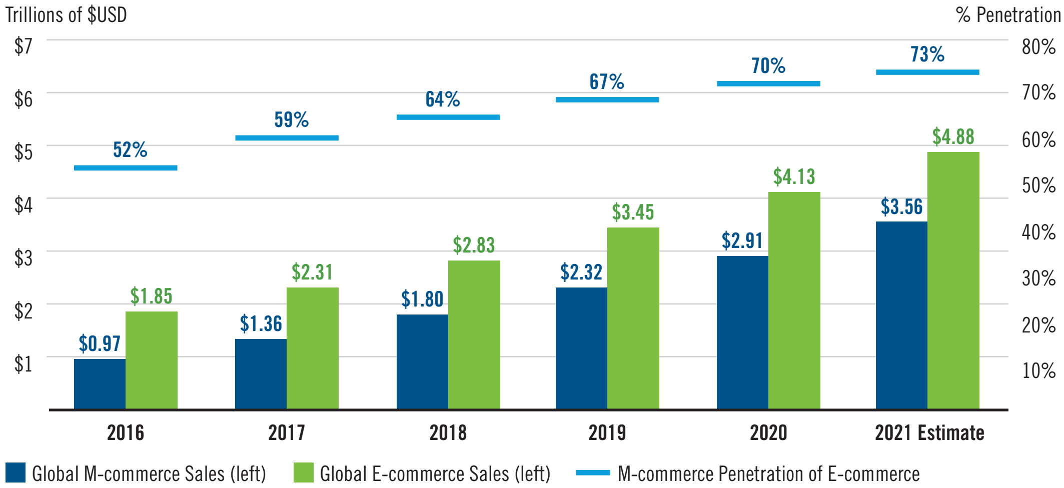
Books were one of the earliest categories of items sold online and were in fact the only thing Amazon sold when it went public in 1997. Books were a logical starting category for online retail, as they are mostly the same size, easy to ship, simple to describe using typeface, and a category where virtually unlimited selection mattered. More importantly, books were easy to sell within the constraints of dial-up internet. All of the early pioneers of e-commerce, whether that was Amazon, eBay, Craigslist, or Etsy, relied on simple web pages that were typically less than 1 megabytes (MB) in size to describe and sell their product. Dial-up service, while slow, was sufficient to load these web pages. It was only as internet technology evolved from dial-up service to coaxial cable and fiber that we saw the expansion of e-commerce into many more categories. This included video streaming like Netflix and YouTube, video advertisements through platforms such as Facebook and Instagram, video calling with Zoom and Microsoft Teams, online education, cloud services, and many others. All of what we know as e-commerce today was only made possible by the existence and development of the internet, and increasing internet speeds led to expanding possibilities.

However, in its infancy, the internet, and thus e-commerce, was not available to all households. Even in 2007, less than 50% of adult Americans had a broadband connection at home.[2] The invention of the smartphone, or basically a pocket computer, allowed anyone anywhere to be connected online. Smartphone penetration grew rapidly from less than 11% of the US population in 2007,[3] when the iPhone first launched, to over 80% today.[4]

NEARLY THREE QUARTERS OF E-COMMERCE PURCHASES ARE MADE WITH A MOBILE DEVICE

Exhibit 1: Global Mobile Commerce as a Share of Total Global E-commerce

As of February 9, 2021



Source: eMarketer, Global eCommerce Update 2021.

Today, mobile e-commerce, otherwise known as m-commerce, comprises about 70% of total e-commerce sales globally and has more than tripled since 2015.[5,6]

In addition, smartphone mobility has allowed the internet to move beyond category expansion and into entirely new businesses, like location-based advertisements and ride sharing. So, while the internet was foundational to the existence of e-commerce, the smartphone has made accessibility much more ubiquitous to the general population and has made e-commerce as universal as it is today.[7]

PAYMENTS AND LOGISTICS: CRITICAL E-COMMERCE-SUPPORTING ECOSYSTEMS

If the internet was foundational, then payments and logistics were critical. Returning to the analogy introduced earlier, when a river shifts, the diverted water pools in new areas, and in those pools form new ecosystems and biodiversity. Let us say that after this river shifted, one of the resulting pools became home to trout. For those trout to exist, other life forms—smaller fish, insects, algae, bacteria, etc.—must also develop to play supporting, yet critical, roles in the ecosystem. It is much the same within e-commerce. Big platforms, like Amazon and Alibaba, exist and flourish because critical infrastructure like payments and logistics evolved to support them.

Today, payments is a thriving area of investment that benefits both from the shift away from cash—a trend COVID-19 accelerated—and the industry's unique position in a positive feedback loop with e-commerce. Just as mobile phones helped accelerate e-commerce, e-commerce accelerated digital payments, helping drive demand to build new infrastructure for virtual transactions. Today, the market capitalization of the top five public payments companies is nearly US$1.5 trillion.[8] Within the industry, innovation has flourished. Take, for example, Shop Pay, a Shopify service that is similar to Apple Pay and Google Pay. It allows customers to checkout 60% faster and results in 18% higher conversion rates from returning shoppers due to its one-tap accelerated checkout.[9] Another example is the "pay later" checkout option, which increases conversion and allows customers to delay payment instantly, all while utilizing alternative data and artificial intelligence to automate the credit risk assessment. These types of innovations and offerings within payments continue to chip away at customer pain points and drive further penetration of e-commerce.

If payments were pulled happily along in the wake of online buying, then logistics were grudgingly and laboriously yanked along. Logistics and fulfillment are ultimately expensive and complex networks that require significant coordination and planning. The term logistics refers to everything that goes into getting the finished product from manufacturer to end destination (as well as the reverse with returns). Relative to brick-and-mortar stores, e-commerce requires a 400% increase in spending on distribution centers and transportation to the consumers.[10] In fact, the total fulfillment costs to serve an e-commerce customer is 2.5–3× that of a brick-and-mortar retail customer. However, as a result, the number of warehouses, warehouse employees, logistics robotics and technologies that improve warehouse efficiency have seen tremendous growth in the last decade as retailers increasingly shift online. Amazon, one of the largest e-commerce platforms in the world, spends US$46 billion on fulfillment alone, and these costs grew 34% in 2019 compared to the previous year (due primarily to the shift to free 1-day delivery for Prime users).[11] Not surprisingly, COVID-19 accelerated logistics adoption. Amazon reported a 49% increase in shipping costs in the first quarter of 2020 and hired 85,000 new workers to deal with the increased demand for products on their platform.[12] Similarly, Honeywell's Intelligrated, a leader in warehouse automation, saw greater than 300% order growth in the second quarter of 2020 as companies scrambled to make their warehouse operations more efficient.[13] Though difficult and complicated, logistics is an industry that is quickly evolving, as consumers demand greater and greater convenience. This in turn increases their willingness to buy things online, driving further e-commerce penetration.

While we have offered two significant examples here, it is important to note that e-commerce has fundamentally changed many more industries, such as social media, online security, customer support, and website development. These symbiotic ecosystems continue to evolve and accelerate the e-commerce trend, pushing our definitions of convenience and spurring further penetration and disruption. We believe a cohesive view of the entire ecosystem including supporting platforms is essential to our understanding of the pace and duration of e-commerce. We also believe that it is this cohesive view that differentiates us from other investors in this space who often have too narrow of a purview, isolated and defined by industry sectors as opposed to the underlying trends themselves.

Symbiotic ecosystems continue to evolve and accelerate the e-commerce trend, pushing our definitions of convenience and spurring further penetration and disruption.

THE FUTURE: ACCELERATION OF E-COMMERCE TRENDS

As we look to the future, we are encouraged by the trends we are seeing. In many ways, the pace of change is accelerating. Technologies like 5G and virtual reality drive our optimism, and we believe will drive further penetration of e-commerce as well. We see new businesses and new business models continuing to emerge. Globally, we see countries leapfrogging the United States, as adopting new technologies is more efficient without legacy infrastructure. Finally, we believe the COVID-19 pandemic will in many areas create lasting change in people's habits.

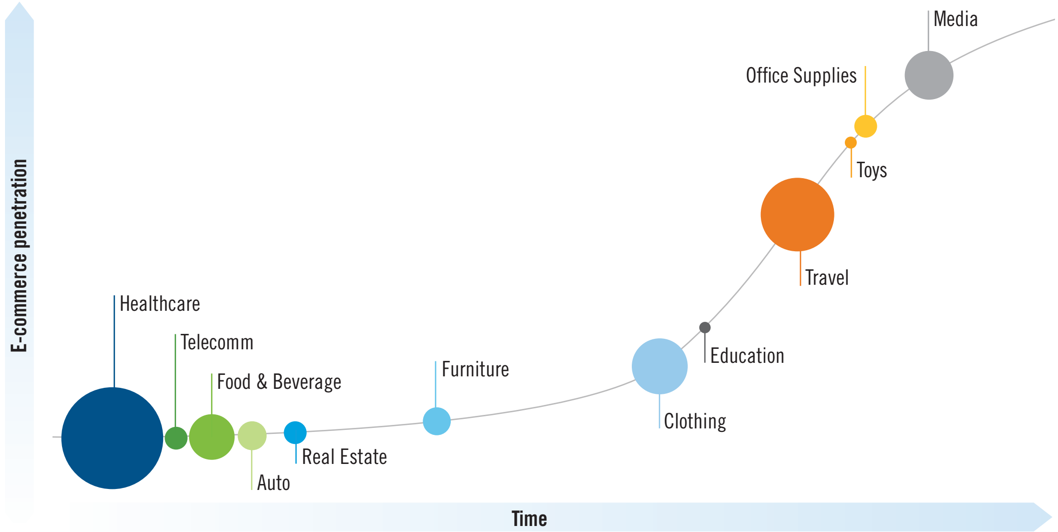
Technological advancements like 5G will accelerate penetration

Advancements in technology have historically accelerated e-commerce penetration and we believe will continue to do so. After all, it would be impossible to have media streaming services or cloud services running on dial-up internet. Today, we are on the precipice of 5G, which promises latency speeds as low as 1 millisecond versus 50 milliseconds in 4G. Longer term, we believe this will allow for advancements in augmented reality and virtual reality. Lower latency will be integral to industries that require specificity on an individual basis. Imagine a world in which, using augmented and virtual reality, you could "walk around" the home you're interested in buying, feel what it's like to drive a certain car, see how clothes look on yourself without trying them on, and see how a piece of furniture would look within your home virtually. With this technology in mind, we look at the industries that still have very low penetration of e-commerce and we see promising futures—these include real estate, auto, furniture and health care.

PLENTY OF GROWTH TO GO: WE ARE EARLY ON THE S-CURVE

Exhibit 2: E-commerce penetration in select industries

As of February 9, 2021



Note: the circles along this curve denotes the respective size of each industry listed—the bigger the circle, the larger the industry.

Source: Franklin Templeton. For illustrative purposes only. This commentary reflects the analysis and opinions of the investment team and may differ from the opinions of other portfolio managers, investment teams or platforms at Franklin Templeton. Because market and economic conditions are subject to rapid change, the analysis and opinions provided may change without notice. Statements of fact are from sources considered reliable, but no representation or warranty is made as to their completeness or accuracy.

New business models will emerge

The ability of the internet to bring together a vast set of diverse consumers, with a wide range of preferences, instantaneously creates a rich backdrop for new businesses and business models to emerge. For instance, the sharing economy is an economic model that allows users to maximize their assets' utilization, therefore increasing economic efficiency. Though made famous with ride and auxiliary home sharing, these new business models can also extend to primary residences, campgrounds, freelance services, office space, and even clothing and jewelry. Creating a two-sided, trust-based market requires a lot of innovation, including rating systems, more complex distribution, and new forms of customer service.

Another area where we see the emergence of new businesses is in online price discovery. Price discovery has become more efficient as multiple types of auction models emerge, such as: the highest bidder auction format; the lowest price clearing auction (Dutch auction) format; and, finally algorithm-enhanced auctions where frequency, relevance, and other factors are blended together to produce the best outcome. These new business models have created more powerful competitors within existing industries, expanding their respective addressable markets.

Group buying, social media and influencers are also making shopping more engaging and fun. As we look to the future, we are excited by what additional retail technologies we see emerging on the horizon. For example, new technology that solves the tremendous complexities of managing individual low price point Stock Keeping Units (SKUs) in an omni-channel environment, allowing online purchases, and returns or exchange in-store. We've even seen software developed to help businesses navigate the 12,000 different local tax jurisdictions in the United States in real time. Same-day shipping, third-party fulfillment, facial recognition, authentication security software, edge computing—all areas of promising new growth. We believe this Cambrian-like explosion of new businesses and business models in the e-commerce world will create significant opportunity for investment. That said, we are always aware that the innovators and disruptors of today may one day be disrupted themselves tomorrow. Ever vigilant of this concept, we firmly believe active management is necessary to invest in innovation.

We are always aware that the innovators and disruptors of today may one day be disrupted themselves tomorrow. Ever vigilant of this concept, we firmly believe active management is necessary to invest in innovation.

International leapfrogging

Many countries do not have the equivalent legacy infrastructure as the United States. At first blush this may seem like a disadvantage, but in some cases, the lack of incumbents and existing infrastructure allows them to leapfrog the United States. For example, China is the largest e-commerce market in the world. With nearly US$2 trillion in retail e-commerce sales and 36% penetration rates in 2019, it has far surpassed the United States US$600 billion or 16% penetration rates.[14,15] Despite similar geographic size and four times the population, China has only 2.8 retail sq ft/per person, less than 1/8th that of the United States at 23.5 sq ft/person.[16] The country's lack of a legacy retail footprint has allowed it to quickly adopt e-commerce trends at a faster pace than the United States.

We see similar dynamics in mobile payments. China never fully embraced the use of credit cards, and this fact allowed them to adopt mobile payments significantly faster than the United States by jumping straight from a cash society to a mobile payment society. We believe the same phenomenon will happen in other countries and other emerging markets. For example, Latin America is only about 4.5% penetrated in e-commerce with a nearly 22% growth rate. Mexico's e-commerce penetration grew 35% in 2019.[17] India, the Philippines and Malaysia are three of the top five fastest growing e-commerce countries in the world.[18] Looking at e-commerce globally, we see the leapfrogging of many countries as further accelerating e-commerce trends.

Long-term effects of COVID-19

Today, we are seeing a drastic acceleration in the secular shift to e-commerce because of COVID-19. This crisis is unprecedented, but like so much of the history that we like to study, we have some parallels. We have witnessed other exogenous events in the past that have had similar accelerating and lasting effects. India's banknote demonetization is one such example. On November 8, 2016, Indian Prime Minister Narendra Modi announced in a live unscheduled televised address that the use of all 500- and 1,000- rupee banknotes—86% of Indian currency in circulation at that time—would be invalid past midnight.[19] One of the many and widespread effects of this sudden cash shortage was that online retailers saw a noticeable and sustained increase in the adoption of digital payments following the demonetization. Most consumers maintained this level of usage even after the cash shortage had concluded, showing that macro events can have long lasting effects on consumer behaviors.[20,21]

COVID-19 will likely have a similarly lasting effect on our economy. As shelter-in-place continues to rely on e-commerce to fulfill consumer demand, cashless and contactless payments, fast fulfillment, online security and virtual "window shopping" will become an even more integral part of our day-to-day lives, and we believe companies supporting these capabilities will thrive.

On the other hand, as with any sudden shift in demand, some companies will struggle. J.C. Penney, Neiman Marcus, J. Crew and Barneys are just a few casualties filing for bankruptcy in 2020. And as these businesses fade, it will only further accelerate e-commerce trends as their customers will be forced to adapt in an online retail world.

In 1570, a 5.8 magnitude earthquake struck the city of Ferrara in Italy and changed the course of the Po River, moving it 20 kilometers to the north.[22] As it turns out, the earthquake was the last of a series of tectonic events—the "straw that broke the camel's back"—that lifted the southern portion of the Po Valley substantially and shifted the Po River a total of 40 kilometers north over 3,000 years. Where the river shifted, new aquatic life formed where none existed before. Where it disappeared, so too did many incumbent life forms. In time, we may very well see the COVID-19 pandemic as similar to the earthquake that moved the Po River. The pandemic shifted consumer behavior irreversibly. It as an event created winners and losers in all parts of the economy, and for us, an opportunity.

CONTRIBUTORS

Matthew Moberg, CPA
Senior Vice President,
Portfolio Manager

Franklin Equity Group

Joyce Lin, CFA
Vice President,
Analyst/Portfolio Manager

Franklin Equity Group

Will Holding
Research Associate

Franklin Equity Group

Endnotes

1. Source: *The New York Times*, "Los Angeles Rethinks Taxis as Uber and Lyft Dominate the Streets," January 12, 2020.
2. Source: Pew Research Centre, "Home Broadband Adoption 2007," July 3, 2007.
3. Source: OECD, "OECD Internet Economy Outlook 2012," Chapter 2, Figure 2.4, June 2012.
4. Source: Pew Research Centre, Mobile Fact Sheet, June 12, 2019.
5. Source: Business Insider, "Rise of M-Commerce: Mobile Ecommerce Shopping Stats & Trends in 2021," December 30, 2020.
6. Source: eMarketer, Global Ecommerce Update 2021.
7. Today almost 20% of Americans rely solely on their mobile phones for internet access with no home broadband service.
8. Source: Bloomberg L.P., Sum of Market Cap of Top 5 Financial Transaction Processors.
9. Source: Shopify.
10. Source: Prologis, "Unlocking Supply Chain Value," June 2018.
11. Source: *Digital Commerce 360*, "Jeff Bezos Sets his Departure as CEO as Amazon reports a Record Year," February 2, 2020.
12. Source: Supply Chain Dive, Amazon's Fulfillment Slows, Coronavirus Adds $4b in Projected Q2 Operational Cost," April 30, 2020.
13. Source: Honeywell SPS analyst day.
14. Source: eMarketer, "E-commerce Continues Strong Gains Amid Global Economic Uncertainty," June 30, 2019
15. Source: Bank of America, US Department of Commerce, Shaw Sprint Research.
16. Source: *Business Insider*, "The retail apolocypse is still in its 'early innings'—and thousands more stores will close before it ends," October 3, 2018.
17. Source: Morgan Stanley, "Playbook for the Digital Age: Initiating on LatAm Retail & e-commerce", 2020.
18. Source: eMarketer, "E-commerce Continues Strong Gains Amid Global Economic Uncertainty," June 30, 2019.
19. Source: Bandi Chaithanya, Moreno Tom, Ngwe Donald, and Zhiji Xu, *The Effect of Payment Choice on Online Retail: Evidence from the 2016 Indian Demonetization*, June 27, 2019.
20. Source: Chodorow-Reich, G., Gopinath, G., Mishra, P., and Narayanan, A. (2018). *Cash and the Economy: Evidence from India's Demonetization.* Technical report, National Bureau of Economic Research.
21. Source: Agarwal, S., Basu, D., Ghosh, P., Pareek, B., and Zhang, J. (2018). *Demonetization and digitization. Social Science Research Network Working Paper.*
22. Source: Pettenati, F., Sirovich, L., Source inversion of the 1570 Ferrara earthquake and definitive diversion of the Po River (Italy), JGR Solid Earth, American Geophysical Union, Volume 120, Issue 8.

WHAT ARE THE RISKS?

All investments involve risks, including possible loss of principal. All investments involve risks, including possible loss of principal. Stock prices fluctuate, sometimes rapidly and dramatically, due to factors affecting individual companies, particular industries or sectors, or general market conditions. Special risks are associated with foreign investing, including currency fluctuations, economic instability and political developments. Investments in emerging markets involve heightened risks related to the same factors, in addition to those associated with these markets' smaller size and lesser liquidity. Investments in fast-growing industries like the technology sector (which historically has been volatile) could result in increased price fluctuation, especially over the short term, due to the rapid pace of product change and development and changes in government regulation of companies emphasizing scientific or technological advancement or regulatory approval for new drugs and medical instruments. The companies and case studies shown herein are used solely for illustrative purposes; any investment may or may not be currently held by any portfolio advised by Franklin Templeton Investments. The opinions are intended solely to provide insight into how securities are analyzed. The information provided is not a recommendation or individual investment advice for any particular security, strategy, or investment product and is not an indication of the trading intent of any Franklin Templeton managed portfolio. This is not a complete analysis of every material fact regarding any industry, security or investment and should not be viewed as an investment recommendation. This is intended to provide insight into the portfolio selection and research process. Factual statements are taken from sources considered reliable but have not been independently verified for completeness or accuracy. These opinions may not be relied upon as investment advice or as an offer for any particular security. Past performance does not guarantee future results.

Any companies and/or case studies referenced herein are used solely for illustrative purposes; any investment may or may not be currently held by any portfolio advised by Franklin Templeton. The information provided is not a recommendation or individual investment advice for any particular security, strategy, or investment product and is not an indication of the trading intent of any Franklin Templeton managed portfolio.

IMPORTANT LEGAL INFORMATION

This material is intended to be of general interest only and should not be construed as individual investment advice or a recommendation or solicitation to buy, sell or hold any security or to adopt any investment strategy. It does not constitute legal or tax advice.

The views expressed are those of the investment manager and the comments, opinions and analyses are rendered as at publication date and may change without notice. The information provided in this material is not intended as a complete analysis of every material fact regarding any country, region or market. **All investments involve risks, including possible loss of principal.**

Data from third party sources may have been used in the preparation of this material and Franklin Templeton ("FT") has not independently verified, validated or audited such data. FT accepts no liability whatsoever for any loss arising from use of this information and reliance upon the comments opinions and analyses in the material is at the sole discretion of the user.

Products, services and information may not be available in all jurisdictions and are offered outside the U.S. by other FT affiliates and/or their distributors as local laws and regulation permits. Please consult your own financial professional or Franklin Templeton institutional contact for further information on availability of products and services in your jurisdiction.

Issued in the U.S. by Franklin Templeton Distributors, Inc., One Franklin Parkway, San Mateo, California 94403-1906, (800) DIAL BEN/342-5236, franklintempleton.com—Franklin Templeton Distributors, Inc. is the principal distributor of Franklin Templeton U.S. registered products, which are not FDIC insured; may lose value; and are not bank guaranteed and are available only in jurisdictions where an offer or solicitation of such products is permitted under applicable laws and regulation.

Australia: Issued by Franklin Templeton Investments Australia Limited (ABN 87 006 972 247) (Australian Financial Services License Holder No. 225328), Level 19, 101 Collins Street, Melbourne, Victoria, 3000 / **Austria/Germany:** Issued by Franklin Templeton Investment Services GmbH, Frankfurt, Mainzer Landstr. 16, 60325 Frankfurt/Main, Tel 08 00/0 73 80 01 (Germany), 08 00/29 59 11 (Austria), Fax +49(0)69/2 72 23-120, info@franklintempleton.de, info@franklintempleton.at / **Canada:** Issued by Franklin Templeton Investments Corp., 200 King Street West, Suite 1500 Toronto, ON, M5H3T4, Fax (416) 364-1163, (800) 387-0830, www.franklintempleton.ca / **Netherlands:** Franklin Templeton International Services S.à r.l., Dutch Branch, World Trade Center Amsterdam, H-Toren, 5e verdieping, Zuidplein 36, 1077 XV Amsterdam, Netherlands. Tel +31 (0) 20 575 2890 / **United Arab Emirates:** Issued by Franklin Templeton Investments (ME) Limited, authorized and regulated by the Dubai Financial Services Authority. Dubai office: Franklin Templeton, The Gate, East Wing, Level 2, Dubai International Financial Centre, P.O. Box 506613, Dubai, U.A.E., Tel +9714-4284100, Fax +9714-4284140 / **France:** Issued by Franklin Templeton International Services S.à r.l., French branch., 20 rue de la Paix, 75002 Paris France / **Hong Kong:** Issued by Franklin Templeton Investments (Asia) Limited, 17/F, Chater House, 8 Connaught Road Central, Hong Kong / **Italy:** Issued by Franklin Templeton International Services S.à.r.l.—Italian Branch, Corso Italia, 1—Milan, 20122, Italy / **Japan:** Issued by Franklin Templeton Investments Japan Limited / **Korea:** Issued by Franklin Templeton Investment Trust Management Co., Ltd., 3rd fl., CCMM Building, 12 Youido-Dong, Youngdungpo-Gu, Seoul, Korea 150-968 / **Luxembourg/Benelux:** Issued by Franklin Templeton International Services S.à r.l.—Supervised by the Commission de Surveillance du Secteur Financier–8A, rue Albert Borschette, L-1246 Luxembourg, Tel +352-46 66 67-1, Fax +352-46 66 76 / **Malaysia:** Issued by Franklin Templeton Asset Management (Malaysia) Sdn. Bhd. & Franklin Templeton GSC Asset Management Sdn. Bhd / **Poland:** Issued by Templeton Asset Management (Poland) TFI S.A.; Rondo ONZ 1; 00-124 Warsaw / **Romania:** Franklin Templeton International Services S.À R.L. Luxembourg, Bucharest Branch, at 78-80 Buzesti Str, Premium Point, 8th Floor, Bucharest 1, 011017, Romania. Registered with Romania Financial Supervisory Authority under no. PJM07.1AFIASMDLUX0037/10 March 2016 and authorized and regulated in Luxembourg by Commission de Surveillance du Secture Financiere. Telephone: + 40 21 200 9600 / **Singapore:** Issued by Templeton Asset Management Ltd. Registration No. (UEN) 199205211E. 7 Temasek Boulevard, #38-03 Suntec Tower One, 038987, Singapore / **Spain:** Issued by Franklin Templeton International Services S.à r.l.—Spanish Branch, Professional of the Financial Sector under the Supervision of CNMV, José Ortega y Gasset 29, Madrid, Spain. Tel +34 91 426 3600, Fax +34 91 577 1857 / **South Africa:** Issued by Franklin Templeton Investments SA (PTY) Ltd which is an authorised Financial Services Provider. Tel +27 (21) 831 7400, Fax +27 (21) 831 7422 / **Switzerland:** Issued by Franklin Templeton Switzerland Ltd, Stockerstrasse 38, CH-8002 Zurich / **UK:** Issued by Franklin Templeton Investment Management Limited (FTIML), registered office: Cannon Place, 78 Cannon Street, London EC4N 6HL, Tel +44 (0)20 7073 8500. Authorized and regulated in the United Kingdom by the Financial Conduct Authority / **Nordic regions:** Issued by Franklin Templeton International Services S.à r.l., Contact details: Franklin Templeton International Services S.à r.l., Swedish Branch, filial, Nybrokajen 5, SE-111 48, Stockholm, Sweden. Tel +46 (0)8 545 012 30, nordicinfo@franklintempleton.com, authorised in the Luxembourg by the Commission de Surveillance du Secteur Financier to conduct certain financial activities in Denmark, in Sweden, in Norway, in Iceland and in Finland. Franklin Templeton International Services S.à r.l., Swedish Branch, filial conducts activities under supervision of Finansinspektionen in Sweden / **Offshore Americas**: In the U.S., this publication is made available only to financial intermediaries by Templeton/Franklin Investment Services, 100 Fountain Parkway, St. Petersburg, Florida 33716. Tel (800) 239-3894 (USA Toll-Free), (877) 389-0076 (Canada Toll-Free), and Fax (727) 299-8736. Investments are not FDIC insured; may lose value; and are not bank guaranteed. Distribution outside the U.S. may be made by Templeton Global Advisors Limited or other sub-distributors, intermediaries, dealers or professional investors that have been engaged by Templeton Global Advisors Limited to distribute shares of Franklin Templeton funds in certain jurisdictions. This is not an offer to sell or a solicitation of an offer to purchase securities in any jurisdiction where it would be illegal to do so.

Please visit www.franklinresources.com to be directed to your local Franklin Templeton website.

CFA® and Chartered Financial Analyst® are trademarks owned by CFA Institute.

FRANKLIN TEMPLETON