On the Development of Fintech in Asia

Liu Yong

Abstract There are five models of fintech development in the world: the technology promotion model represented by the USA, the rule-driven model represented by the UK, the market pull model represented by China, the mixed competition model represented by Japan and Indonesia, and the model of fanning out from point to area represented by South Korea and Israel. In terms of the layout, the transformation of traditional financial hubs has been accelerated, China and the USA have outstanding advantages in fintech, and the Asia-Pacific region has great potential for fintech development. The fintech of China has been promoted to the worlds leading level; Japan boosts the rapid growth of fintech through advantages of backwardness; Singapore gathers innovative resources with a relaxed and inclusive atmosphere; South Korea promotes scale development of fintech industry by fanning out from point to area; India is gradually exerting its potential for fintech development; Israel builds the highland of fintech development through guidance plus service; Indonesia has gradually become a rising star in fintech development in Southeast Asia; Hong Kong promotes the momentum of sound fintech development with government assistance.

Keywords Fifintech development · Asia · Policy and regulatory measures · Digital transformation

1 Overview of Global Fintech Development

In recent years, global fintech has maintained a high speed of development, the adoption rate of fintech has gradually increased, and a large number of fintech unicorn enterprises have emerged. With the application of big data, blockchain, AI, and other technologies in the financial field becoming more and more mature, new models and

L. Yong (✉)
Zhongguancun Internet Finance Institute, Beijing, China
e-mail: liuyong@guopeijigou.com

Z. Zheng (ed.), *Proceedings of the Second International Forum on Financial Mathematics and Financial Technology*, Financial Mathematics and Fintech,
https://doi.org/10.1007/978-981-99-2366-3_1

industry forms of financial service have come into being. Among them, some application fields have developed more rapidly including digital currency, open banking, digital banking, etc.

1.1 Development Dynamics

Fintech enterprises are growing fast. According to the relevant data, there are 1057 unicorn enterprises in the world now as of November 2021, and fintech unicorns play a decisive role in fintech field with the most amount of enterprises on the list which is 139 and the total valuation is 4.7 trillion yuan, accounting for 19% of the total valuation of unicorn enterprises on the list. From a country perspective, the USA has the largest number of unicorn enterprises in the fintech sector, followed by China. In 2019 Fintech 100 announced by Klynveld Peat Marwick Goerdeler (KPMG), the enterprises in Asia-Pacific region (including Australia and New Zealand) performed brilliantly, with a total of 42 enterprises on the list. As far as payment enterprises were concerned, 27 companies were on the list, which took the lead. As for other categories of companies on the list, there were 19 wealth management companies, 17 insurance companies, 15 lending companies, and 13 companies with relatively comprehensive financial business.

The developing economies represented by Southeast Asia and Latin America have obvious development characteristics in the field of financial science and technology. According to the report of the Future of Southeast Asian fintech by the British consultancy Dealroom, European venture capital company FinchCapital and Indonesian venture capital company MDIVentures, the outbreak of COVID-19 pneumonia has accelerated the digital transformation of fintech in the region, especially in the field of digital payment. Indonesia is expected to become the largest financial technology hub in the region by 2025, with an expected market value of US $130 billion in related fields. According to the global fintech report for the second quarter of 2021 by CB Insights, fintech financing in Latin America has increased at a compound annual growth rate of 57% since 2016, reaching US $4.246 billion by the second quarter of 2021. Among them, the financing amount of fintech companies in Brazil alone accounts for 70% of the total financing in the region.

More and more central banks have begun to actively study the issuance of CBDC (Central Bank Digital Currency), and some countries have even begun to build the underlying infrastructure of CBDC and start the pilot of CBDC technology. As the first country in the world to launch a sovereign digital currency, DC/EP has conducted pilot projects in some domestic cities, commercial banks, and cross-border payments since April 2020, and completed the country's first digital RMB insurance policy in December 2020. In 2020, the Bank of France launched a digital currency pilot project. European and American countries are also unwilling to fall behind. The central banks of Canada, Sweden, the UK, and other countries jointly set up a CBDC group with BIS. In May 2020, the United States released a white chapter on the digital dollar

project (DDP), which introduced in detail the basic architecture, distribution purpose, and potential application scenarios of CBDC in the United States.

The evolution of digital banking is accelerating. As a banking development model which has arisen in recent years, digital banking is an important achievement of digital transformation of banks. Currently, 60% of the worlds banking population is using digital banking through online services and cashless transactions. According to the relevant data in the Nets (an European transaction processing center) report, non-contacting digital wallet transactions increased by more than two-thirds in the first half of 2020 compared with 2019. With the increase of the users of digital banking, the number of digital banks has gradually increased. In 2019, Hong Kong Monetary Authority (HKMA) approved the establishment of 8 virtual banks. Monetary Authority of Singapore (MAS) opened up applications for digital banking licences in 2020. In addition, digital banks in many countries engage in online banking business with traditional banking license or in traditional authorized business forms, such as Monzo Bank and N26 Bank in the UK, aiBank, WeBank, and MYbank, in China.

The world has a deeper understanding of the concept of sustainable development, and the practice scenes of fintech in the field of green finance have increased. From the perspective of application scenarios, the use of fintech tools covers ESG investment and financing, national carbon market trading, green building, green consumption, green agriculture, small and micro enterprises, and other fields. Fintech is widely used in environmental data, ESG data and evaluation, green credit information management system of financial institutions, and other scenarios.

1.2 The Financing Profile

Global fintech investment and financing grew strongly. In 2020, the number of financing transactions reached 3443, and the number of financing transactions in the first three quarters of 2021 was 3549, which has exceeded the total amount of financing in the whole year of last year. The total financing amount of fintech in 2020 was US $48.4 billion, and the amount of financing in the first three quarters of 2021 was US $94.7 billion, nearly twice the total financing amount of last year.

The financing amount of financing projects is mainly concentrated in North America, Asia, and Europe, with a quarter on quarter increase of more than 50%. Among them, North America has the highest amount of total financing, accounting for more than half of the total global investment, reaching the highest in the second quarter of this year, with USD 16.56 billion, followed by Asia, which reached the highest in the third quarter of this year, with $5.9 billion. South America exceeded USD 1 billion for the first time in the second quarter of this year. In Africa and Oceania, the amount of financing is relatively stable and has little change (Fig. 1).

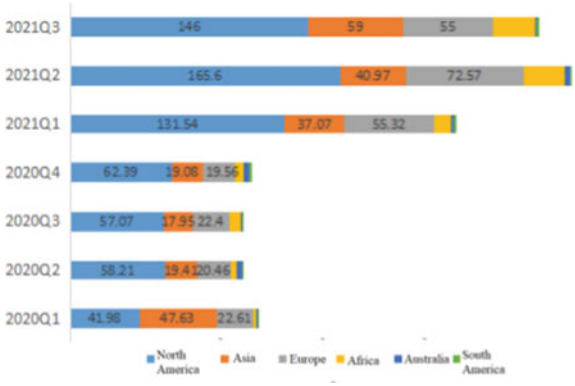

Fig. 1 The amount of financing in fintech in global continents from 2010 to Q3 of 2021

1.3 Regulatory Environment

In recent years, financial management departments in various economies have increasingly improved their regulation on fintech activities, and have promoted the healthy and orderly development of fintech through measures such as continuous monitoring, the establishment of regulators, and the introduction of regulatory policies. On the one hand, financial management departments support the entrance of fintech companies into the market to make up for the current weak links in financial services; on the other hand, countries have set a high threshold for access to financial business to reasonably guard against systemic risks.

The legislative process of data protection has been accelerated. In recent years, with the iterative innovation of new technologies, various business entities are accelerating the development of new data resources, and meanwhile the incurred problems such as data privacy protection are also increasingly valued by various countries. EU countries summarize and improve data legislation in practice: since the second half of 2019, the European Commission (EC) and Council of the European Union have organized each member countrys regulators to submit a law enforcement summary, and they have received 19 law enforcement summary reports from different countries. In September 2020, European Data Protection Board (EDPB) issued Guidelines on the Targeting of Social Media Users (the Draft Guidelines), expounding on the requirements of data protection in social media. At the beginning of 2020, California Consumer Privacy Act (CCPA) of the USA formally came into force and was formally incorporated into Californias judicial system. On October 21, 2020, the Peoples Republic of China released (Draft) and solicited public opinions. It is the first law that specifically stipulates personal information protection. Promulgated, it will become the basic law in the field of personal information protection, the Personal Information Protection Law of the Peoples Republic of China, officially came into force on November 1, 2021.

The innovation of fintech regulation tools has been continuously strengthened. Firstly, some countries have established fintech innovation mechanism. To cite a few

examples, France proposed in March 2021 to establish a European exemption mechanism in regard to blockchain, relax some legal requirements that cannot meet the needs of blockchain development, and it suggested that exempted entities should follow the key principles of financial regulation. Secondly, some countries have further improved the Sandbox Mechanisms. Thirdly, many countries vigorously support the development of RegTech. To cite a few examples, Central Bank of Brazil (CBB) announced in April that Pier, an information integration platform for financial regulators based on blockchain technology, began its operation online, which could help the participating institutions quickly access the latest data of other institutions, thus shortening the data query operation that might have taken a month to several seconds.

The fintech policy system has been continuously improved. Nowadays, countries all over the world gradually realize the potential value of fintech and formulate relevant development strategies and improve relevant policy systems to support the development of fintech. At present, apart from the policies related to AI, blockchain, big data, and other key underlying technologies of fintech, areas such as digital banking, online payment, and encrypted assets are gradually covered. The regulation on the application of fintech has basically realized full coverage, and the fintech policy system is continuously improved.

1.4 The Models of Fintech Development

At present, around the world there are generally five models of fintech development. The first is the Technology Promotion Model represented by the USA, which is characterized by mutual promotion of finance and technology and a win-win relationship between industry and culture. The second is the Rule Driven Model represented by the UK, which is characterized by innovating regulatory methods and boosting industrial development through rules. The third is the Market Pull Model represented by China, which is characterized by accelerated digital transformation and breakthroughs sought in strict regulation. The fourth is the Mixed Competition Model represented by Japan and Indonesia, which is characterized by accelerating the pace of reform and continuous stimulation of potential. The fifth is the Model of Fanning out from Point to Area represented by South Korea and Israel, which is characterized by locating breakthroughs and focusing on tackling key problems (Fig. 2).

1.5 Spatial Layout

In recent years, the fintech hubs represented by Shanghai, Beijing, Shenzhen, Hangzhou, San Francisco (Silicon Valley), New York, London, and Chicago are accelerating their rise based on financial industry and driven by technology. China and the USA have their distinctive advantages in the development of fintech and have become leaders in the development of fintech worldwide. The Asia-Pacific region

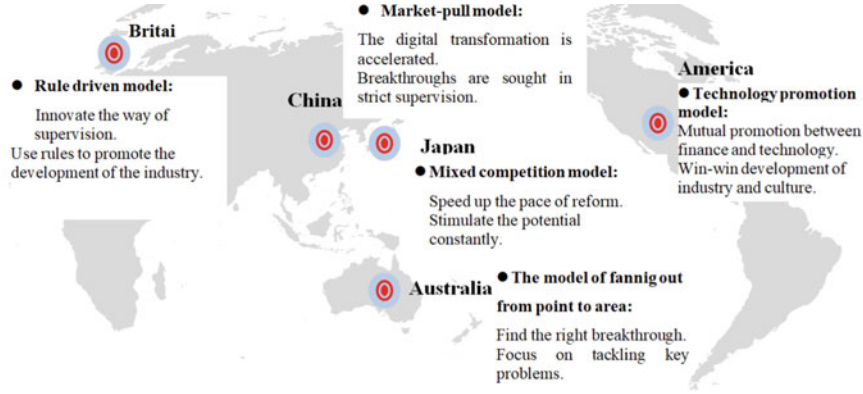

Fig. 2 The models of fintech development around the world

has gradually demonstrated its potential for fintech development and has attracted a large influx of capital, showing its advantage of backwardness.

The transformation of traditional financial hubs has been accelerated and there is great potential for the development of fintech in the Asia-Pacific region. With the comprehensive empowerment and transformation of finance by technology, the transformation of traditional financial hubs having been accelerated and newly emerging financial cities having been upgraded in an all-round way, and a new ecology of regional economy having been created with a strategic height, in the future financial hubs will take fintech as the core competitiveness of cities and compete for the commanding heights of fintech without exception. According to Global Fintech Hub Report 2021, the 9 cities in the first echelon of the global fintech hubs were Beijing, San Francisco (Silicon Valley), New York, Shanghai, Shenzhen, London, Hangzhou, Singapore, and Chicago respectively. These cities are home to the large financial institutions and the headquarters of financial institutions of the country. Most of them have a solid foundation for financial industry. They are currently starting the pace of all-round digital transformation of financial industry supported by technology. From the perspective of fintech experience, developing countries and Asia continue to maintain an overall leading edge. Not only the top 10 cities all located in developing countries in Asia, but also developing countries account for 80% among the top 20 cities for two consecutive years and Asian cities account for 65%.

2 Practice of Fintech Development in Asia

2.1 China—The Fintech Has Been Promoted to the Worlds Leading Level

2.1.1 Development Features: Accelerated Digital Transformation

According to the development stages of technology application in financial industry, the development nodes of Chinas fintech industry are relatively clear. The development of fintech in China can be divided into four stages, as is shown in Fig. 3. China has entered the fintech 4.0 era, when finance and technology develop in a highly integrated way.

The development of fintech industry leap into the front ranks of the world. There are 139 unicorns in China's fintech industry, ranking first in the world. The market scale of China's fintech enterprises is growing steadily. According to the prediction and display of relevant data of the Forward Looking Industry Research Institute, the market scale of China's fintech enterprises is expected to reach 463.1 billion yuan in 2021, an increase of nearly 17% over the previous year. It is expected that the scale of China's fintech market will still achieve stable growth in 2022.

Great progress has been made in technological innovation. From 2015 to the first half of 2019, a total of more than 22,000 enterprises applied for fintech-related patents in China, with a total number of more than 88,000 patents. Among them, big data analysis, interconnection technology, and cloud computing accounted for the highest proportion, while big data, cloud computing, biometric security, and AI maintained relatively smooth and steady growth; blockchain technology performed brilliantly with explosive growth, with the proportion of patents increasing from 0.4% in 2015 to 8.5% in 2019 (Fig. 4).

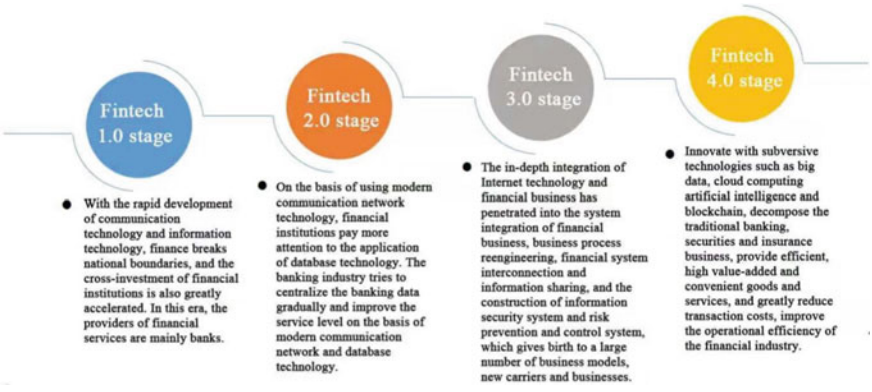

Fig. 3 Development process of Chinas fintech

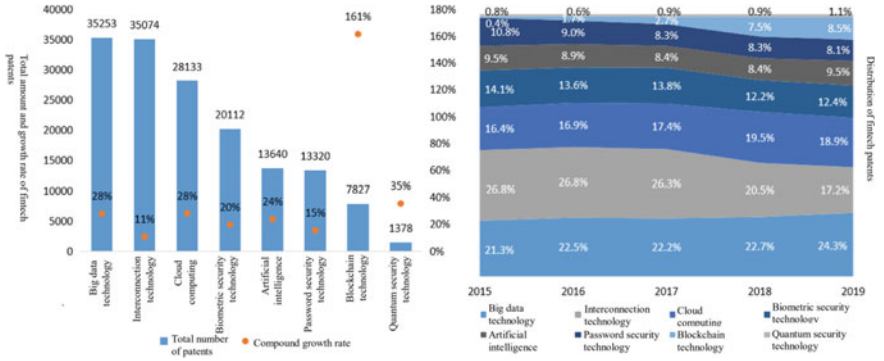

Fig. 4 Fintech patents

There is a shortage of fintech talents. At present, fintech talents are in short supply, and the growth rate is far lower than the development rate of fintech itself. According to 2018 China Fintech Employment Report released by Michael Page (China), 92% of the fintech enterprises interviewed found that China is currently confronting a severe shortage of fintech professional talents, 85% of the employers interviewed said that they encountered recruitment difficulties, and 45% of the employers interviewed said that the greatest difficulty they confronted in recruitment was the difficulty in finding talents that could meet the specific position requirements. According to the survey, the most popular fintech positions were big data position, AI position, and risk management position, accounting for 40%, 32%, and 12%, respectively.

2.1.2 Policies and Regulatory Measures: Finding Breakthroughs in Strict Regulation and Ensuring Steady Development of Data Protection

The top-down design for fintech development has been continuously improved. In August 2019, the people's Bank of China issued the Financial Technology (fintech) Development Plan (2019–2021). The introduction of this programmatic document will build the top-level design of "four beams and eight columns" of financial technology. In December 2021, the central bank issued the Fintech Development Plan (2022–2025), which is the second round of fintech development plan issued by the central bank after the release of the plan in 2019. Compared with the first round of planning, this round of planning will focus on solving the problem of uneven and insufficient development of financial science and technology, with clearer key tasks, clearer development direction, and stronger implementation guarantee. At the same time, the plan puts forward the financial technology development vision of "striving to achieve the leap forward improvement of the overall level and core competitiveness by 2025", which has opened up a broader development space for China's financial technology industry.

The system of fintech supervision rules has been gradually improved. The basic regulatory rules system of fintech is gradually improving. While improving the rule system in a single technical field, it enriches the supervision of business links such as fintech innovative product design, operation mode, and risk control means. In addition, it further complements and improves the regulatory rules for consumer rights and interests protection, personal privacy, and financial information data.

The standardization of fintech has been gradually strengthened. The central bank has issued and implemented technical standards for payment tokenization, payment information protection, acceptance terminal registration management, mobile terminal trusted execution environment, mobile financial client application software, incorporated financial science and technology products into the national unified certification system, and continued to carry out leader activities in the field of point of sale terminals (POS), self-service terminals (ATM), bar code payment acceptance terminals and online banking services.

2.1.3 Layout of Key Fintech Cities: The Cities in East China are Leading, but Each of the Cities has Its Own Characteristics

At present, China is already leading the global fintech. However, there are differences in the development speed and level of fintech among its cities. The overall strength of the cities in east China is relatively strong, the optimized layout of Beijings fintech develops steadily, Shanghai tries to build an international brand of fintech, Shenzhen strives to be the leading role in the development of Guangdong-Hong Kong-Macao Greater Bay Areas fintech, and Hangzhou adopts the strategy of policy plus talents to re-create new vitality for the citys development. Cities such as Chengdu, Chongqing, Guangzhou, Nanjing, and Qingdao are also actively laying out the development of fintech.

2.2 Japan—Boosting the Rapid Growth of Fintech Through Advantages of Backwardness

2.2.1 Development Features: The Advantage of Backwardness in Fintech has Shown

The comprehensive competitive strength lays the foundation for the development of fintech. Japan is the third largest developed country in the world, But its fintech development began relatively late. In 2018, the scale of Japans fintech market reached 214.5 billion yen, and it has been going up all the way. It was expected to reach 572.7 billion yen in 2020, with an average annual growth rate of more than 50% (Fig. 5).

Optimizing cultural soft environment and accelerating the shaping of a non-cash society. According to EY Global Fintech Adoption Index 2019, in terms of the

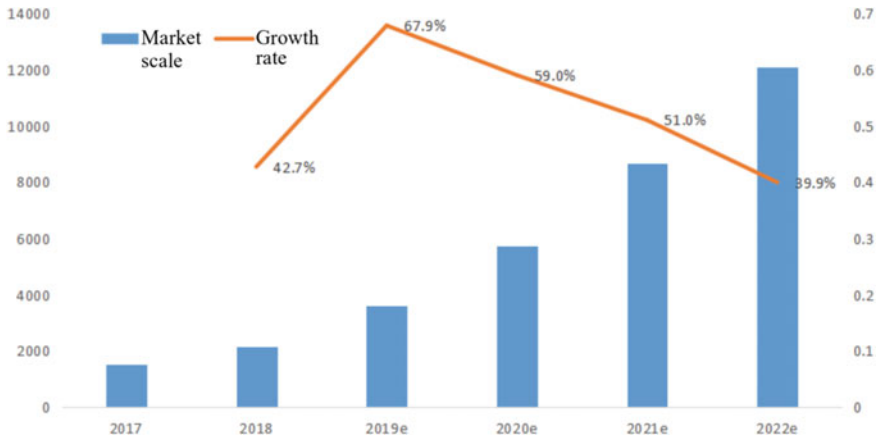

Fig. 5 The scale of Japans fintech market (Unit: 100 million yen, %)

global consumer fintech application index, Japan ranked the lowest in 27 markets, with only 34%. The Japanese government issued Fintech Vision in May 2017, which clearly proposed that it should pay attention to the added value of fintech and focus on improving the adoption rate of electronic payments. After that, the government issued Future Investment Strategy 2017, explicitly proposing to triple the proportion of non-cash payments to more than 40% by Expo Osaka 2025. Since then, the Japanese government has been committed to promoting non-cash payment rebate activities [Consumers would get a rebate of about 2–5% for each non-cash payment], continuously optimizing the cultural environment and accelerating the shaping of a non-cash society.

The commercial configuration of various industries has gradually taken shape. The mobile payment sector has stepped out of the era of barbaric growth and formed a duopoly pattern of Line pay and PayPay, and has nurtured a number of outstanding fintech start-ups on this basis. Japan attaches great importance to the development of blockchain. In 2018, the market size of Japan blockchain reached 8.07 billion yen, and it reached 33.57 billion yen by 2020. With relatively strong development momentum, it saw the emergence of a number of blockchain start-ups with certain strength and characteristics, such as Dobulejump.tokyo and Nayuta Japans regulation on network lending is relatively loose, and network lending and crowdfunding have become an important part of Japans inclusive finance, hence the much rapid development of the industry. In 2014, when Japan amended its financial commodity trading law, crowdfunding suddenly came to the fore. In 2018, the scale of Japans crowdfunding market reached 204.5 billion yen. During the epidemic, many crowdfunding platforms also took on the responsibilities of assisting commercial tenants, etc. Japan is also actively promoting the development of sectors such as personal loan, Robo advising, and supply chain finance. Although they are still in the initial stage, they have great potential for future development (Fig. 6).

Fig. 6 A diagram of the industrial ecology of Japans fintech

2.2.2 Policy and Regulatory Measures: Optimizing the Policy System and Forging Ahead with Determination

In terms of the development policy and regulatory measures in fintech, Japan adopts strict regulation and easing measures at the same time. For the development of some traditional industries, especially in the aspects of digital transformation, the regulation is relatively strict. However, the regulation on sectors such as crowdfunding and network lending is relatively loose, so these sectors can develop rapidly. Strict regulation measures can effectively control the risks in fintech innovation. Moreover, in 2018, JFSA started to implement a sandbox mechanism for financial innovation, allowing financial and insurance products to be put into trial operation within a certain risk range, and steadily promoting healthy and sustainable innovative development. The loose measures in some sectors can stimulate the development vitality of the fintech industry for it to reform in development, maintain stability in progress, and create a safe and controllable development ecology in an all-round way.

2.2.3 Layout of Key Fintech Cities: Tokyo Bay Area Endowed with Good Resources to Push Traditional Financial Institutions on the Way of Reform

Fintech got developed in Japan later than in other developed economies, so it has not yet formed a ubiquitous layout of fintech hubs. Whether according to the fintech hub report released by Global Fintech Hub Federation or the index and list of fintech hubs released by institutions such as Deloitte and Z/Yen Group, the fintech hubs of Japan that may enter the list tend to be Tokyo. Therefore, this chapter focused on

the relevant situation and policy measures of Tokyo as a fintech hub. Tokyo ranks among internationally renowned financial centers together with other international financial centers such as New York financial center and London financial center. Meanwhile, Tokyo is also the capital of Japan and the financial capital of Japan. Since the 1960s, the Japanese government has been planning to build the capital circle of Tokyo, linking Tokyo with several neighboring counties for joint development and construction. At present, Tokyo Bay Area has become one of the worlds eight recognized bay areas.

Since the 1990s, the Japanese government has formulated and promulgated a series of science and technology innovation strategies and policy measures to stimulate the high-speed rise of science and technology innovation level in Tokyo Bay Area. Relying on internationally first-class universities and research institutions, innovative enterprise clusters, and the support of the Japanese governments policy inclination, Tokyo Bay Area has absorbed advanced technology and innovation concepts in its opening to the outside world, vigorously developed advanced scientific and technological productivity, formed a bay area ecological environment conducive to scientific and technological innovation, spawned numerous scientific and technological innovation institutions, and witnessed the emergence of a large number of scientific and technological innovation achievements, making Tokyo Bay Area gradually develop into a world center of innovation with international influence.

2.3 Singapore—Gathering Innovative Resources with a Relaxed and Inclusive Atmosphere

2.3.1 Development Features: An Active Atmosphere for Fintech Innovation

International innovation elements gather and multiple resources converge. Singapore is an international trade hub, an Asian financial center, and a place of strategic importance for technological innovation. Its convenient geographical conditions have facilitated the convergence of financial and technological innovation resources. On the one hand, as a global financial center, Singapore has financial industry as its service industry with the highest added value, with more than 1,200 financial institutions stationed here. On the other hand, Singapores scientific and technological innovation has developed rapidly. In Global Innovation Index 2018 released by WIPO (WIPO), Singapore ranked the fifth, overtaking traditional science and technology powers such as the USA, Germany, Israel, South Korea, and Japan and successfully ranking among the worlds leading science and technology innovation centers.

There are rich forms of activities and strong vitality in fintech. Since 2016, Singapore has been hosting Singapore Fintech Festival (SFF) and Singapore Week of Innovation & Technology (SWITCH). In 2019, SWITCH and SFF merged into SFF X SWITCH for the first time. On June 8, 2020, on the basis of previous experience

of holding activities, Singapore held the MAS Global Fintech Innovation Challenge for the first time by innovating the form of activities. With the theme of Building Defenses, Seizing Opportunities, and Emerging Stronger, the competition had a total bonus of S$1.75 million and comprised two parts: MAS FinTech Awards and MAS Global FinTech Hackcelerator.

Digital banking booms and digital finance accelerates. At present, Singapore is gradually loosening the restriction on the application for digital full bank license. The introduction of digital bank license is the largest banking liberalization in Singapore in the past 20 years. In December 2020, MAS issued a total of 4 digital bank licenses, of which 2 were DFB licenses and another 2 were DWB licenses. The launch of digital banks in Singapore will form competition with traditional banks, but meanwhile it will promote the rapid development of fintech in Singapore.

Actively extending the application scenarios of blockchain technology. Singapore is the friendliest country to the development of blockchain in Southeast Asia and even all over the world. At present, a large number of mature blockchain projects are distributed in sectors such as trading platforms, public blockchains, hosting, cloud storage, infrastructure, consulting, and insurance. Singapore vigorously promotes the application of blockchain technology in financial scenarios. On the one hand, it uses blockchain technology to promote the development of digital payment. On the other hand, it focuses on SME financing and supply chain finance. In addition, it adopts blockchain technology to ameliorate the pain points of service of industrial finance including supply chain finance, etc.

In sound fintech ecology, various subjects jointly pursue interconnected development. Singapores rich and diverse international fintech activities and its open and inclusive innovation environment, etc. have attracted diversified fintech talents to gather here. In August 2020, Singapore established Asian Institute of Digital Finance (AIDF), jointly founded by MAS, National Research Foundation (NRF) of Singapore, and National University of Singapore (NUS), to meet the demand for digital financial services in Asia. The strong community effect has attracted the convergence of talents such as entrepreneurs, domain experts, angel investors, and industry mentors, and it has provided a platform for exchanges and collaboration among entrepreneurs, investors, and financial institutions. Meanwhile, it has attracted high-quality native start-ups of Asian countries such as India and Indonesia to migrate to Singapore, forming a highly open international fintech ecosystem (Fig. 7).

2.3.2 Policy and Regulatory Measures: The Top-Down Design is Optimized and Special Policies are Increased

Perfecting the top-down design of fintech. The Singaporean government has authorized MAS to be the policy subject for the innovation and development of fintech which is fully responsible for the strategic planning, policy framework, and policy coordination of the development of fintech. In order to further promote the coordinated and efficient development of fintech, MAS has established professional fintech management institutions. Firstly, FinTech & Innovation Group (FTIG) was set up,

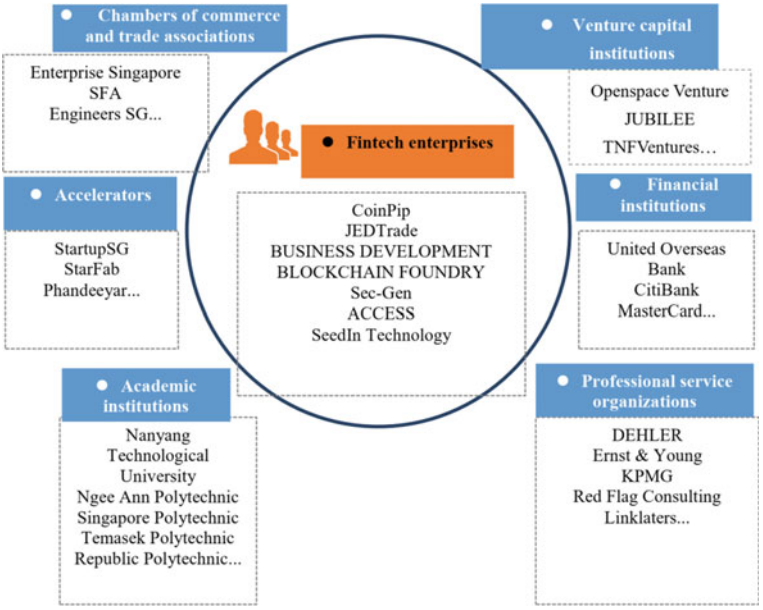

Fig. 7 Fintech ecosystem

which comprises three offices, respectively for payment and technology solutions, technology infrastructure, and technology innovation lab. FTIG invested S$ 225 million to promote Financial Sector Technology & Innovation Scheme (FSTI) and encourage the global financial industry to set up an innovation and research and development center in Singapore. Secondly, Fintech Office was established, which is mainly responsible for three tasks: the first one is to review, correspond to and improve fintech-related subsidy schemes for cross-governmental agencies; the second one is to pay attention to industrial infrastructure and the gap between talent training and manpower demand and put forward target strategies, policies, and programs to enhance the competitiveness of the industry and enterprise organizations; the third one is to manage Singapores fintech brand and marketing strategy through fintech activities and related initiatives and strive to become a global fintech hub.

Formulating special fintech regulatory policies to promote the healthy development of enterprises. The Singaporean government has adopted a multi-pronged approach to promote the development of fintech at home. Some of the measures are universal, including providing a supportive environment for start-ups, adopting a collaborative approach, and attracting foreign investment. Apart from common measures, Singapore has formulated special fintech regulatory policies to guide the development of various segments of fintech, mainly focusing on AI and data analysis (hereinafter referred to as AIDA), blockchain technology, digital assets, payment bill, and open banking.

Promoting the development of RegTech application to reduce risks SGX has launched a new RegTech scheme that can automatically report market irregularities and promote fair trading. At present, Singapore has had representative companies ranking the worlds top 100 in RegTech involving sectors such as compliance management and anti-money laundering. Besides, for local start-ups, the Singaporean government has established a Regulatory Sandbox system to encourage the innovative development of fintech start-ups and nurture and incubate outstanding enterprises.

2.4 South Korea—Promoting Scale Development of Fintech Industry by Fanning Out From Point to Area

2.4.1 Development Features: The Foundation for the Development of Fintech is Solid

The 5G information and communication technology takes the lead. According to the data from South Koreas Ministry of Science & Information and Communication Technology (MSICT), South Korea is the first country in the world to start 5G commercial use. After the official launch of 5G business services on April 3, 2019, the number of users has increased continuously, reaching nearly 10 million by the end of October 2020.

Blockchain technology is developing rapidly. According to the data from Korean Intellectual Property Office (KIPO), a total of 1,301 blockchain patents were registered in South Korea in 2019, a 50-fold increase from 24 in 2015, and the number of the patents increased further in 2020 after the Covid-19 pandemic began.

Forming the mechanism design of two kinds of institutions and three modes of sharing, the big data credit system is refined. South Korea has established a much refined personal and corporate big data credit system. In this system, Korea Federation of Banks (KFB) is the pillar of the credit industry. On this basis, there are three data-sharing modes of credit information service. One is to force financial institutions to submit credit information to KFB, which will then be provided by KFB to private credit reporting companies; the second is to share information within the industry through associations or corporate groups; the third is that credit reporting companies collect other information through commercial contracts. Under the mechanism design of two kinds of institutions and three modes of sharing, the South Korean credit investigation industry can not only quickly and timely collect nationwide credit information, but also ensure that valuable credit information could be legally and fully shared across the whole society.

P2P loan industry develops rapidly. According to the statistics of the South Korean government, the total investment in P2P loans in South Korea increased from 37.3 billion won at the end of 2015 to 2.34 trillion won at the end of 2017, and then rapidly increased to 6.2 trillion won by the end of June 2019. In August 2020, the Law on Financial Industry Related to Online Investment and laws related to user protection

(P2P laws) were officially implemented, which would strengthen the protection of investors and formally set a legal framework for P2P development.

2.4.2 Policy and Regulatory Measures: Strengthen Planning and Launch Fintech Development Strategy

On December 4, 2019, Financial Services Commission (FSC), Republic of Korea announced that it would vigorously promote the large-scale development of the fintech industry, and introduced 8 measures in different sectors, involving improving the current Regulatory Sandbox system, carrying out regulatory reform to promote the development of fintech, loosen the entry restrictions of the financial industry, establishing a regulatory basis for the digital age, developing new growth engine for financial innovation, promoting the investment in fintech and establishing a venture capital ecosystem with private sector investment as the core, assisting fintech enterprises with overseas expansion expanding public support for fintech enterprises.

Preferential taxation is applied to research and development of blockchain technology. A report released by the local Ministry of Strategy and Finance announced the latest tax laws that came into effect in February 2019. And the blockchain has been added to the research and development list that provides tax credits. This means that the companies or enterprises that develop blockchain technology can deduct some taxes from the research and development expenses. The tax reduction depends on the size of the company.

Implement the Regulatory Sandbox plan and accelerate the digital transformation. On April 1, 2019, FSC, Republic of Korea officially launched a fintech Regulatory Sandbox program, thereby hoping to promote competition in South Koreas financial industry and bring more favorable services to consumers. Up to May 2020, FSC had held a total of 14 assessment committee meetings. Through various assessments of business innovation, consumer convenience, and project stability and feasibility, a total of 102 innovative financial services were eventually selected into the Regulatory Sandbox, which obtained exemption from licensing and other regulations.

2.4.3 Layout of Key Fintech Cities: Seoul—Taking Various Measures to Create a Business Environment for Fintech

Seoul is the largest city on the Korean Peninsula and one of the major financial cities in Asia with advantages in economic, technological, and cultural development. Seoul ranks the fifth among the top ten Asian cities in terms of economy, only after Tokyo, Shanghai, Beijing, and Hong Kong. Its economic aggregate accounts for about 23% of that of South Korea. The population of Seoul is about 10.2 million, accounting for 20% of the total population of South Korea. In addition, Seoul accounts for half of Korea in terms of personal income tax, corporate income tax, and bank deposits, and the number of innovative enterprises and graduates from colleges and universities account for 30% of Koreas total. Seoul is South Koreas political and economic

center, which has laid a good foundation for fintech development. In recent years, Seoul has created a good business environment for fintech by holding the fintech week, establishing fintech labs, setting up innovation funds to increase investment in fintech industries, etc.

Holding fintech week to create an innovative atmosphere. South Korea launched the first Korea Fintech Week from May 23 to 25, 2019. The event was held in Seouls Dongdaemun Design Plaza (DDP). It is the first global fintech fair in South Korea, and the FSC hopes to develop it into an important annual fintech event in Asia. In 2019, Korea Fintech Week invited global financial institutions, international organizations, and global fintech companies to discuss relevant policies to help local fintech companies expand ties with local and global investors. In addition, the activity also provided counseling services for college students and young job seekers who are interested in the fintech industry.

Affected by the epidemic, the 2020 Korea Fintech Week was changed to be held online. The FSC said it had attracted more than 170,000 page visitors and received more than 110 million page views. Financial companies and fintech enterprises set up a total of 150 virtual exhibition halls. A total of 35 enterprises participated in the online job fair session, with more than 1,000 job seekers competing for about 80 jobs provided by 21 fintech enterprises.

Launching SEOUL FINTECH LAB. In April 2018, the Seoul municipal government launched the first SEOUL FINTECH LAB, which was mainly aimed at early-stage start-ups. In July 2019, the second fintech lab was launched, which would be targeted at growth-stage start-ups and accommodate approximately 14 start-ups from South Korea, the USA, Hong Kong, and Singapore. The fintech lab will become a key anchor point for South Koreas fintech industry, so as to help South Koreas promising fintech start-ups develop abroad. The Seoul Innovation Growth Fund was established. At the end of 2018, Seoul set up an innovation fund of around 130 billion won (approximately USD 116 million) to be invested exclusively in innovative industries such as blockchain and fintech. In early 2019, the Seoul municipal government announced that the Seoul municipal government would invest 1.2 trillion won (USD 1.07 billion) in start-up companies in the fintech sector through the investment fund by 2022.

2.5 KazakhstanCDigital Transformation Speeds Up the Construction of Central Asian Fintech Hub

2.5.1 Development Features: The Digital Economy is Booming

Central Asia is located between the worlds two largest economies. Proposed by the Belt and Road Initiative, it can be regarded as a bridge connecting Europe and China. As a growing potential market, Kazakhstan has played a key role in the process of Central Asia becoming a global fintech hub.

Although in the beginning the level was relatively low, the digitization process in Kazakhstan is developing rapidly, mainly including: (1) The rapid growth of e-commerce and mobile commerce; (2) The transition from cash payments to non-contact and digital payments; (3) The growth of innovative digital financial products and services. Since the outbreak of COVID-19, these structural changes which had lasted for many years have accelerated, creating a favorable environment for the further development of fintech.

The fast-growing e-commerce market is one of the driving forces behind the development of fintech. Compared with other emerging market countries and developed economies, in Kazakhstan, the e-commerce penetration has a significant upward potential. According to Euromonitors data, the market value of e-commerce in Kazakhstan in 2019 was estimated to be KZT 401.3 billion (USD 1.1 billion), equivalent to 3.4% of the total volume of retail trade, with a CAGR of 33.3% from 2016 to 2019.

Digital payment is developing rapidly. The adoption rates of Internet and mobile phone have increased significantly. According to Ovum (world mobile information service), Kazakhstans total number of smartphones increased from 12.7 million in 2016 to 19.2 million in 2019 and is expected to reach 23.4 million by 2024. Banks are using mobile and Internet banks to provide better financial services to remote and rural areas. Fintech companies have fewer opportunities to cooperate with standard financial sector, but with the increase of mobile Internet adoption rate, they have obtained huge opportunities in areas not covered by traditional financial markets. In 2019, Kazakhstans digital payment amount more than tripled to about USD 34.8 billion Like e-commerce, this trend has been accelerated by the COVID-19 epidemic. In 2019, Kaspi.kz accounted for 83% of the growth of the entire payment market in Kazakhstan and became the largest contributor to Kazakhstans transition to digital payment.

The digital transformation of banking and insurance industry is at the right time. The COVID-19 epidemic has enabled most retail banking activities to be carried out online, which has promoted the development of digital banking. Banking services are rapidly moving from branch-based, product-centric organizations that use traditional technologies to more personalized digital solutions that are consumer-centric and deliver seamlessly. Since January 2019, the citizens of Kazakhstan have been able to use electronic insurance and choose to submit their applications online. Within the conceptual framework of the development of the financial sector in the Republic of Kazakhstan to 2030, it is expected that electronic insurance policy sales will be introduced into the compulsory courses.

2.5.2 Policy and Regulatory Measures: Being Committed to Promoting Financial Innovation in a Wider Range of Areas

Astana Financial Services Authority (AFSA), established on January 1, 2018, is independent from the National Bank of Kazakhstan (NBK) and the financial market supervision and Development Department of Kazakhstan. It is an independent regu-

lator of financial and non-financial services activities of AIFC (Astana international financial center, established on July 5, 2018, is the financial center of Astana, Kazakhstan). In its fintech hub department, AIFC assists relevant companies in developing new products and services in the fintech sector in various ways. One way is to provide acceleration projects where start-ups can work closely with mentors from around the world to develop the necessary capabilities. Another way is for the fintech department of AFSA to provide a legal and regulatory basis for the development of new financial products and technologies and to test them at the fintech lab (Regulatory Sandbox). At present, 30 projects are being tested in Regulatory Sandbox. Currently, more than 125 start-ups work with the fintech department of AIFC. These companies are distributed in different sectors such as payment and mobile wallet, market, credit, AI and machine learning, blockchain, digital identification, network security, and fraud prevention.

The fintech department of AIFC supports venture capital and corporate innovative development with the goal of creating a healthy venture capital ecosystem and expanding opportunities for start-ups in Central Asia and the countries belonging to Commonwealth of Independent States (CIS) to attract investment and perform transactions. In this way, AIFC is creating a comprehensive ecosystem, which covers strengthening regulation, supporting start-ups, helping attract investment, and implementing fintech solutions within enterprises. To address the innovation challenge in the financial sector, AIFC is taking a series of regulatory measures to promote innovation and strengthen the protection of the consumers of financial services/products., including setting up a fintech lab to promote fintech development, introducing a regulatory framework to promote the development of crowdfunding, expanding the framework for the list of regulated and market activities, implementing a series of policies to promote the healthy development of digital asset, creating a looser banking system to strengthen inclusive financing, implementing open API to promote the innovation of digital currency and payment services, providing corporate income tax and value-added tax exemptions for fintech companies optimizing e-commerce regulatory measures, ameliorating the framework to promote venture capital financing, launching Global Financial Innovation Network (GFIN) to promote cross-border regulation and innovation.

2.5.3 Layout of Key Fintech Cities: Nur Sultan and Almaty—Leading the Development of Non-cash Payment

Kazakhstans cities with the most active fintech development are undoubtedly Nur Sultan (the capital) and Almaty (the countrys largest city). As the most densely populated and economically developed cities, they have non-cash payments leading in both quantity and share. Almatys non-cash payments occupied the largest market share: nearly KZT 7 trillion (about USD 16.5 billion). The city also had the highest proportion of non-cash payments, which was 76.8%. Nur Sultan ranked the second with a market share of KZT 2.9 trillion (approximately USD 6.8 billion) in non-cash

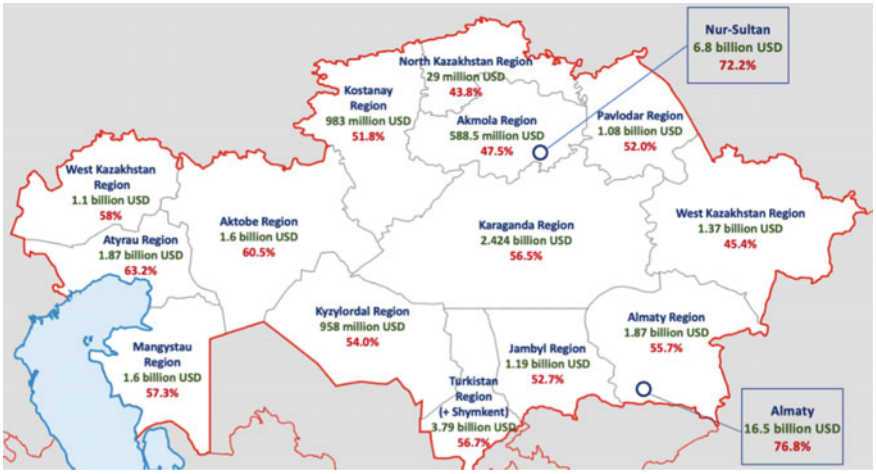

Fig. 8 Market share and proportion of non-cash payment in different cities and regions of Kazakhstan

payments, with the proportion of non-cash payments reaching 72.2%, which also ranked the second (Fig. 8).

Apart from being absolute leaders in the market share of non-cash payments, Almaty and Nur Sultan are also major hubs for fintech start-ups in the country. The countrys largest fintech accelerator, science park, and center are located in the following cities: the AIFC Fintech Hub in Astana, AIFC and Nuris; TechGarden and Most in Almaty.

2.6 India—Potential for Fintech Development Has Been Gradually Exerted

2.6.1 Development Features: Digital Technology Promotes the Innovative Development of Fintech

Indian fintech enterprises as a whole are experiencing the transition from initial stage to growth stage. According to relevant statistics, as of 2019, the number of fintech start-ups in India was second only to the USA, ranking the second in the world. Taking the development of fintech enterprises in several major sub-sectors as an example, there are only dozens of network lending platforms in India at present, which are in the initial stage, and few Indians have experienced online lending investment. Indias credit investigation industry is still in the exploratory stage, with a huge long tail market. Indias crowdfunding industry is in the early stage of development, showing a slow growth trend since 2014. The crowdfunding industry lacks clear regulation,

and SEBI(Securities and Exchange Commission of India), the main regulator, has not yet issued regulatory regulations.

The commercial forms of fintech are constantly improving. Sectors such as payment, loan, wealth management technology, personal finance, insurance, and RegTech have blossomed in an all-round way. Take the sectors of payment and online lending as an example. In the sector of payment, Internet payment covers enterprises with various systems, such as telecom, e-commerce, banks, wallet companies, and other enterprises with different representatives, and some representative payment companies such as Paytm are popular with capital investment. Indian fintech also has great potential in payment, online lending, blockchain, robo advising, inclusive financing, technology-driven integrated banking services, Internet financial security, biometrics, etc.

Digital payment helps India seize the innovation highland of fintech. Digital payment industry has become the core field of accelerating digital capacity building in India and has greatly boosted India to seize the innovative highland of fintech. In 2016, Modi put forward the slogan of Stand Up India, which officially helped the entrepreneurial trend from the height of national policies, with a view to establishing a new ecosystem in the financial scope, and announced the implementation of the Digital India program, initiating the banknote scrapping campaign, and making clear that digital ID cards should be bound to financial services. The banknote scrapping campaign directly boosted Indias fintech industry to the mainstream position, and Indias unique payment infrastructure with a unified payment interface won the trust of the people, which solved the problem of cash-based mode of payment and reduced the financing difficulties of the enterprises. In 2019, India launched the Digital India program, hoping to digitize every offline transaction by unifying the payment industry and e-commerce system. Meanwhile, Mastercard has also launched a project called Team Cashless India in India. This activity would help merchants accept digital payment and improve the coverage of fintech. In addition, the huge development potential of Indias fintech market has also attracted more companies around the world to deploy the Indian fintech market, such as famous Chinese enterprises Alibaba, Tencent, and JD.com and investment institutions Sequoia Capital, Hillhouse Capital, etc. The international influence of the fintech development has been continuously enhanced.

Population advantage lays the foundation for fintech development. India has the second largest population in the world. According to the statistics of the World Bank, as of 2018, the population of India was 1.353 billion. In terms of population structure, the population under 35 years old accounts for 65% of the total, and the population under 25 years old accounts for 50%. In terms of age and proportion, India has a larger number of young people, which is an idealized proportion in the population structure. There are a large number of talents available for fintech development. In the entrepreneurial development of fintech, more young entrepreneurs have the opportunity to start businesses, and there are more long-tailed users of fintech. By 2019, the number of Internet users in India was 560 million, accounting for about 41% of the total population. As a country with big Internet demand only second to China, India has great room for the development and implementation of intelligent

applications. In terms of the adoption rate of fintech, according to public data, as of 2019, the adoption rate of fintech in India had reached 87%.

2.6.2 Fintech Development Policies and Measures: Two-Pronged Approach of Regulation and Publicity to Accelerate Fintech Development

Supervision is the key to the development of fintech. India insists on doing by learning, learning by doing in fintech regulation. In the aspect of fintech regulation, the top-down design is gradually improved, fintech is included in the regulation scope, the Regulatory Sandbox of fintech has been launched, and the popularization rate and adoption rate of fintech are improved by setting up funds, launching fintech publicity activities, etc.

2.6.3 Fintech Development Measures in Key Cities: Mumbai—Sound Financial Foundation and Satisfying Scene Experience

In 2019, Mumbais overall ranking in Global Fintech Hub Index (GFHI) improved by 6 places and it entered the top 20 in the world for the first time. Mumbais fintech industry has improved rapidly, and with 6 highly financed unlisted fintech enterprises such as Freecharge and InCred the number ranked the 16th in the world. Moreover, Mumbai, with its huge population size and excellent population structure (the average age was only 27 years old), had 64% fintech users, ranking the 12th in the world. The advantage of ranking the first in Asia except Chinese cities was glamorous all over the world, making the fintech experience in Mumbai a major advantage.

Actively building fintech into one of the characteristic industries for urban development. Mumbai, as the largest financial center in India, constantly ameliorates its fintech ecology. At present, it has large financial institutions such as HDFC Bank, Kotak Mahindra Bank, ICICI Bank, and State Bank of India, ranking the seventh in the global TOP200 financial institutions by total market value. The digital transformation of traditional finance is accelerated actively, e.g., State Bank of India has launched YONO, a comprehensive life and financial service platform, HDFC Bank launched UltraCash, a mobile payment application program, etc. The rate of utilization of fintech has been increased in an accelerated manner.

2.7 *Israel—Guidance Plus Service to Create a Highland for the Development of Fintech*

2.7.1 Development Features: Technology and International Resources are Transformed Into Fintech Development Advantages

Israel is an internationally recognized innovation powerhouse. The proportion of scientists and engineers engaged in high-tech research and development in Israel is the highest in the world. Among the high-tech companies listed on Nasdaq in the United States, the total number of Israeli companies ranks second. Israel has more than 6,000 technology start-up companies, ranking first in the world. More than 270 multinational companies in the world have set up scientific research centers in Israel. Israel has strong scientific and technological innovation genes and international resources. These resources have laid a solid foundation for fintech innovation and development of Israel. In general, the development of Israeli fintech presents three major development features.

First, the underlying technology shows obvious endowment advantages. Israel is a model of the integration of military and civilian development all over the world. At the same time, the demand for cutting-edge technology and related innovations in the military field are smoothly transmitted to the commercial field. Israel has strong military applications in the fields of security, computer vision, and neuro-language planning. These technological applications are also applied to the development of fintech. Currently, it is the country with the highest usage density of fintech applications. Israel is one of the first countries in the world to adopt blockchain and digital encryption technology. It has many start-up companies with core technologies in the field of blockchain and digital encryption, such as QEDit and DAGLabs. From 2013 to 2019, the amount of financing for fintech and related underlying technologies (artificial intelligence, network security, etc.) was on an upward trend. Especially in the field of artificial intelligence, the amount of financing doubled from USD 1.463 billion in 2017 to USD 3.182 billion in 2019, and the average amount of a single financing increased from USD 7.07 million in 2017 to USD 16.41 million in 2019, increased by more than 100%.

Second, the science and innovation ecology is increasingly perfect. Israel attaches great importance to the formation of the science and innovation ecology. Its government has taken various measures to ensure that scientific research is one of its priorities. It provides security through tax and fee reduction, and at the same time it increases the expenditure in the industry. In the 2020 OECD R&D Intensity Index (the ratio of R&D investment to GDP), Israel continued to maintain its leading position. It is expected that the total future expenditure will continue to increase. According to the latest annual global entrepreneurial ecosystem rankings released by the global entrepreneurial research organization StartupBlink, Israels global ranking has risen by one over last year, ranking third in the world.

Third, the degree of internationalization of fintech is high. Due to geographical restrictions and market restrictions, Israels fintech has attracted international invest-

ment and fintech companies and has exported products and services to the outside world since its emerging. According to a report released by the Israel Venture Capital Data Center in 2020, the participation of foreign investors in Israeli equity investment in the fintech sector increased from 57% in 2018 to 69% in 2019. In the fields of payment, transaction, and digital currency, more than 90% of fintech companies provide international services. In 2019, Israels high-tech industry export continued to grow, reaching a historical record of USD 45.8 billion, accounting for about 46% of Israels total export, increased by 1.2% than that in 2018. Among them, the export of related technology products and services such as fintech and artificial intelligence accounted for a relatively large proportion.

2.7.2 Policies and Regulatory Measures: Guidance but Not Leading, and Strengthening of Communication Between Government and Industries

Israel has many policies and regulatory measures. From the establishment of a regulatory and innovative fintech hub to the establishment of a fintech assistance center, from adjusting the fintech license application process to launching the data sandbox program, the Israeli government basically guides the development of fintech as a market assistant and industrial development guider. Strengthening the communication between the government and the industries and being a partner for the development of fintech are the characteristics of Israeli fintech policies and regulatory measures.

In July 2018, the Israel Securities Authority (hereinafter referred to as ISA) announced the establishment of a regulatory innovation fintech hub, mainly aiming at promoting dialogue between regulators and participants in the fintech industry. In 2019, the Capital Market Authority of Israel joined the GFIN and participated in the global fintech regulatory reform together with international institutions such as the World Bank and the International Monetary Fund, etc. In July 2020, the Israel Securities Authority and the Israel Innovation Authority jointly launched a data sandbox plan for fintech start-ups.

2.7.3 Layout of Key Fintech Cities: Tel Aviv—The Integration of Internal and External Strategies to Promote the Innovation and Development of Fintech

Tel Aviv is Israels second largest city. The city cluster centered on Tel Aviv has become Israels largest metropolitan area and economic hub, and is known as Israels economic capital and technology center. 77% of Israeli start-ups, 81% of investment institutions, 72% of incubators, and 85% of R&D centers are located in Tel Aviv. Tel Aviv owns Israels only stock exchange, Tel Aviv Stock Exchange (TASE), which has become the international headquarters of venture capital companies, scientific research institutions, and a gathering place for high-tech companies. At the same time, Tel Aviv has a relatively complete innovation incubation system and scientific

talents. Among the top 200 global entrepreneurial ecosystem cities, Tel Aviv of Israel ranks seventh. The advantage of focusing on financial innovation with leading technology is obvious. According to the 27th Global Financial Center Index Report (GFCI 27), Tel Aviv ranks 36th.

Tel Avivs fintech development adopts an international strategy. Taking advantage of its own superior innovation environment and developed international capital agglomeration, the products of major fintech companies consider Tel Aviv as an effective test point for product technology, and Tel Aviv will be the first place to test the effects of products and services before international marketing. Tel Aviv Global City Office is used to implement targeted marketing for international fintech customers. While enhancing the citys global media image, various activities are held to meet fintech services and needs, link start-ups and investment capital, as well as implement cross-bank and cross-domain cooperation.

2.8 Indonesia—A Rising Star of Fintech Development in Southeast Asia

2.8.1 Development Features: Fintech is in the Preliminary Development Stage, and Its Potential Continues to be Highlighted

The development of the Internet has certain advantages. According to the 2019 Southeast Asia Digital Economy Report, Indonesia is the country with the largest Internet economy in Southeast Asia. It was even more than quadrupled in 2019, with more than USD 40 billion, and it is expected to reach USD 130 billion in 2025. Internet users in Indonesia are growing rapidly. According to a report released by a global social media marketing company We Are Social and Hootsuite, in January 2020, Internet penetration rate of Indonesia was 64%, with an average annual growth rate of close to 20%. Moreover, Indonesia has crossed the mature development stage of the Internet and moved directly to the development stage of the mobile Internet. In January 2019, there were 356 million mobile phone users in Indonesia, the penetration rate of mobile phones was 133%, and the number of active mobile Internet users reached 142 million.

The fintech industry is developing rapidly. According to a market report by Swiss Global Enterprise, a Swiss export and promotion agency, Indonesias digital financial services revenue is expected to grow significantly at a compound annual growth rate (CAGR) of 34%, and will reach USD 8.6 billion in 2025. The research report Future of Southeast Asia Financial Technology shows that the total valuation of Indonesian fintech companies reached USD 35 billion in 2020, accounting for 32% of that in Southeast Asia.

The online lending and payment industry is booming. The cumulative amount of loans for online lending in Indonesia increased from IDR 2.56 trillion in December 2017 to IDR 102.52 trillion in March 2020, increased by 40 times. According to data

compiled by the Otoritas Jasa Keuangan (OJK), Indonesias total loans from Fintech loans in May 2020 increased by 166.03% on a year-on-year basis. OJK estimates that there are more than 25 million borrower accounts and more than 654,200 entities providing loans. In terms of fintech payment, the total number of electronic money transactions at the end of 2019 reached 5.2 billion, an increase of 79.3% from 2.9 billion in last year. In May 2020, BI had issued licenses to 51 electronic money operators, and the main participants included GoPay, Ovo, Dana, and LinkAja.

2.8.2 Policies and Regulatory Measures: The System Continues to be Improved and the Supervision Continues to be Upgraded

The fintech policy and supervision system have been continuously improved to encourage the development of the industry. Indonesias fintech sector is under the supervision of Bank Indonesia (BI) and the Otoritas Jasa Keuangan (OJK), with the Ministry of Information and Communications of Indonesia playing a supporting role. Bank Indonesia and OJK are responsible for different regulatory fields. Each of them has a supervisory team, and they learn from each other and complement each other (Table 1).

In October 2017, the Otoritas Jasa Keuangan (OJK) issued the 2017–2022 Development Plan, which formulated 10 major policies and implementation plans, and clearly stated that appropriate supervision should be carried out to optimize the development of financial technology. On November 30, 2017, Bank Indonesia issued the Financial Technology Regulatory Regulation No. 19/12/PBI/2017 for the first time, which aimed to regulate fintech behaviors to promote innovation, protect consumers and manage risks so as to maintain a stable currency and financial system and build an efficient, safe and reliable payment system. In the same year, the Bank Indonesia launched a fintech Regulatory Sandbox, allowing fintech companies [Payment system development (including blockchain and distributed ledgers); aggregate payment; Internet investment management and risk control; Internet insurance; credit,

Table 1 Fintech regulatory authorities and their responsibilities

Regulatory authorities	Specific regulatory responsibilities
Bank Indonesia	Electronic wallet, electronic cash, payment gateway, principal, conversion company, card issuer and receiver, clearing office, settlement agent, virtual currency, blockchain, national payment gateway, payment transaction support
Otoritas Jasa Keuangan (OJK)	P2P, crowdfunding. Digital banking, insurtech, capital market fintech, venture capital, online financing, data security, consumer protection
Ministry of Information and Communications	Telecommunications, information technology, fintech related to information technology

financing business, and capital allocation; other financial services (as judged by Bank Indonesia).] in six major sectors to perform a six-month test on their services under the supervision of the Bank Indonesia. On August 16, 2018, OJK, based on the experience of the Bank Indonesia in the fintech Regulatory Sandbox and pre-audit mechanism in the payment field, issued the Digital Financial Innovation Regulation No. 13/POJK.02/2018, which proposed a package of regulations on fintech supervision, established a Regulatory Sandbox system, and filled the blank of Indonesian Bank Regulation No. 19/12/PBI/2017.

Strengthen international fintech cooperation. In October 2018, at the annual meeting of the International Monetary Fund and the World Bank, the Indonesian government promoted the adoption of the FinTech Agenda. In the same year, Chinas Alibaba Cloud announced the establishment of its first data center in Indonesia and officially put it into operation. Since then, various Chinese fintech companies and investors have entered the Indonesian market. In September 2020, the Securities Commission of Malaysia (SC) signed a fintech cooperation agreement with Indonesias Otoritas Jasa Keuangan (OJK) in order to establish a cooperation framework to develop fintech ecosystems in the two markets.

2.8.3 Layout of Key Fintech Cities: Jakarta—The Rapid Development of Fintech with Inclusive Finance as the Core

Jakarta is the capital, the largest city, and the economic center of Indonesia. The Greater Jakarta Region surrounding the surrounding towns is the second largest metropolitan area in the world. Its industry is dominated by finance, accounting for about one-third of the countrys GDP. It has the largest financial and major industrial and commercial institutions in the country. Stock exchanges and futures exchanges are all located in Jakarta. At the same time, Jakarta is also Indonesias fintech hub city. At present, most fintech companies are located in Jakarta (or Greater Jakarta Region), and domestic business customers are basically in the same area.

Jakarta has become the birthplace of fintech companies, the first test site, and the first launch site for products and services. Indonesias first fintech unicorn company OVO was born in Jakarta, and Akselan, the first equity crowdfunding platform, was officially established in Jakarta. Among the numerous fintech companies, more than 70% are engaged in digital financial inclusion business, mainly providing financing and lending services for small and micro enterprises and rural populations.

2.9 *Hong Kong of China—The Government Assists the Strong Development of Fintech*

2.9.1 Development Features: Seek Innovation While Maintaining Stability to Build a Fintech Hub

The enthusiasm for the development of fintech is booming. Hong Kong has a huge financial system, relatively complete financial ecology, and favorable conditions for the development of fintech. The construction and development of the Guangdong-Hong Kong-Macao Greater Bay Area also brings more opportunities for development of fintech in Hong Kong. According to statistics from the Hong Kong Investment Promotion Agency, there are currently more than 600 fintech companies in Hong Kong covering multiple business areas. According to relevant KPMG data and its statistics on global investment and financing, Hong Kong, China ranked ninth in Asia in terms of investment and financing in 2018. Between 2014 and 2018, the total investment of fintech companies operating in Hong Kong amounted to USD 1.1 billion. In the first half of 2019, fintech companies in Hong Kong raised a total of USD 150 million of fund, an increase of 561% on a year-on-year basis. At present, Hong Kongs key application areas of fintech involve mobile payment, cross-border e-commerce payment, securities payment settlement, online financing platform, wealth technology, commercial insurance, etc.

The internationalization characteristics in various fields of fintech are obvious. In terms of payment and settlement, with a wide variety of financial products in Hong Kong, coupled with the opening of Shanghai-Hong Kong Stock Connect, Shenzhen-Hong Kong Stock Connect, and Bond Connect, post-trade processing platforms have huge space for fintech. In terms of wealth management, as an international investment and asset management center, Hong Kong has already applied a large number of technologies in the field of asset management, such as computerized transactions and investments, and still has great potential in automated consulting, big data, and artificial intelligence. In terms of cross-border e-commerce in trade field, it involves payment and exchange in multiple currencies. Hong Kong has the obvious advantages of free currency convertibility and offshore RMB center. Coupled with tax laws and other conditions, Hong Kong is still preferred cross-border e-commerce. Relying on the above advantages, a large number of cross-border payment companies have recently appeared in Hong Kong. In terms of supply chain finance, the blockchain trade financing platform is the construction focus in Hong Kong.

The fintech talent training system is complete. Currently, the main body of cultivating fintech talents in Hong Kong mainly includes two natures, namely, colleges and universities and social organizations. In terms of colleges and universities, many colleges and universities have set up fintech majors at the undergraduate, master, and doctoral levels. The Chinese University of Hong Kong, the University of Hong Kong, City University of Hong Kong, and the Open University of Hong Kong offer fintech major at the undergraduate level; the Chinese University of Hong Kong, Hong Kong University of Science and Technology, Hong Kong Baptist University, etc. offer such

major at the masters level; and the Hong Kong Polytechnic University offers fintech major. In terms of social organizations, organizations such as the Hong Kong Youth Association Continuing Education Center, the Vocational Training Council, the Institute of Financial Technologists of Asia, and the Hong Kong Institute of Bankers have attracted or strengthened the training of fintech talents in online and offline methods by setting up basic fintech courses and issuing certificates.

2.9.2 Fintech Development Policies and Measures: Innovative Support Measures Contribute to Strong Development of Fintech

The government supervision service system is efficient and perfect. Hong Kong has successively established and improved relevant government service systems. First, specialized agencies are established and a Regulatory Sandbox is established. The government of Hong Kong Special Administrative Region has established an Innovation and Technology Bureau to coordinate the development of fintech. At the same time, the Hong Kong Monetary Authority, the Securities and Futures Commission, and the Insurance Regulatory Authority have respectively set up fintech Regulatory Sandboxes to provide companies with a pilot-based regulatory environment for the application of innovative technologies. At the same time, the government has also set up a fast track for Internet insurance sales companies, such as ZhongAn Insurance and other online insurance companies, to apply for licenses. Second, the introduction of corporate resources is strengthened. The Hong Kong Investment Promotion Agency has established a fintech task team to successfully attract 19 fintech companies to settle in Hong Kong and provide assistance to more than 310 fintech companies.

Integrate into the development of the Guangdong-Hong Kong-Macao Greater Bay Area. Hong Kong cooperates with companies such as Tencent, etc., and the Hong Kong Monetary Authority has issued the first batch of third-party payment licenses to them. Through the deployment of WeChat Hong Kong Wallet, Passenger QR Code, We Remit and other products, Tencent has well integrated with the advantages of Hong Kong and Macau based on its accumulated mobile payment capabilities for many years. With the support from all regulatory parties, Tencents E-Pass will give priority to pilot virtual multi-certificate integration in the Guangdong-Hong Kong-Macao Greater Bay Area, which can meet the needs of residents in Guangdong, Hong Kong, and Macau to use a unified digital identity to enjoy multiple services so as to realize the interconnection in Guangdong-Hong Kong-Macao Greater Bay Area.