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Research on Financial Technology Innovation and Application Based on 5G Network

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ABSTRACT In the mobile era, more and more financial institutions are beginning to cooperate with financial technology companies to enhance services and attract customers. The emergence of 5G technology has provided new choices for financial institutions, and the impact of the 5G ecosystem on financial companies and mobile banking is self-evident. With its strong security and speed, 5G technology will greatly shorten the trading cycle and transaction delay, and the capital market will also usher in a revolution. 5G technology will bring more customers and market share to financial institutions and financial technology. In terms of financial technology innovation and application services, 5G will increase productivity and customer satisfaction. The financial services industry hopes that 5G will improve real-time mobile trading and high-frequency trading. Safety is the most critical of the financial sector, 84 percent of financial services executives pay more attention to the potential of 5G provides a more secure transactions. This paper studies financial technology to promote business innovation, reduce risks in the financial sector, and promote high-quality economic development. Relying on high-speed, large-bandwidth, low-latency mobile 5G networks, it is carried out in the backbone network technology evolution, computer room drone inspection, and cash box transportation path monitoring.

INDEX TERMS 5G network, financial technology, innovation, service.

I. INTRODUCTION

5G will spawn a new wave of technology, and artificial industries such as artificial intelligence, cloud computing, big data, 4K/8K video, VR/AR, and unmanned driving will develop rapidly in the 5G era [1], [2]. With the continuous development of society, people are more and more dependent on the network. In order to meet the business needs of users, it is necessary to strengthen the ability of network decision-making, and promote the intelligent development

and automation of the network. Therefore, 5G can fully utilize the network slicing technology to meet the needs of different service types, effectively alleviate the contradictions and conflicts between different business requirements, realize effective management of the network, and establish corresponding behaviors and comprehensive improvement. The rationality of the network configuration. In the future development of 5G networks, intelligent development is needed, and artificial intelligence is used to change the current network operation mode. Compared with the 2G, 3G, and 4G eras, the development of the 5G network era has created a good development environment for the development of

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artificial intelligence, and promoted the integration between core technologies and system structures. In the 5G network architecture, the smart center is a core part. According to the information transmitted in the environmental cabin, the corresponding processing can be carried out to maximize the value of the information. In order to ensure the reasonable formulation of network decisions, the system will send the calculated results to each network policy module, thus ensuring the scientificity of network decision-making. On the one hand, the high rate of 5G brings more possibilities to mobile payments. The theory of 5G transmission speed can reach 10Gb per second, hundreds of times faster than 4G, and it can download a full HD movie in less than two minutes [3]. 5G can flexibly support a variety of different devices, so that end users are always connected, far more than just smart phones, but also all kinds of smart home devices, such a wide range of connections lead humans into the era of Internet of Everything. An overall payment solution based on complex biometrics (such as faces, fingerprints, irises, voices, etc.) may enter people's field of vision [4]. Everything will also be equipped with sensors for each product. The user will complete the identification and payment of the goods at the same time as the products are selected. The supermarkets that are automatically paid for by unattended and shopping are becoming a reality. The implementation of decentralization technology such as high-speed transmission and blockchain based on 5G will alleviate the data exchange pressure of banks and payment company systems, and enable distributed computing capabilities to be expanded indefinitely, which will improve the efficiency and reliability of payment [5]–[8]. The combination of 5G applications with cloud computing and big data, artificial intelligence and other technologies will also greatly improve the security prevention and control capabilities, data value output capabilities, and user experience of mobile payments [9]. On the other hand, the Internet of Things will wipe out new sparks. The Internet of Things is rapidly entering people's lives. The Internet of Things requires that things and things, things and people, and people and people be completely interconnected. Mobile payment is an important part of the Internet, which can help people more easily realize capital transfer and consumption upgrade. For example, the "red packets" function of mobile payment is an innovative attempt based on the Internet of Things. A red packet can connect merchants and users into a virtuous cycle and an active consumption chain. At the Mobile World Congress in 2018, 5G technology became the focus, and all aspects of information showed that 5G standards and 5G commercialization have entered a critical stage [10].

In the 5G era, operators can use the uplink frequency band of FDD and the full frequency band of TDD to form a new network to support business development. The 3.5 GHz band is recognized as a key band for 5G. In order to promote global unified support for the 3.5GHz frequency band to 5G spectrum, China Mobile has designed a 3.5GHz full-band RF indicator, including the terminal link. The frequency

bands used in the high-band 5G network must be mixed high-, medium-, and low-frequency cooperative bands [11]–[13]. 5G needs to consider all frequency bands covering low, medium and high frequency bands. The low and medium frequency bands generally refer to the frequency bands below 6 GHz, which solve the problem of continuous network coverage by means of high and low frequency complementary; while the high frequency band refers to the frequency band of 6 GHz or even 24 GHz, because of its limited coverage, but with large bandwidth. Meet the extremely high user rate and system capacity requirements of the hotspot area. However, with the different time points of 5G development, the development of 5G applications and the degree of cooperation in each frequency band are also different. It is impossible for the initial operators to put all resources into the high-band deployment. As the 5G applications become more and more clear, the entire 5G network will be a three-dimensional network with high and low frequency coordination to ensure a better user experience. There are four challenges in the high frequency band: performance in multiple scenarios, deployment flexibility, integration and cost, low power consumption and green [14]–[17]. The core of operators is communication technology. When operators continue to explore and grow rapidly in the field of Internet finance, their demand for compound financial talents is particularly urgent. Compared with Internet companies, the operator's mechanism is complicated, and the talent team also has cross-border difficulties [18]. To adapt to the requirements of the mobile Internet era, there is outstanding performance in mobile payment. It is necessary for operators to learn from the international leading experience and transform the traditional organizational structure to shorten the decision-making process and improve the market response speed of the organization; Make changes to stimulate endogenous motivation, improve the initiative of existing personnel to cross-border learning, and attract more and more outstanding financial talents to join; upgrade the model of innovation and entrepreneurship, and stimulate the organization more effectively through small contracting Innovative potential [6]. The competition in the era of mobile Internet is a cross-border competition, and the requirements for the knowledge structure of the talent team have undergone profound changes. Complying with the trend of the mobile Internet era, accelerating the development of mobile payment, and building a professional, diversified, innovative and compound financial talent team is extremely urgent.

This paper studies the new intelligent information interaction products customized for the financial industry. Based on the latest carrier communication standard (5G) in the world, it can effectively combine the advantages of SMS, WeChat and APP, and can perform AI voice and semantic recognition to achieve users. Intelligent interaction, helping financial institutions to achieve one-stop service for product promotion and business processing. From the current financial market, on the one hand, financial institutions are increasingly diversified, and the user base is very large. On the other hand, users

may also purchase a variety of financial products services, and information interaction requires high quality and efficiency and integration. At the moment, SMS, WeChat public account, APP as the main means of communication, each has its own characteristics: SMS reading rate is high, but can only be presented in text form, one-way information transmission, lack of interactivity; WeChat public The information of the number is rich, but it attracts individual users to pay more attention to the cost; the business handling function of the APP is the most, but the user is most difficult to expand and the cost is higher. Therefore, when financial institutions integrate SMS, WeChat public account, APP for business promotion, and attract individual users to conduct business processing, they need to jump through multiple applications, many steps, serious transaction leakage, low conversion efficiency, and more information exchange channels. Small and medium-sized financial institutions are particularly weak. The advent of the 5G+AI era has broken the traditional mode of interaction between financial institutions and users, and will open a new era.

II. 5G WIRELESS COMMUNICATION TECHNOLOGY OVERVIEW

5G wireless communication technology refers to upgrading, improving and optimizing various wireless network technologies before processing, and paying attention to the application of nanotechnology, with convenience and flexibility to ensure user privacy, improve transmission speed and reduce energy consumption. In order to break the constraints of traditional network technology, this technology adopts a IP address as a data transmission base station, and collects and aggregates a large amount of information into a mobile terminal in real time, thereby improving data validity and security. It consumes less energy in business management and has higher information transmission efficiency. Therefore, when information transmission obstacles occur, this technology can detect and activate protection measures in the first time. 5G use technology to build a complete network platform that can be flexibly for people who provide services.

5G wireless communication technology is divided into three levels: metropolitan area network, core network and access network. The metropolitan area network is the first layer. This network category includes related communication facilities and equipment, which can transmit and sense signals in a wireless call mode, enabling rapid sharing of information and achieving twice the result with half the effort. The core network is the second layer. The key role of this network is to interface data ports and communication equipment, and to scientifically classify and transmit information about planned completion. The access network is the third layer. The main function of this network is to construct data results, that is, to reasonably standardize the complicated data information in the 5G communication technology Internet, to make the processing method simpler, and to achieve full coverage of information.

With the rapid development of wireless communication technology, spectrum resources are becoming less and less. In order to avoid waste of resources and promote the healthy development of 5G communication technology, people have developed a new multi-antenna transmission technology. For example, building a large matrix through L SAL technology, effectively preventing interference, greatly improving the fundamental benefits of edge users, optimizing the allocation of spectrum resources, and creating favorable conditions for the development of 5G wireless communication technology. This kind of transmission technology can scientifically design the spatial layout, and use layering to make full use of one-to-many service advantages. With the continuous development of communication technologies, spectrum resources are becoming less and less, especially in low-band resources. In order to ensure the sustainable development of 5G wireless communication technology, it is necessary to improve the utilization rate of high frequency band resources. At this stage, high-frequency transmission technology can effectively promote the application and development of 5G wireless communication technology. Meet the technical requirements of modern network development by greatly increasing the utilization rate of frequency band resources. Today, many countries in the world and communications companies have increased R & D strength and extent of application of high-frequency transmission technology. In the future, 5G networks will use high-frequency bands (over 6GHz) and mid-low frequency bands (below 6GHz). In order to meet the access requirements of services such as car networking, under the premise of ensuring high-rate communication (single-user Gbps), Considering the mobility of the vehicle, the coverage distance of the high-band 5G network will be limited, especially for uplink communication. The transmission power of the on-board 5G terminal (compared to the 5G base station) is small, and the vehicle is easy to drive out of the coverage area of the 5G base station. The 5G network needs to consider the uplink and downlink decoupling (upstream and low frequency bands in the uplink, medium and high frequency bands in the downlink) and DD (Device To Device) technology to meet the demand of large mobile broadband in the service scenario represented by the Internet of Vehicles.

The development of 5G wireless communication technology has a large space, which has made the community more and more dense. In order to effectively promote the full coverage of this technology and meet the development requirements of large-area data services, blind spots should be removed in time to increase technical capacity. As data is widely used, cell density increases. Therefore, it is necessary to improve the anti-interference ability of 5G wireless communication technology, fully apply dense network technology, and promote the good development of 5G wireless communication technology. Nanotechnology plays an important role in 5G wireless communication technology and is the core structure for improving technology construction. This technique may focus data collection system in the form

of a flattened convey information according to the Internet IP transmission mode, the user terminal and its introduction. After the data is processed by the nanotechnology, the system combines the server to arrange the wireless signal again to ensure the signal quality and prompt the signal to enter the user terminal smoothly. The relevant personnel applied the nanochip to the mobile supervision center, and adopted the automatic mode to provide users with convenient conditions, thereby obtaining high-precision results, and the effect is remarkable in improving the use efficiency and quality of the 5G wireless communication technology. Cloud computing is an emerging technology for centrally controlled servers that can be used to store data and implement applications. This technology enables file and device application software to be stored on each terminal and can be read and used using the Internet. Full implementation and use of cloud computing technology, ensures regional information platform to store more video data and control information system in central and effectively read the file, and then lay the foundation for a well-functioning system. Its servers are mainly divided into four layers: network layer, physical layer, application layer and dialogue layer. At the bottom is the physical layer, which is mainly responsible for collecting data and promoting the open construction of 5G wireless communication technology. The network layer connects the dialogue layer and the physical layer to ensure unimpeded transmission of information. The dialogue layer is an open delivery protocol around system commands, and the disposal mode is selected according to various IP addresses. Users introduce 5G wireless communication technology, need to build a household and log in with a password. If the password is incorrect, you cannot connect. The application layer can provide users with a full range of services, transform data into a new plan, and deeply analyze product features, thereby effectively improving user efficiency.

The important mission of 5G is to change society, so 5G is an important enabling technology for China's economic and social development. In terms of helping the transformation and upgrading of traditional industries, 5G will assume an important responsibility. 5G applications currently focus on three major scenarios: eMBB, uRLLC, and mMTC. As shown in Figure 1.

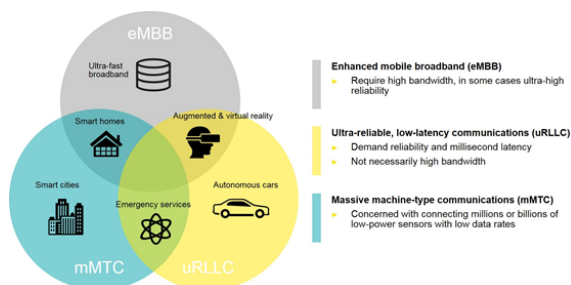


FIGURE 1. The three major scenes that 5G applications are currently focusing on.

In terms of media/games, 5G will bring a truly immersive experience. Such as higher capacity provided by the 5G network to provide users with ultra-high definition 4K and virtual reality services. In the automotive industry, cars will rely on high-performance secure networks, and better performance, higher security, and device-to-device communication are expected to be areas where 5G provides real business value. Connected cars are a major trend in the automotive industry, and while many are still looking at unmanned systems, GPS with real-time traffic and map information updates is the best 5G use case. In terms of utilities, 5G will cut costs and ensure safety. Improve productivity, faster and enhance the efficiency of the introduction of new products and services are the key business drivers of public utility enterprises to adopt 5G. Remote monitoring and maintenance through sensors is considered the best advantage because many utilities want to protect valuable assets in remote and even dangerous areas. In terms of public safety, 5G will improve the public experience and raise its security awareness. Public safety agencies want 5G technology and the Internet of Things to provide citizens with greater security while minimizing the use of taxpayer funds, and hope to extend the performance of networked devices and 5G network slicing through new networks to provide secure priority in emergencies. Communication ability. In the high-tech manufacturing industry, 5G brings higher productivity. With new entrants as well as the negative impact of threats to business processes in manufacturing, most companies plan to increase productivity through 5G technology to improve the user experience and faster introduction of new products and services, hoping to take advantage of 5G technology. Manage risk through asset monitoring to improve the security of remote sites. In the Internet/digital native generation, 5G helps build close customer relationships. Companies such as online stores, social networking, digital organization and collaboration tools, and travel sharing services are hoping to help them stay on the ground, attract new users and build brand loyalty through cutting-edge technology. The enhanced user experience is the primary expected benefit. 5G brings new opportunities to the industry, which is beyond doubt. From the historical situation, 5G will inevitably reshape the entire market structure, and the pattern of reshaping the mobile phone market will also reshape the pattern of the operator market. Who is the most beneficial to 2G to 3G, China Unicom's earliest 3G lead, and finally obtained The advantages of the 3G stage. Brand manufacturers in 3G, we know that iphone is growing rapidly, 4G is completely different. The investment of China Mobile China Telecom has made the two operators in the industry develop faster, and the two operators started to do the collection or ultra Low end. The Chinese cool is a wave. The whole market will have a pattern change in the 5G stage or the system switching stage from the change of loyalty. Now all the mobile phone manufacturers eat the dividend is the brand loyalty, OPPO brand loyalty has exceeded 40% (that is 40 % of people who bought the brand phone will continue to follow.) The brand loyalty of Apple is even higher. The premise

is that there is no big technological breakthrough. Once 5G is behind, or some brands are doing well in 5G marketing. Will make other brands of users turn more to manufacturers who are doing well in 5G.

III. FINANCIAL TECHNOLOGY

The new industrial revolution and technological revolution led by big data, cloud computing, artificial intelligence, blockchain and mobile internet will lead to the continuous breaking and reconstruction of the boundaries and research paradigms of the financial discipline. The main reason for the current round of science and technology eruption has caused the subversive impact of the traditional development model of the financial industry as follows: On the one hand, the global data accumulation stock has reached the scale and level of a new round of industry changes, and the global data is being 40 per year. The speed of around % is growing rapidly. In 2017, the global total data is 21.6ZB (1 ZB is equal to 10 trillion bytes), and financial data accounts for a high proportion. In addition, financial markets naturally have massive standardized big data, suitable for Cutting-edge technology takes root. On the other hand, the use of cutting-edge technology such as artificial intelligence in algorithms and computing power, as well as revolutionary breakthroughs in hardware technologies such as GPU(Graphics Processing Unit), TPU (Tensor Processing Unit)and NPU(Neural Network Processing Unit), have brought the "Moore's Law", which has been stable for 50 years, to an end. Science and technology have profoundly changed the financial format and began to become the commanding heights of future financial development. Financial technology is actively being deployed in various fields of the traditional financial industry, and it has become a new outlet. The technology involved in financial technology has the characteristics of fast, iterative, cross-border, and mixed industry. It is the superposition of frontier subversive technology and traditional financial services and scenes such as big data, artificial intelligence, and blockchain technology. It mainly includes four core parts: big data finance, artificial intelligence finance, blockchain finance and quantitative finance.

Financial technology is the product of deep penetration and integration of finance and technology. Its core lies in using technology to make finance better and more efficient in serving the real economy. In the evolution of financial technology, technology empowers finance, incrementally complements and reconstructs financial formats, and promotes financial services to improve quality and efficiency; finance promotes the transfer of scientific and technological achievements from back-end technology to front-end exhibitions. From the perspective of industry essence, finance itself is a data- and technology-intensive industry. From the early use of card perforation assisted data processing to the use of computers to achieve accounting computerization, from relying entirely on physical outlets to business, to credit cards, ATMs and online banking, financial institutions have been the most active use of information technology.

In this sense, financial technology is not a new concept or practice, but has already existed. As far as the evolution process is concerned, there are three factors that promote the development of financial technology: First, the development of technology itself and the maturity of application. With the continuous development of technologies such as mobile internet, cloud computing, big data and blockchain, application costs are gradually reduced, and the application potential in the financial field is gradually becoming more prominent. The second is the imbalance of the regulatory environment. After the subprime mortgage crisis, the major economies in the world have generally strengthened their financial supervision. The operating costs and compliance costs of traditional financial institutions have increased significantly, and risk appetite has been significantly reduced. Faced with the large demand for financial services in the economy, the financial supply is obviously insufficient, which provides extremely favorable development opportunities for financial technology enterprises that are not included in the regulatory framework and some innovative business models. Third, business models and user habits have changed dramatically. The focus of business activities has accelerated the transfer to the Internet, and the rapid expansion of online transactions and third-party payment has driven profound changes in user habits. The "user disintermediation" (turning to a better Internet company with a better user experience) caused by the rapid changes in customer habits poses a serious challenge to traditional financial business models and processes.

IV. FINANCIAL TECHNOLOGY INNOVATION AND APPLICATION OF COMMERCIAL BANKS

Under the background of profound changes in the business environment, it has become an inevitable choice for commercial banks to accelerate the development of financial technology. However, it should be recognized that commercial banks are very different from Internet (or financial technology) companies in terms of business philosophy, organization management and talent reserve. This determines that the bank's financial technology innovation cannot and does not have to replicate many models of Internet companies. According to the needs of their own business development, we should determine the key directions and contents, and do "do something, do something", instead of "seeking big and seeking". At present, financial banking innovation in commercial banks mainly focuses on the following aspects:

From ATMs to online and mobile banking, the financial services industry is often an early adopter of digital technology. For example, according to AT&T and IDG (International Data Group) research, 81% of financial institutions have made technological changes at the company and/or branch level in recent years. As mobile usage continues to accelerate, many customers are actively looking for new services to match the evolving technology in pockets and wrists. To meet these needs, banks must be more agile than ever.

5G technology is expected to help banks and other financial companies deliver new, innovative mobile services that

consumers want. The low latency, high data capacity and reliability of the upcoming 5G network will help create a new service delivery platform - almost wherever customers are. An example of a technology that can be powered by 5G is a remote teller. The service will enable customers to get personalized attention through video sessions without having to find and travel to the nearest branch. Whether in a smartphone or through personalized ATM(Asynchronous Transfer Mode), a 5G network may provide teller services.

A. WEARABLE DEVICES

Another promising pivot for 5G financial services is wearables. Wearable devices have become an important channel for mobile payments and may add more in the future. In the past, wearable devices relied on local authentication using biometric data to enroll fingerprints and then check them for new scans each time the user accesses the device. These biometric checks are becoming more and more complex, moving from fingerprints to faces, even beyond speech recognition and behavioral analysis, where the service checks the user's input patterns to authenticate them. By connecting to the cloud using 5G technology, these devices can share data with financial services - possibly with higher reliability and lower latency than ever before. This data sharing enables cloud-based services to apply more computing power and evaluate these new biometric data types with greater accuracy. Ideally, banks and other financial companies will no longer need to rely on a form of biometric authentication. By using real-time 5G connections to aggregate biometric data from different devices of the user, financial institutions can also provide multi-layer authentication for additional account protection. This will help to significantly reduce the risk of underreporting during the biometrics process. There are several main directions for channel transformation channel innovation: First, accelerate the innovation and construction of online channels (mobile banking, direct banking, internet banking, etc.) to adapt to changes in customer demand. At present, the business volume of commercial banks such as online banking, mobile banking, WeChat banking, direct banking and self-service channels has increased year by year. In particular, mobile banking has replaced the PC as the main entry point for online transactions. It should be pointed out that with the continuous development of the Internet economy, the exploration of the above-mentioned fields of commercial banks has gradually exceeded the scope of channel transformation, and has penetrated into the business model and product innovation level. The large-scale MIMO technology in multi-antenna technology can not only reduce the transmission power, reduce the intra-cell and inter-cell interference without increasing the spectrum resources, but also improve the spectrum efficiency and power efficiency by 4G. The main bottlenecks in the application of this technology are high-dimensional channel modeling and estimation and complexity control.

B. DATA COLLECTION AND WEALTH MANAGEMENT

5G is able to collect stable data from customers, which will help banks do more than just protect their accounts. Low-latency bandwidth provides real-time information collection and data transfer from location to payment information, paving the way for artificial intelligence-based personal banking services. These services aggregate user behavior data in real time to create context-aware financial advice. Automated Finance Assistants can alert users that when they go to the cinema, they reach the weekly budget limit for entertainment services or propose new ways to save at the grocery store. With high-speed, low-latency services, they can provide more accurate advice in the most important places. Retail Finance Business The innovative retail business is aimed at a large number of customers and has many products. It is much more affected by financial technology than other types of business. Among the many businesses, the innovation of commercial banks mainly focuses on the following aspects: The first is payment innovation. In order to cope with the pressure of Internet payment, commercial banks have invested a lot of energy in payment innovation, and there are many kinds of products. The 5G wealth management application is shown in Figure 2. From NFC to ApplePay, to flash payment, QR code payment, sonic payment, and Bluetooth payment and photonic payment. However, due to the combination of scenes, commercial banks are far less than Internet companies [19]. Despite the continuous technological innovation, it has been difficult to reverse the decline in the field of retail payments.



FIGURE 2. 5G wealth management application.

The second is the Internet property sales. After the success of Yu'eobao, commercial banks have followed suit to develop a variety of "bao" products with more powerful functions (higher withdrawals, faster arrivals, higher returns, and some with active management functions). In addition, the bank has also developed products linked to insurance and linked notes in addition to the money fund, which further enriched the Internet wealth management product system. The third is personal online loans. In response to the core needs of the personal loan user experience to be "fast", commercial banks have launched various forms of online loans. This kind of loan is based on mobile internet technology. Based on the customer's previous transaction data, it makes full use of big data analysis and uses the decision engine to conduct credit approval for customer loans. The loan processing channel can

be completed by self-service through online banking, mobile banking and other terminals. It has realized the automatic loan process of online application, automatic approval, online signing and automatic lending. The fourth is smart investment. In the past few years, smart investment has sprung up in China. The first to enter this field are financial technology startups such as Blue Ocean Zhitou, Qizhitou, Tianmi RA, Snowball and Golden Beta. The intelligent investment innovation of commercial banks began with China Merchants Bank.

C. BEYOND THE CUSTOMER

It is expected that the advantages of 5G will exceed customers. Financial professionals can also use them to create more efficient back-end processes. In terms of insurance, damage assessors can quickly send dozens of photos back to headquarters using a 5G-enabled high-speed connection without waiting to reach their office or home network. Using this technology, insurers can provide services to customers faster and more automatically, especially when the claims adjustment process is combined with AI. The future of financial services is mobile. This article uses SDN to reduce latency. SDN technology is a software-programmable new network architecture that separates the control plane of the network device from the forwarding plane and centralizes the control plane. We know that in traditional networks, the control plane functions are distributed in various network nodes (such as hubs, switches, routers, etc.), so if you want to deploy a new network function, you must upgrade all network devices. This greatly limits network innovation! From this point of view, SDN is the “savior” that came into being! SDN adopts a centralized control plane and a distributed forwarding plane. The two planes are separated from each other and the control plane is utilized. The control-forward communication interface centrally controls the network devices on the forwarding plane and provides flexible programmability upwards. Because of this “natural talent”, SDN naturally became the “buster” of the EPC control surface and user plane coupling problem. Bank outlet innovation: 5G technology reduces the space distance to limit the services, and narrows the blind spots of existing banking outlets. For areas where banking services are difficult to reach, especially in areas where service personnel are scarce, or in agile networks in cities, financial institutions can use VR or holographic technology to present financial services through stereoscopic images to provide users with an on-site experience. If the holographic technology is mature in the future, holographic remote account verification may be used to further shorten the obstacles caused by space. On the other hand, the bank’s off-line intelligent equipment and agile network can be deployed through 5G, reducing the cost of dedicated line deployment, and 5G can play a complementary role in areas where the wired network is difficult to deploy. Figure 3 shows the average bank turnover rate in recent years.

The financial business innovation of the company is relatively retail. The direct impact of the company’s financial

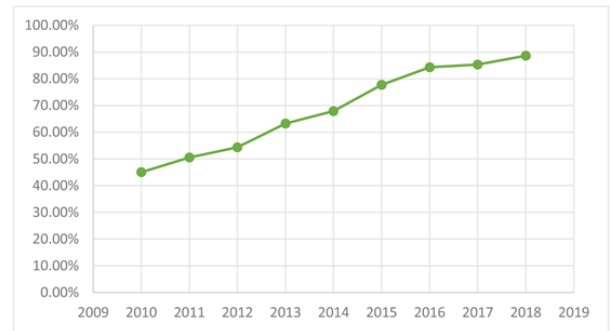


FIGURE 3. Average bank exit rate.

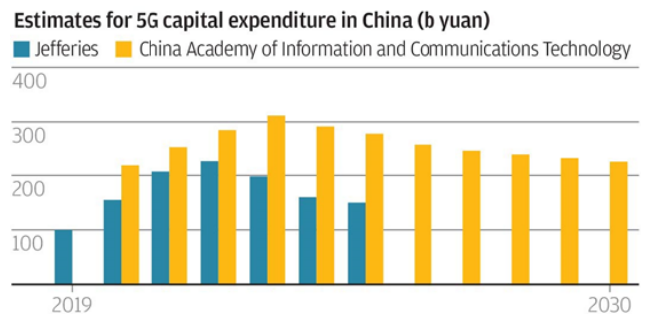


FIGURE 4. 5G expenditure estimate.

business on the Internet is relatively small. However, in the context of increasingly fierce competition and increasingly obvious trends in financial disintermediation, commercial banks have also begun to actively learn from the Internet thinking model and apply it to financial technology, continuously expand and innovate the service model of corporate finance. The 5G expenditure estimate is shown in Figure 4. Representative innovations include: using big data technology to improve the efficiency of small and micro enterprise financing; developing a “transaction bank” business based on payment settlement, using financial technology and Internet platform to integrate various products that the bank originally dispersed, To provide customers with a more comprehensive and convenient one-stop service, effectively reduce customer capital costs and debt levels; use blockchain and other technologies to slightly improve traditional business processes, improve business efficiency and risk control levels, and so on. Inter-bank business innovation is the most market-oriented and innovative business type among commercial banks. There are many successful cases in the field business using Internet thinking and financial technology for innovation.

The innovation of interbank business based on financial technology generally has the following categories: First, banks use Internet technology to integrate existing inter-bank business resources to achieve information-driven, service integration, business scenario and development ecology. Second, based on inter-bank business resources, improve the efficiency of inter-bank assets and liabilities. In addition, the use

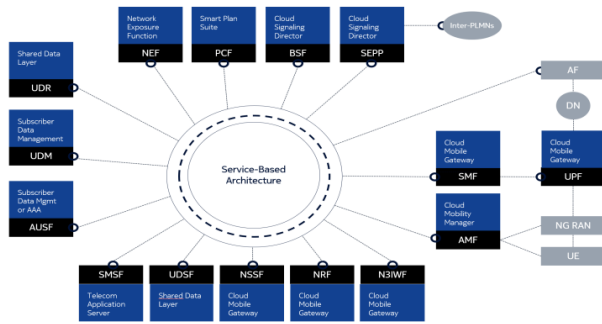


FIGURE 5. 5G system architecture.

of the Internet and financial technology to expand the advantages of long-tail customers, the inter-bank resources directly connected with the terminal needs of long-tail customers, forming a comprehensive financial trading platform through inter-bank business and retail business. The third is to use the technical gradient between banks to conduct financial technology output to other peers (especially small and medium-sized banks). At present, the “Silver and Silver Platform” of Industrial Bank and the “E-Communication” of Ping An Bank are the representatives of the first two types of innovation. The Xingye Gold, Ping An Account, and Zhaoyin Yunchuang are examples of some banks exploring the export of financial technology. Ecological innovation Ecological innovation refers to the intervention of commercial banks in ecology and scene construction. This kind of innovation has moved away from the traditional financial services and is closer to the e-commerce business. From the perspective of commercial banks (especially large banks), this kind of attempt has its merits, that is, through the construction of the ecological circle to achieve the “three streams of one” of information flow, logistics and capital flow, and carry out various financial services accordingly. To meet the challenges of Internet companies. But for traditional banks, this kind of innovation (especially the comprehensive e-commerce platform) is also the most difficult for banks.

D. SYSTEM VERIFICATION

Virtualization and cloud computing reduce computing costs by pooling resources in shared data centers. By using virtualization, you can scale down the 5G core network. The changing core network components can operate as a communication virtual machine. Moving the control plane of a 5G core network to a cloud provider reduces deployment costs. The 5G core is a network of interconnected services, as shown in the following figure 5. The AMF role in the 5G independent registration provides a good overview of the AMF functionality.

As shown in Figure 6, The AMF performs most of the functions that the MME performs in a 4G network: Terminate RAN CP interface (N2); NAS signaling; NAS encryption and integrity protection; Mobility Management

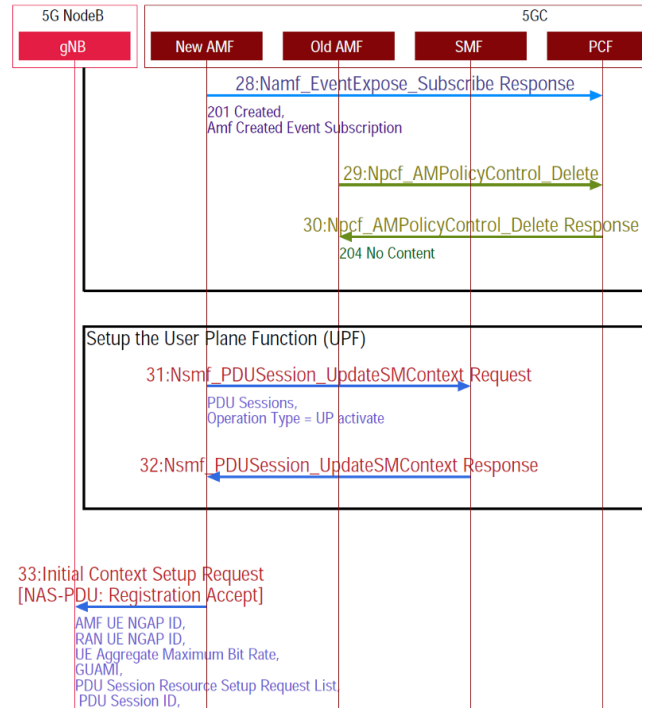


FIGURE 6. AMF-Access and mobility function sequence diagram.

(MM) Layer NAS Termination; Session Management (SM) layer NAS forwarding; Verify UE; Manage security context; Registration management; Connection management; Accessibility management; Liquidity management; Apply PCF’s mobile-related policies (such as mobile restrictions).

V. CONCLUSION

Never before, as China’s economic development enters a new stage and the degree of economic Internetization continues to increase, the impact of financial technology on traditional finance will continue to increase. From another perspective, this also means that the application of financial technology by commercial banks will continue to deepen. Of course, due to the low risk nature of the bank itself, it has been difficult to reverse the business philosophy and risk appetite in the short term. This means that the development path of banks in the field of financial technology will be completely different from that of Internet companies (or financial technology start-ups). It is precisely because of this difference that banks and Internet companies (or financial technology start-ups) have greater room for cooperation: First, cooperation at the technical level. Through the establishment of a joint financial and chemical laboratory, the 5G technology advantage of technology start-ups is combined with the financial application scenarios of commercial banks to accelerate the speed of technology development and application. At present, following the establishment of the Joint Financial and Technological Laboratory by Agricultural Bank and Baidu, Dalian Bank has also established a financial AI laboratory with JD Finance,

and it is expected that there will be more such cooperation in the future. The second is cooperation at the product and business level. By building an Internet ecosystem, jointly launching products and services, sharing customer resources and financial technology capabilities to achieve a win-win situation for Internet companies and commercial banks. It is expected that the types of products and business scope of cooperation in the future will continue to expand, and it is expected to expand from the current consumer credit to the Internet of Things and supply chain finance.

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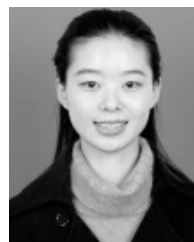
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