EXPLORING THE FUTURE OF RUSSIA'S ECONOMY AND MARKETS

In this extraordinary, essential volume, Bruno Sergi has put together a diverse, multinational, multidisciplinary collection of authors to explore the most important, most relevant trends in Russian economic development. This book deserves a wide audience of scholars and practitioners of policy and management.

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(Primakov Institute of World Economy and
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Industry, Innovation and Entrepreneurship;
Chairman of the Commission on Legal Support of the
Development of Organizations of Defence-Industrial Sector.

EXPLORING THE FUTURE OF RUSSIA'S ECONOMY AND MARKETS: TOWARDS SUSTAINABLE ECONOMIC DEVELOPMENT

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Preface

The emerging market economies' booming and fast-developing local consumer markets, abundant low-cost labor, and rising middle class have been the significant characteristics of the world economy. They showcase some of the most appealing economic growth stories since the end of World War II, and we have noticed the shift in wealth from developed economies to emerging markets. According to national data, advanced economies accounted for an average of over 59% of world GDP (at purchasing power parity) from 1980 to 2007, while the combined share of developing and emerging economies was 41%. Since 2007, this share has been wholly reversed, and the emerging and developing nations now account for 59.25% of the world's GDP. This fact has naturally attracted much attention. However, upon closer examination, scholars find that the landscape is fraught with an ongoing slowdown across some of the world's major emerging markets and complex social, economic, and financial systemic risks. Russia is one of these countries that paradoxically exhibit enormous potential. With a remarkable GDP growth rate during the 2000s, Russia has changed, but not enough to compete regarding smart industrialization and modernization, which are still a long way off. Considering these realities, I intended to produce an analysis of the challenging issues faced by Russia and its people in a perspective of sustainable growth, suggesting issues, analysis, and ways of solving these challenges. However, let me kick off with a simple question. What is Russia? This vast country, the world's largest one, no doubt rich in natural resources, straddling Europe, Asia, the Pacific and the Arctic oceans, a fantastic landscape, and history, it is home to economic and industrial markets that can become of immense scale. Russia is an essential, critical player in an unprecedently complex global economy. It has yet to exploit its unique position within this brave new world fully. That is, Russia is a relevant country to explore during such groundbreaking and critical times. As the sheer scale of Russia and cultural position between the booming Asian region and western Europe, Russia is a case essential and unique. Therefore, I wanted to produce a book that is a first serious attempt to deal with the economic potentiality Russia has, and the extraordinary range of chapters forms a coherent read.

Exploring the Future of Russia's Economy and Markets offers the first serious study of Russia's contemporary economic growth and economic aptitude. A full spectrum of financial, banking, and technology innovation have developed, and we can expect that more changes and innovations will shape Russia, and more disruptive financial technologies will come in soon. Endeavoring to bring all these perspective in one single volume was my primary goal. Moreover, as a current associate of the Harvard's Davis Center for Russian and Eurasian Studies, having the first international meeting of the International Center for Emerging Markets Research held at Harvard could be the ideal venue. Based on the April

2017 conference "'New Reality' and Russian Markets" that was held at Harvard University and co-hosted by Harvard Davis Center for Russian and Eurasian Studies and RUDN University, Moscow, it brings together world-renowned thinkers to offer the latest empirical research on financial risks and stability, fintech, industrial policies and technological parks, TNCs, the oil and natural gas industry, and the impact of international sanctions on Russia's sustainable development. Cumulatively, the chapters I gathered here to demand that Russia looks for alternative drivers to get its economy going. The distinguished colleagues and economists here offer flexible bases for economic and financial stability that would foster sustainable economic development for Russia.

Although the continuing western sanctions, Russia has enormous economic potentialities. In this context, I wanted to look at the case of how Russia is now doing to create employment, development, and prosperity. Russia has the tenth largest population in the world, of 144 million people, unemployment has been around the 7.6% mark from 1993 until 2017, and it is less than 5% at the time of writing this preface. It does not have now a booming market economy like other emerging markets do, although its primary source of growth in the last few years, i.e., during the first two terms of President Vladimir Putin's presidency, has been the oil and gas industry. Nevertheless, it needs to find alternative sources to be able to make rapid progress in the changing landscape of the global economy.

This edited volume aims to highlight the economic impact these new realities are having on the Russian economy and how it will help Russia to shift its dependence from its natural resources of oil and natural gas to other critical factors, such as IT, innovation and technological projects. If in the past, Russia has been heavily reliant on oil and natural gas revenues, which had been the core of the economy, however, an ever-changing situation demands that Russia look for alternative means to get its economy going instead of relying on oil and natural gas as it has been doing over the past several years. I think to cope with external sanctions, Russia is moving towards a greener economy based on the concept of preservation of natural resources and development of innovations. Even though Russia has been a relevant crude oil producer for the past 130 years, oil production has spurred economic growth for the country during the 2000s and affected Russia's overall international influence. However, Russia's natural resources did not turn out to be a permanent bonanza for Moscow because of price fluctuations. Russia is experiencing a significant change on the way to the sustainable development path with greater welfare conditions for the Russians. Importantly, perspectives are much different today because Russia is a world player, giving the country an unrivaled stake.

The volume is the product of a conference that has been taken place at Harvard University's Davis Center for Russian Studies on April 10, 2017, center to whom I am an associate since 2013, and organized by the International Center for Emerging Markets Research at RUDN University, Moscow. Having in mind graduate students, researchers, and professionals alike, this book catalyzes cutting-edge research and rigorous conceptual and empirical chapters,

presenting in-depth and yet digestible way for the students and professionals. The volume is committed to innovating the literature panorama and remain committed to broadening the knowledge about Russia and explore the intellectual answers to the problems in the functioning of the present-day Russian market and institutions. It explores the subjects of contemporary trends in Russian economic performance as well toward financial stability.

All in all, *Exploring the Future of Russia's Economy and Markets* examines Russia's promises and realities from both a theoretical and empirical perspective. Grounded in state-of-the-art and comprehensive coverage, all contributors present theoretical and econometric analysis of past and current trends, provide up-to-date technical portrayals on the economic challenges including the dynamics and prospects of Russia's economics. Moreover, with an added endeavor of disentangling and breaking the markets down to see what the resulting outcomes, directions, and strategies would be. Although each chapter will be a stand-alone piece of analysis, the entire volume communicates new insights to students who are interested in the Russian economic experiment and eventually concerned with its policy and applications. The book is very comprehensive and offers a friendly reading style. The chapters provide definitive new insights into the evolving Russia's economics that was the central theme of the conference held at Harvard. The distinguished economists have been able to articulate rock-solid economic thoughts and methodologies that would help understand how Russia might take full advantage of its position within the world economy and foster its sustainable economic development. I very much hope that *Exploring the Future of Russia's Economy and Markets* may shape future lines of inquiry on the causal factors and limits of economic policy in Russia and for its original insights into frontier topics, the book is exceptionally worth to read and likely to stimulate analysis for economists and policymakers.

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Chapter 1

How Can FinTech Impact Russia's Development?

Kevin Chen and Bruno S. Sergi

1.1. Introduction

Financial technology (FinTech) has been evolving rapidly over the past decade. There have been more confusion and misunderstanding about what is the field of FinTech? What does FinTech want to achieve? Why are FinTech firms suddenly becoming so crucial to the society? Are we going to see the end of the traditional financial market? Apparently, many traditional monetary policy and tools are less effective after the 2008 global financial crisis. As King (2016) wrote in his highly influential book, the credit creation function by traditional banking system has been severely challenged over the past decade. Since the FinTech innovations are rapidly evolving, there has been limited research on this subject. We first review the FinTech development in the West and Asia, to gain perspectives of how Russia's FinTech could evolve.

Gomber, Koch, and Siering (2017)'s recent chapter surveyed recent research in the digital finance field and pointed some exciting directions for future research. Haddad and Hornuf (2016) discussed the technological determinants of the global FinTech market. Arner, Barberis, and Buckley (2015) provided a summary of the FinTech development from historical and legal perspective. Regulatory regime changes were suggested in the chapter as a primary reason for the FinTech to be developed rapidly in emerging markets. On a more specific topic of blockchain technology, Walch (2015) detailed the operational risk aspect of the technology. With regard to the investing perspectives of FinTech, Kuo, Lee, and Teo (2015) suggested essential factors for these firms to be viable. Dhar and Stein (2016) summarized current FinTech platforms and strategies. Schindler (2017)'s chapter showed that FinTech firms were bringing profound changes and innovation to the financial industry. Philippon (2017) demonstrated that FinTech could improve both financial stability and access to services, albeit at a changed regulatory regime.

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It is fair to say that due to the recent rapid development of the subject, many of these researchers did not cover the latest innovations. Also, some of them tended to focus on a narrow technical aspect of FinTech. Others tended to look at the topic from the legal and regulatory point of view. For example, in their recent chapter, Buchak et al. (2017) presented the regulatory arbitrage for FinTech firms in the US. Zetzsche, Buckley, and Arner (2017)'s chapter discussed the specific liability of distributed ledgers as the legal risks of the blockchain. In a recent study about the risk pricing within FinTech industry, Jagtiani and Lemieux (2017) gave evidence that the alternative information was used in the pricing process. On the other hand, Guild (2017) argued that adopting a responsive regulatory approach was suitable to increase the financial inclusion. Bromberg, Godwin, and Ramsay (2017) suggested using sandboxes approach to achieve a balance between regulation and innovation in FinTech. Even traditional central bank functions might be disrupted by the FinTech development, as discussed by Caruana and Warsh (2017) in their joint research presented to a conference hosted by the Basel Bank of International Settlements. From an application point of view, Ma, Nahal, and Tran (2017), at Bank of America Merrill Lynch research team, published a detailed handbook about Global Big Data Investment. For technical details about bitcoin futures that have been listed on Chicago Board Options Exchange, CBOE's introduction chapter (2017) is a useful reference.

In the study by Chen (2018), an overview of the FinTech industry was provided, with a strong emphasis on the recent development in the applications of these newly set up unicorns. The financial market has experienced constant innovation. For the past 10 years, the convergence of finance and technology has been truly revolutionary. The financial crisis of 2008 put the global financial system toward the brink of collapse. In the aftermath of the crisis, most of the large financial institutions in the US and the rest of the world have been in a shell-shocked mode. Many of them took government bailout money, which severely restricted their capability and willingness to take the risk. Most of the traditional financial institutions became extremely risk-averse. Thus, the leadership of financial innovation has been passed on to many smaller start-up financial firms, or large technology firms, that have little-to-no crisis baggage and regulatory burden. It is indeed a welcome changing of guards since the new entrants to the financial innovation have been less driven by financial rewards in a traditional sense and more driven by a vision for more social inclusion. In this chapter, we survey the new world of financial innovation with the new smart players.

Russian technology firms have been at the forefront of this FinTech innovation wave. Russian investors are among the most active venture capital investors globally. For example, Russian billionaire Yuri Milner's DST Global is an early investor of more than 30 technology start-ups globally. Since, in many areas of the traditional financial market, Russia has had lackluster domestic development, FinTech companies could well be the area that Russia leapfrogs ahead, due to its vast expertise in information technology space. Also, cyberworld could mitigate hugely the physical distance challenge for a nation like Russia, which

encompasses 12 time zones. Kakushadze and Liew (2017) discussed the exciting case of Russian government-backed cryptocurrency, CryptoRuble.

1.2. Payment

One core function of traditional financial institutions is to facilitate payments. Ever since the modern banks were created in Italy, they have been serving as the intermediary between the payer and the payee. No matter if it is a small person-to-person money transfer or a sizeable corporate payment of hundreds of millions to merchandize suppliers. The payment process has been notoriously slow, inefficient, and expensive with the traditional banks.

PayPal is one of the earliest firms that started to challenge the existing model of payment through financial institutions. The company established a web-based system that relies on the users to submit payment to each other, without the need to open up complex bank accounts. Later, the company expanded its service to mobile devices. AliPay is a payment service that was launched by Chinese e-commerce giant Alibaba. The service was launched in 2012, and it has already attracted 451 million active users. Many of these users did not have access to banking services previously. In India, a similar service called PayTM has been launched and has grown rapidly.

In an interesting development, two friends Andrew Kortina and Iqram Magdon-Ismail, who met as freshman roommates at the University of Pennsylvania, started a peer-to-peer mobile payment service Venmo. The company was eventually acquired by PayPal. The unique feature of Venmo is its social network component. Since it is used mainly for splitting small bills between friends, meals or movies, the social interactions are called "Venmo time."

In a groundbreaking chapter, Nakamoto (2009) proposed a direct payment system that will not go through traditional financial institutions. Two parties can effectively conduct an immediate payment, using an online blockchain of information. The maintenance of the information accuracy is achieved by computers, and the rewards are "bitcoins" that are generated by the booking efforts. The proof-of-work, or PoW, cannot be changed without rewriting the whole chain, which is close to impossible. With the network of users of bitcoins increasing exponentially, the value of bitcoin rose many hundred times.

Since then, the traditional payment system has been disrupted by the introduction of blockchain technology. The blockchain is mostly a global anonymous secured recording of a data ledger. Many cryptocurrencies have been invented based on the blockchain, including the most well-known one bitcoin. Despite all the concerns of high volatility and lack of government supervision, blockchain is likely to survive and prosper, bringing along a new wave of payment channels. For a survey of major cryptocurrencies, one can refer to a recent publication from Morgan Stanley (2017). Higginson, Lorenz, Münstermann, and Olesen (2017) provided a discussion about what blockchain technology can be used in the payment system. For industry use cases, IBM (2017) illustrated real-life examples of blockchain applications. In many countries, cryptocurrencies have

been accepted as an alternative payment choice. Notably, the Ministry of Finance of Germany (Bundesministerium der Finanzen, 2018) signed a decree recognizing bitcoin as legal tender in February 2018. The decree cites the decision of the European court of 2015, which determined bitcoin currency regarding taxation and abolished value-added tax when buying goods and services using cryptocurrency. Other countries are likely to publish similar regulations.

Due to limited traditional branch network in commercial banks in Russia, payment has been cumbersome and less efficient. With the increasing penetration of smartphones and 3G/4G network, it is possible to see a further reduction in traditional banking branch offices in Russia and increasing usage of online payment systems. Also, payment system through an online platform tends to be more efficient and less costly. It would be a more sustainable way of financial market development for average Russian citizens. There is also a possibility that Russia could develop a new P2P payment system that completely circumvents the traditional commercial banking payment system.

1.3. Loan and Credit

In addition to payments, credit and loan issuance is another core function of the modern financial system. In fact, for most of the financial institutions, issuing loans and charging interest is the bread and butter of their business. However, it is a well-known shortcoming that the traditional banking services have been inadequate for many segments of the society. The problems range from excessive lending to the subprime borrowers in the US, which ended up causing a worldwide financial crisis,[1] to lack of credit for small- and medium-size companies and start-ups, and other misallocations of resources.

Since the end of Great Recession of 2007–2009, the global banking system has been ordered by regulators in many countries to tighten up its lending criteria, which inevitably caused a lack of credit or capital formation for many regular borrowers. In many developing countries, the microcredit model invented by Professor Muhammad Yunus has been highly successful. He was awarded the Nobel Peace Prize for founding the Grameen Bank and pioneering the concepts of microcredit and microfinance.

Different from the rural area borrowers in emerging market countries, FinTech firms in the US loan and credit space have been tackling the problem from an urban and technology-savvy user base. Lending Club is a pioneer in this field and also a peer-to-peer lending platform. The concept is straightforward: People can go online and borrow directly from other users. Apparently, the platform needs to create a scoring system to grade and rank the credibility of hundreds of thousands of borrowers and hopefully allow borrowers to get a differentiated interest rate based on their individual creditworthiness. Since Lending Club's founding in San Francisco in 2006, the company has grown to

[1]The Financial Crisis Inquiry Report, US Government Printing Office, 2011.

1,500 employees and 400 million dollars in revenue in 2016. More importantly, Lending Club has been able to lend at an interest rate as low as 6%,[2] which was substantially lower than the interest rate charged by traditional credit card firms or banks.

In the US, the traditional payday loans have been used to charge high-interest rates on lower income borrowers. A payday loan is a small, short-term unsecured loan. The loans are also sometimes referred to as "loan sharks" or "cash advances," with the interest rate several times higher than a traditional bank loan. Typically, the borrowers have no credit card or other means to access credit. According to a Federal Reserve Report, "The typical brick-and-mortar payday lender charges $15 per $100 borrowed per two weeks, implying an annual interest rate of 391 percent!".[3]

CommonBond is a FinTech firm founded in New York in 2011, to address the predatory lending issue. Initially, the company was founded by three Wharton MBA students to address the high student loan interest rate problem. They have been able to help student refinance their loans with a much lower rate and drastically cut down their debt burden. Also, in the loan service, the company has aimed to achieve social vision by helping students "one-on-one" model.

For the peer-to-peer lending in UK, Bholat and Atz (2016) provided a survey of the three major lending platforms in UK. In China, Sesame Credit is a lending platform founded in Hangzhou, China, in January 2015, by Ant Financial, a Chinese FinTech company. Sesame's goal is to use online information to build a credit score for users and let them access financing by strong credit score. Since the start of the platform, already 130 million people have used the system to borrow small loans. It is clear that for a country like China, which did not have a credit system like credit bureaus in the US, FinTech firms are filling a gap that traditional banks were not able to fulfill. Later on, Sesame Credit was also used for a wide range of fields, including dating, classified ads, and public services.

Apparently, the traditional financial institutions are not willing to give up a hugely lucrative business to technology firms. Many of them are trying to learn and set up subsidiaries to compete for the Lending Clubs of the world again. Goldman Sachs Group Inc. has established its own peer-to-peer lending platform called Marcus formerly known as "Mosaic." Other banks have invested in the leading peer-to-peer lending firms to be part of the future growth.

Hubert and Matthey (2003) proposed a new lending strategy that allows private banks to profitably increase financing of small and medium companies in Russia. It is feasible to implement this with FinTech firms, which naturally use big data in making the loan decisions. A recent development in a remote Russian village might illustrate the "affordable credit" solution using

[2]"Interest Rates and How We Set Them". Lending Club. May 2012.
[3]Reframing the Debate about Payday Lending, Robert DeYoung, Ronald J. Mann, Donald P. Morgan, and Michael R. Strain. Federal Reserve Bank of New York, October 2015.

FinTech.[4] It was reported that a Russian farmer launched a cryptocurrency called *kolion*. He was able to convince local chicken farmers, dairy farmers, and tractor dealers to use *kolion* for lending to each other as the Russian commercial banks were not willing to extend credit to these smaller farmers. The drawback is that since the launch of *kolion*, its value had some similar rollercoaster move like many other cryptocurrencies.

1.4. Investment

FinTech firms have been disrupting the whole traditional financial ecosystem, and investing is no exception. From money market to fixed income assets, to equities, new firms have mushroomed in all areas of investment to provide better solutions. One reason for the dramatic growth of new investment firms in the FinTech space is the subpar service that the traditional investment advisors have offered. It is no secret that the majority of active mutual funds have underperformed a passive buy-and-hold index strategy while charging higher fees. The conflict of the "warehouse" investment banks in providing investment solutions has disappointed many individual investors and intuitional investors. Furthermore, the zero interest rate policy (ZIRP) by the Federal Reserve Bank, since 2008, or negative interest rate by major central banks, including European Central Bank, Swiss National Bank, and Bank of Japan, has forced many investors to look for alternative ways to gain any return that is better than zero.

1.4.1. Money Markets

For alternatives to traditional money market funds, the pioneer is probably the PayPal. PayPal has been running a highly successful payment business. Thus, it expanded toward money market fund business to provide investment choice for its users. The PayPal money market fund was incepted in January 1992, way ahead of its time. By the end of 2010, PayPal money market fund has attached more than 1.5 million investors, with average account balance at about US$300. Clearly, the concept proved to be well received by investors. However, due to the relatively large operation cost of the fund, at about 0.85% per year, the fund was run with an operational deficit covered by the PayPal company. Because of the ZIRP from the Federal Reserve System in the US, PayPal was losing money for two years, until it was shut down in mid-2011.

Yu'E Bao, a money market fund launched by Ant Financial in China in June 2013, has so far been able to grow more successfully. The business model was similar to the PayPal money market fund, which is to let individuals put their small account balance toward a money market instrument that generates a higher yield. After three years of operation, Yu'E Bao has attracted more than 152 million users, with total assets of 720 billion Chinese RMB (roughly

[4]Farmer Banks on Cryptocurrency, *The Wall Street Journal*, April 24, 2018.

US$108 billion). Part of their success might be attributed to the lack of investment products for individual Chinese investors, which is very different from the highly mature US capital market.

1.4.2. Fixed Income and Equity Investments

Fixed income and equity markets are the more complicated ones for FinTech firms to crack. However, the need here is evident, since the fixed income mutual funds and equity mutual funds have been lagging the passive index for decades. Also, the excess fees being charged to the investors have been scandalous. A paradigm shift is that investors, both large institutions and small retail investors, have been "voting with their feet," leaving mutual funds and moving into passive indexing.

Betterment is probably the first robo-advisor that started in 2008 and focused on using passive indexing for investors. Essentially on Betterment, investors are advised to apply Modern Portfolio Theory, which aims to optimally allocate capital based on risk tolerance. No individual stocks or bonds are required. All investments are earmarked for passive index exchange-traded funds (ETFs).

Wealthfront is a similar robo-advisor in this field. The chief investment officer of Wealthfront is a renowned professor at Princeton University, Burton Malkiel (1973). His book *A Random Walk Down Wall Street* said that market is efficient, and investors shall not try to pick up individual stocks. Thus, Wealthfront put the theory into real-world practice, and it has been a success.

Also, some of the large traditional investment banks and asset management firms have launched their in-house robo-advisor business. Vanguard is a massive asset management firm that focuses on passive index funds, in particular, the S&P 500 index funds. Thus, the firm is quick to build up a robust robo-advisor business with almost US$41 billion assets.

Lastly, there are some newest players in the robo-advisor field, which try to provide a fusion solution toward the traditional financial institutions who want to enter the field, albeit lack of expertise. Marstone is a FinTech company in this category. The company runs a "white-labeled" platform that can be tailored to large institutions. Users might be accessing a traditional financial institution's robo-advisor service, without knowing that the underlying infrastructure is in fact from a third-party start-up.

It is important to note that robo-advisors are not designed to "outperform" traditional investments. It is intended to deliver a better user experience vs conventional brokerage services. The cost for these services tends to be very competitive vs traditional asset managers. Lastly, robo-advisors are usually able to offer fractional shares of ETFs or stocks that have high denominations. Naturally, this innovation lowered the investment account minimum size and reduced the entry barriers for retail investors. Since robo-advisors tend not use any leverage, nor financial derivatives, their return might not be comparable to hedge funds or private equities.

1.4.3. Artificial Intelligence in Investment

Many robo-advisors rely on the traditional portfolio management theory. However, the recent technological breakthrough has made artificial intelligence possible in the investment arena. The two keys for successful artificial intelligence (AI) investing are big data and computation capability. It has been only until two to three years ago, that technology was advanced enough to accumulate substantial amount data for analytical work. The proliferation of big data collection algorism is a recent phenomenon, but it has opened the new doors for new pools of information.

Secondly, without the recent advancement of computation power, the AI investing would not be possible either. In fact, we are the beginning of a new era, which combines the real-time mega data and analytical system.

QPlum is one example of AI in the investment advisory world. The company is founded by Gaurav Chakravorty, formerly a successful high-frequency trader at Tower Research. His approach at QPlum is essentially combining AI with data science. According to QPlum, three broad investing styles such as market allocation, risk parity, and momentum investing are offered to investors. All strategies are implemented with 40 plus ETFs.

1.5. Insurance

Insurance is one of the remaining areas that has seen the limited penetration of FinTech firms. Part of the reason is that insurance business tends to be a more opaque market, with insufficient attention being paid by users. People tend to just buy an insurance policy and forget about it.

Interestingly, medical insurance is the first field that FinTech firms entered. Oscar Health is a company founded in New York City in 2012. It was launched at the same time that Affordable Care Act went into effect. Oscar started selling healthcare insurance online in New York State first and then expanded to other states. Currently, Oscar sells individual health insurance plans, both directly and through health insurance marketplaces, in New York, Texas, and California. However, they have exited the New Jersey market. It is worth noting that despite the fact that the company is not profitable yet, the valuation of Oscar Health is well above US$1 billion, put the company into the category of "unicorn" companies.

For property insurance, for example, car insurance, and life insurance, many traditional insurance companies took the initiative to start their online division. For instance, according to GEICO, a highly successful car insurance company owned by Mr Warren Buffet's Berkshire Hathaway Companies, a significant portion of its business has already been generated by its web portal.

Zhong An Insurance is probably the world's first online insurance that went IPO in Hong Kong Stock Exchange in September 2017. Ping An (a Chinese financial holding company that specializes in the insurance business), Tencent, and Alibaba (the top two Chinese e-commerce and online gaming company) joined forces in 2013 to launch Zhong An. Zhong An is the China's first

property insurance company that sells all its products online along with handling claims. It was expected to start life insurance products online shortly. The company has underwritten over 630 million insurance policies and serviced 150 million clients in its first year of operation. Big data and analytical capabilities make this company a unique firm in FinTech space. Before going public, the market valuation of the company was about US$11 billion.[5] After the company became a publicly traded company, the market valuation of the company surpassed HKUS $100 billion (US$12.8 billion).

1.6. The Next Steps Ahead for FinTech in Russia

Russia is a world leader in technology development. The country has a vast pool of top-quality computer science engineers. We believe there is enormous potential for FinTech firms to flourish in Russia. First, in payment space, it is easy to develop peer-to-peer payment through established social networking sites. According to the Wikipedia, about 82% of the Russian population uses social networking sites. The younger Russians tend to use VK, which has approximately 50 million users. Older Russian social media users like to use OK.ru, which has approximately 30 million users. Leveraging this user base, one can expect a robust payment network being created.

In cryptocurrency space, we are currently seeing huge growth, both in the token issuance and in the currency exchange volumes. However, there is a lack of clear regulatory framework and industry standard. Many initial coin issuances were found to be fraudulent. With the industry being more mature going forward, Russian cryptocurrencies and exchanges could become a significant node in the global technology space.

1.7. Summary

It is no coincidence that most of the FinTech firms of the new era started after the global financial crisis of 2008−2009. With the traditional banks, insurance companies, and asset management firms in retreat, under both shareholders and regulators' pressure, the void was filled by the new entrants. Armed with mega data, AI, the FinTech firms have been embraced by users worldwide. The key to their success is really the user-friendly approach. Also, the proliferation of smartphones since Apple launched iPhone in 2007 created a new generation of consumers that prefer everything on mobile.

We believe the FinTech revolution has just started. They have been particularly successful in many Asian countries. However, many new innovations are yet to be invented or commercialized. Many existing financial service models are likely to be disrupted shortly. Apparently, there are still many uncertainties with

[5]ZhongAn to offer life insurance after Hong Kong IPO worth up to US$1.5 billion. Reuters, September 2017.

these new approaches in finance, in particular, the data security issue and money laundry problem. The regulators need to catch up with the new development. From a user's perspective, FinTech firms have brought a much better set of financial services.

Ma et al. (2017) estimated that by 2020, the big data revolution is likely to generate the amount of data more than 44 zetabytes. It has the potential to double the growth rates of developed countries' economies by 2035 and add 0.8−1.4% to global productivity growth in the long run. It was also estimated by them that global big data market will arrive USD 210 billion by 2020.

Importantly, the FinTech development is not limited to developed markets. In fact, one can expect that emerging market countries are likely to be a broader market to FinTech firms. Similar to the phenomenon that many emerging market countries went from no phone to wireless phones, leapfrogging the fixed-line phones, many of these consumers might go from no financial service to FinTech services, skipping the traditional brick-and-mortar bank branches altogether. The lack of established financial players, huge population growth, and cost-savings are going to be the key drivers for FinTech firms to prosper in many emerging market countries.

References

Arner, D. W., Barberis, J. N., & Buckley, R. P. (1 October 2015). *The evolution of FinTech: A new post-crisis paradigm?* University of Hong Kong Faculty of Law Research Paper No. 2015/047; UNSW Law Research Paper No. 2016-62.

Bholat, D. M., & Atz, U. (29 April 2016). *Peer-to-peer lending and financial innovation in the United Kingdom*. Bank of England Working Paper No. 598.

Bromberg, L., Godwin, A., & Ramsay, I. (20 December 2017). FinTech sandboxes: achieving a balance between regulation and innovation. *Journal of Banking and Finance Law and Practice*, *28*(4), 314−336.

Buchak, G., Matvos, G., Piskorski, T., & Seru, A. (September 2017). Fintech, regulatory arbitrage, and the rise of shadow banks. Columbia Business School Research Paper No. 17−39.

Bundesministerium der Finanzen. (February 2018). Umsatzsteuerliche Behandlung von Bitcoin und anderen sog. virtuellen Währungen; EuGH-Urteil vom 22. Oktober 2015, C-264/14, Hedqvist.

Caruana, J., & Warsh, K. M. (August 2017). *Long-term issues for Central Banks*. BIS Paper No. 92.

Chen, K. (2018). Financial innovation and technology firms: A smart new world with machines. In W. A. Barnett & B. S. Sergi (Eds.), *Banking and finance issues in emerging markets* (Vol. 25). Bingley: Emerald Publishing.

Chicago Board Options Exchange. (2017). *The beginner's guide to Bitcoin futures*. Chicago, IL: CBOE.

Dhar, V., & Stein, R. M. (14 December 2016). *FinTech platforms and strategy.* MIT Sloan Research Paper No. 5183-16.

Gomber, P., Koch, J.-A., & Siering, M. (2017). Digital finance and fintech: Current research and future research directions. *Journal of Business Economics*, *87*(5), 537−580.

Guild, J. (18 August 2017). Fintech and the future of finance. *Asian Journal of Public Affairs*. Lee Kuan Yew School of Public Policy Research Paper No. 17−20.

Haddad, C., & Hornuf, L. (25 August 2016). *The emergence of the global Fintech market: Economic and technological determinants*. CESifo Working Paper Series No. 6131.

Higginson, M., Lorenz, J.-T., Münstermann, B., & Olesen, P. B. (March 2017). *The Promise of Blockchain*. New York, NY: McKinsey.

Hubert, F., & Matthey, A. (January 2003). *New strategies to finance small enterprises in Russia*. Working Paper available on SSRN: 372080.

IBM. (2017). *Blockchain industrial and business use cases*. Retrieved from https://www.ibm.com/blockchain/

Jagtiani, J., & Lemieux, C. (18 July 2017) *Fintech lending: Financial inclusion, risk pricing, and alternative information*. FRB of Philadelphia Working Paper No. 17-17.

Kakushadze, Z., & Liew, J. K.-S. (2 November 2017) CryptoRuble: From Russia with love. *Risk* 53−54.

King, M. (2016). *The end of alchemy: money, banking, and the future of the global economy*. New York, NY: W. W. Norton.

Kuo, C., Lee, D., & Teo, E. G. S. (30 September 2015). *Emergence of Fintech and the LASIC principles*. Working Paper.

Ma, B., Nahal, S., & Tran, F. (2017). *Data capital − global big data and AI primer*. Bank of America Merrill Lynch Analytics August 2017.

Malkiel, B. (1973). *A random walk down wall street*. New York, NY: W. W. Norton.

Nakamoto, S. (2009). *Bitcoin: A peer-to-peer electronic cash system*. Retrieved from Bitcoin.Org

Philippon, T. (August 2017). *The FinTech opportunity*. BIS Working Paper No. 655.

Schindler, J. W. (10 August 2017). *Fintech and financial innovation: Drivers and depth*. Federal Reserve Broad System Working Paper No. 2017-081.

Stanley, M. (2017). *Bitcoin: A new technology and a controversial asset*. New York: Morgan Stanley Co.

Walch, A. (2015). The Bitcoin blockchain as financial market infrastructure: A consideration of operational risk. *NYU Journal of Legislation and Public Policy*, *18*, 837.

Zetzsche, D. A., Buckley, R. P., & Arner, D. W. (13 August 2017). *The distributed liability of distributed ledgers: Legal risks of blockchain*. University of Illinois Law Review, 2017−2018, Forthcoming; University of Luxembourg Law Working Paper No. 007/2017; Center for Business & Corporate Law (CBC) Working Paper 002/2017; University of Hong Kong Faculty of Law Research Paper No. 2017/020; UNSW Law Research Paper No. 52; European Banking Institute Working Paper Series 14.