



# The future of mobile payments

A Chinese perspective

A Ginkgo Management Consulting White Paper

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# Preface



Taking payments is the key to any business and there are plenty of ways to do so. With the ubiquity of mobile phones and the development of mobile commerce (mCommerce), a relatively new way of paying via mobile devices has found its way to consumers all over the world.

Yet, most Western countries are rather slowly adopting this technological enhancement (for example due to privacy concerns), even though companies such as Apple, Google and Facebook have been pushing into this direction for some time now. The US tech giants forged ahead by offering their own digital wallets and / or payment services, with Facebook – the American online social media and social networking service – now even venturing a step further, announcing to release Libra, their own global currency powered by blockchain technology, in 2020.

In the Eastern hemisphere however, more specifically in Asia, China is already on its way to a completely cashless future. By 2020, it is expected, that China's mobile payment transaction volume will surpass 300 trillion Chinese Yuan (around 45 trillion US Dollar\*). Due to their convenience and simplicity, mobile payments have become omnipresent – from high-end luxury flagship stores to paying for a meal at a street food stall.

In order to properly understand the market and future of the mobile payments industry, this whitepaper will provide insights of the history and evolution of mobile payments, a focus on China as the world's mobile payment leader and pioneer, a comparison of the key players in the market as well as several use cases and future outlook.

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\* Exchange rate of 1 Chinese Yuan equals 0.15 US Dollar (April 2019)

## Origination, definition and evolution of mobile payments

Mobile payments are defined as payment services operated under financial regulation and performed from or via a mobile device. The foundation for this type of payment has been laid by the American computer scientist and cryptographer David Chaum who started working on creating digital cash in 1983.<sup>1</sup> Essentially, Chaum is regarded as the inventor of secure digital cash by introducing the so called “blind signature” scheme to the general public in one of his academic papers. A blind signature is a form of digital signature in which the content of a message is disguised (blinded) before it is signed, meaning that the person cannot view the message at the time of signing and therefore promoting anonymity.

Nevertheless, the blind signature can in due course be matched with the original message just as a regular digital signature. A common analogy to the cryptographic blind signature is the signing of a voter’s ballot paper by an election official by seeing the voter’s identity credentials but without glancing into the actual vote thus, ensuring the legitimacy of a vote when counting it.

15 years after David Chaum’s publication<sup>1</sup> – in 1998 – the American company PayPal was founded as a service for transferring money which grew into today’s 250 million user strong worldwide payment processor for online payments. The company, which allows users to send, receive and hold funds in 25

currencies worldwide, is considered as one of the major enablers of mobile payments. Aside from PayPal, Telenor and Ericsson (a Norwegian and a Swedish telecommunications company) were also working on payment services and launched the first “mobile wallet” in 1999. This service enabled users to order goods and services from their mobile phones and paying for them via bank / credit card or cash which was previously transferred to the mobile wallet. In a trial project of their joint endeavor, users were able to purchase movie tickets by first choosing the film, performance and seats and thereafter either accepting or rejecting a given suggestion. Telenor and Ericsson were pioneers and envisioned that the purchase of cinema tickets would only be the beginning and that other products and services would follow suit.

By 2003, approximately 95 million cellphone users worldwide (out of roughly 1 billion according to the Intelligence arm of the GSM Association) made a purchase via their mobile device<sup>2</sup>, which helped triggering the launch of various payment services and mobile wallets such as Alipay (2004), Bitcoin (2008), Google Wallet (2011), WeChat Wallet (2013), Apple Pay (2014), Android Pay (2015) and Samsung Pay (2015) to name the most prominent. The American online publisher TechCrunch estimates that by 2020 90% of all smartphone users will have made a mobile payment.<sup>3</sup>

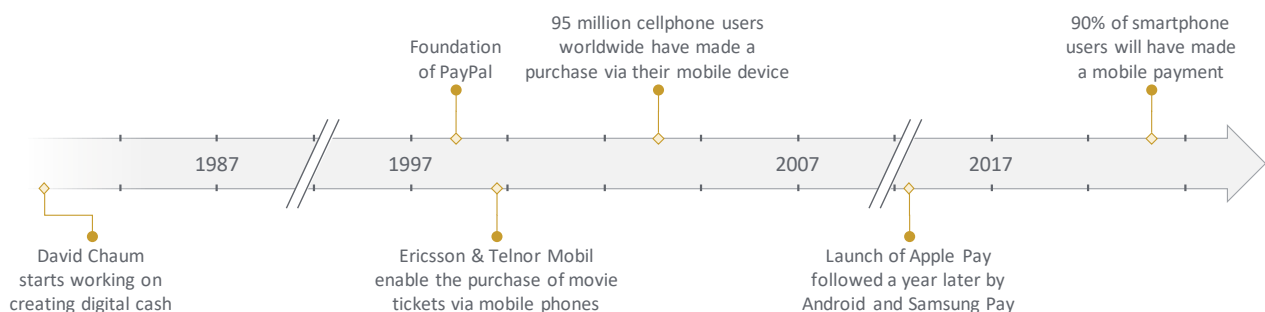


Figure 1: The evolution of mobile payments (Source: Ginkgo Research, 2019)

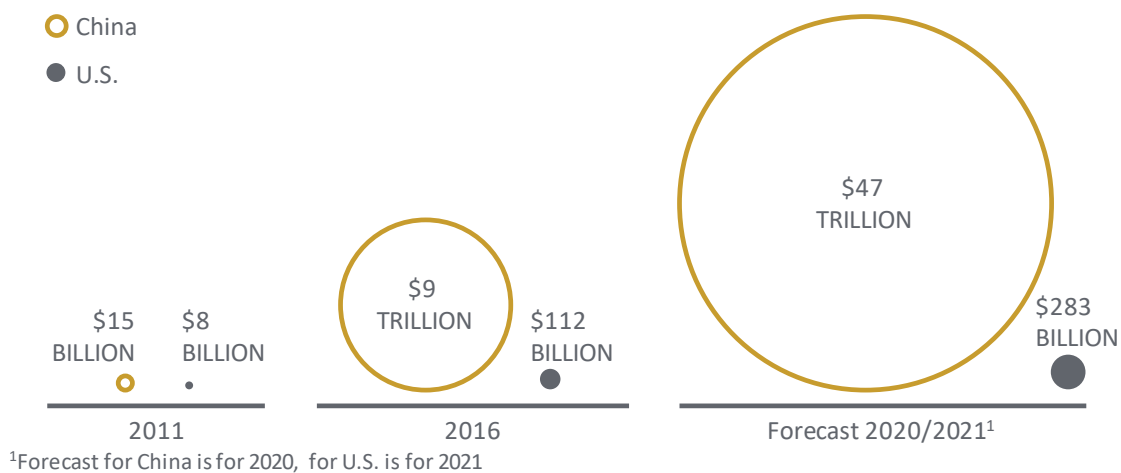


Figure 2: Mobile payment transaction volume of China and the US (Source: Ginkgo Research, 2019)

Over the recent years, the mobile payments transaction volume has increased at a rapid rate, especially in China, which to a large extent resulted from the inadequacy of traditional banks. While branches within cities usually suffer from long queues, branches in the countryside are anything but plentiful and hence more often than not require long journeys. Further, citizens have all but foregone credit card payments due to a mix of dreadful bureaucracy to obtain a credit card in the first place, being reluctant to ratchet up debt on their credit cards and poor

national payment terminal infrastructure. In return, the transaction volume of mobile payments in China is estimated to increase by more than 3,000 times within less than 10 years until 2020. In comparison, the US market's mobile payments transaction volume is estimated to increase by merely 35 times in more or less the same period. This demonstrates that the Chinese market will potentially have outgrown the US market by a factor of 150 in the next years. Consequently, China is on track to become the first cashless society.

## Mobile payments in China

Mobile payments in China are ever more accepted by and used throughout society – specifically the younger generation favors mobile payments over cash. According to a market study undertaken by Ipsos in 2017,<sup>4</sup> the post-60s generation carried 557 Chinese Yuan (around 83 US Dollar\*) on average per day, while the post-90s generation only carried 172 Chinese Yuan (around 25 US Dollar\*) on average per day. In general, just about half of Chinese used cash for only 20% or less of their monthly consumption and 74% of the roughly 7,000 interviewees stated that they could live for one month or longer with only 100 Chinese Yuan (around 15 US Dollar\*) or less in cash. Two years later, Ginkgo predicts that the

outcome probably will already have advanced further into the direction of a completely cashless society, which also bears other sociopolitical implications (e.g. redistribution of wealth across societies).

Moreover, the study showed that between the three payment options (mobile payments, cash and credit card), mobile payments outranked the other two as average payment method across the sectors dining, retail, entertainment and travel by roughly two to one. In the dining sector, only food stands / street vendors saw more payments made in cash than via mobile devices. All other segments (fast food chains, bakeries, cafes, restaurants and fruit vendors)

\* Exchange rate of 1 Chinese Yuan equals 0.15 US Dollar (April 2019)

received more than half of their payments via mobile devices. Unsurprisingly, credit cards were most commonly being used in restaurants in this sector. In retail, mobile payments were most frequently used in convenience stores, followed closely by medium and large supermarkets and shopping malls. Then again, the retail sector still saw a fair share of credit card (especially appliance stores and brand retailers) and cash payments (also convenience stores and shopping malls along with florists). For entertainment, mobile payments dominated the sector and were most popular when purchasing movie tickets and least popular with Internet Cafes – here around one third of the payments were still made in cash. Additionally, the travel sector also saw high percentages in cash payments especially at gas stations and in taxis, while credit cards were mostly being used for hotels.

Ginkgo has observed that mobile payments have already become the new standard and online services and applications usually aid and abet payments via mobile devices by accelerating and simplifying the end-to-end process. Moreover, the online services and applications are all “transaction ready”, due to their seamless payment integration with Alipay, WeChat and the likes.

An example - the purchase of movie tickets via application:



Figure 3: Purchasing process for Movie Tickets (Source: Ginkgo Research, 2019)

- 1 Select movie
- 2 Select cinema
- 3 Select screening time
- 4 Select seat
- 5 Add snacks / drinks, etc. (optional)
- 6 Purchase tickets

As mentioned in the beginning, the mobile payment transaction volume has grown rapidly over the last eight years, especially in China, where it is expected that the mobile payment transaction volume will surpass 300 trillion Chinese Yuan (around 45 trillion US Dollar\*) in 2020. This rapid development is even more noteworthy given the fact that there are essentially only two major players in the Chinese market – Alipay and WeChat Pay – who have a combined market share of more than 90%.

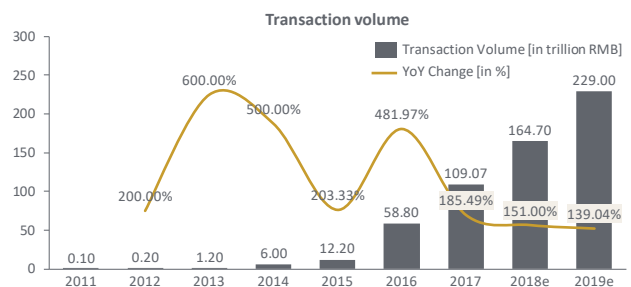


Figure 4: Mobile payment transaction volume in trillion Chinese Yuan 2011 - 2019e (Source: Ginkgo Research, 2019)



## The two Chinese key players: Alipay vs. WeChat Pay

When having a look at the mobile payments market in China, it is worthwhile to focus on third-party providers as they dominate the industry. The two major third-party mobile payment providers in China are Alipay (支付宝) and WeChat Pay (微信支付). Alipay is a mobile and online payment platform, which has been established in February 2004 by the Alibaba Group. It overtook PayPal as the world's largest mobile payment platform in 2013.<sup>5</sup> As of March 2018, the number of Alipay users reached 870 million, while PayPal has around 250 million users globally.<sup>6,7</sup>

Even though Alipay lost some of its market share to WeChat Pay, it still controls more than 50% and therefore remains the market leader. This is also reflected in the distribution of payments of various products / services: bill payments, financial products (e.g. stocks), online-to-offline (O2O) products / services\* and offline payments are all still dominated by Alipay with a ratio of 3:1 to 2:1 compared to WeChat Pay. Only peer-to-peer (P2P) payments – which lies in WeChat's nature of being a messaging / social media platform first and foremost – see WeChat Pay in the lead.

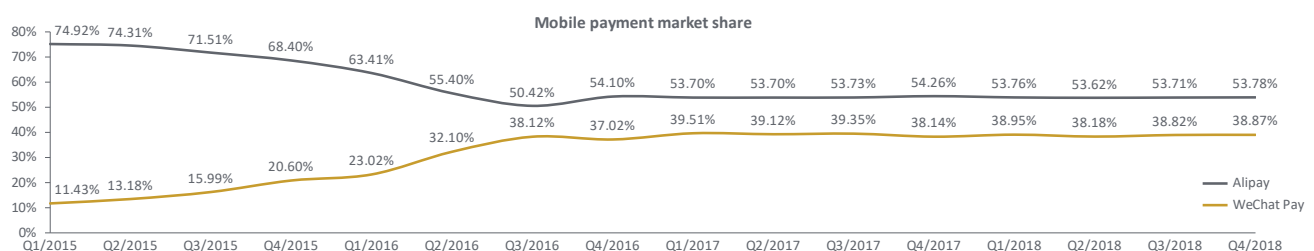


Figure 5: Market share of Alipay and WeChat Pay 2015 – 2018 (Source: Ginkgo Research, 2019)

On the other hand, WeChat Pay is a digital wallet service embedded into WeChat – China's multi-purpose messaging, social media and mobile payment app developed by Tencent in 2011 – which allows users to perform mobile payments and send money between contacts (P2P). WeChat has added its mobile wallet in 2013 and it is reported that around 600 million people out of its one billion monthly active users use WeChat Pay.<sup>8</sup>

Together, Alipay (53.78%) and WeChat Pay (38.87%) make up for 92.65% of the mobile payments market in China. The other 7.35% are made up of OneWallet (壹钱包; 1.19%), UMPay (联动优势; 0.95%), YeePay (易宝; 0.70%), 99Bill (块钱; 0.67%) and several other smaller mobile payment / wallet providers.<sup>9</sup>

Nevertheless, both companies, as well as other competitors, continuously try to (re-)gain market share by complementing their service and feature portfolio (e.g. Alipay has tried to launch WeChat-esque social media and messaging apps, WeChat is continuously venturing deeper into investment and fintech territory and their competitors try to keep up with the pace of innovations).

Albeit Alipay's momentary leadership, WeChat's influence and bargaining power have been steadily increasing. Alipay has already foreseen WeChat becoming a serious threat and tried to kill it in the summer of 2012 by developing a social media app of its own – Laiwang (来往) – which never really took off. After the failed coup, WeChat – "China's app for

\* O2O commerce seeks to draw potential customers from online channels to make purchases in physical stores as well as create a seamless digital experience before, during and after the purchase.

everything” – began its foray into mobile payments with the introduction of its wallet (WeChat Pay in August 2013). In a first experiment, the company set up WeChat-branded vending machines in Beijing to promote its newly launched payment service by offering discounted drinks when paying online. However, it did not take long until vending machine companies followed suit, offering their customers the option to pay via WeChat or Alipay.

In the beginning of 2014, WeChat pushed further into mCommerce by adding a taxi booking function into its wallet (as an official account / app within the app), which allows users to hail and pay a taxi directly from within the app.

Thereafter, other mCommerce inclusions followed, such as the integration of the eCommerce platform JD (京东) – one of China’s massive B2C online retailers and major competitor to Alibaba’s Tmall (天猫) – among others. Another ingenious idea which deserves to be mentioned in particular is the integration of the feature of sending virtual red envelopes (so called hongbao (红包)), as this was one of the key drivers to unlock subsequent transaction activities by winning over Chinese digital wallets through gamification of the Chinese New Year by letting users compete to get the most red envelopes / highest amounts.

The ritual of gifting red envelopes – monetary gifts – especially during holidays or special occasions such as weddings, graduation, etc. is deeply rooted in China’s history. The WeChat red envelope feature debuted during Chinese New Year 2014, roughly six months after the introduction of the WeChat wallet and experienced a stunning growth in part due to Tencent’s partnership with CCTV Spring Festival Gala. This Gala was watched by some 700 million people – as users could win 80 million US Dollar by shaking their phones (another WeChat feature) during the event.<sup>10</sup>

2019’s Spring Festival Gala was broadcasted across 162 countries and regions and watched by almost 1.2 billion viewers around the globe (think the Superbowl times eleven) and during this year’s Chinese New Year, 823 million WeChat users sent or received the digital red envelopes. Overall, Spring Festival holiday travelers made a total of 1.2 billion transactions using WeChat Pay from February 4 to February 9, 2019 (from Chinese New Year’s Eve until the fifth day of the lunar calendar).

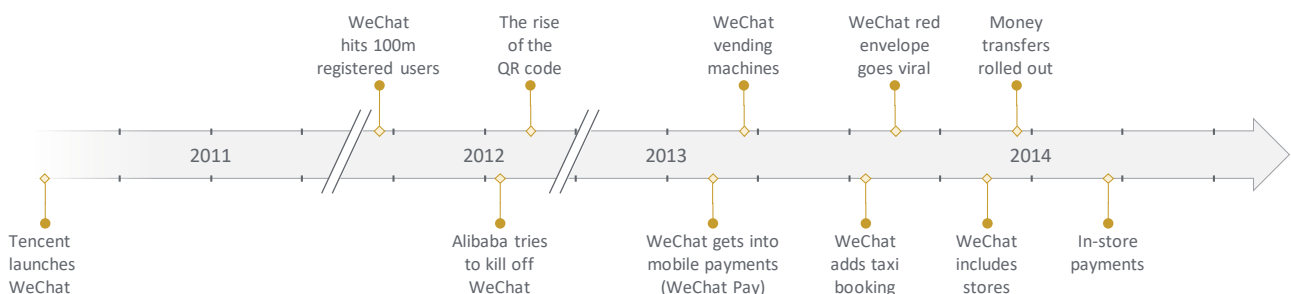


Figure 6: WeChat milestones (Source: Ginkgo Research, 2019)

WeChat (respectively WeChat Pay) has become so ubiquitous that life in China cannot be imagined without it anymore. To give an example, a normal working day in China could look as follows:

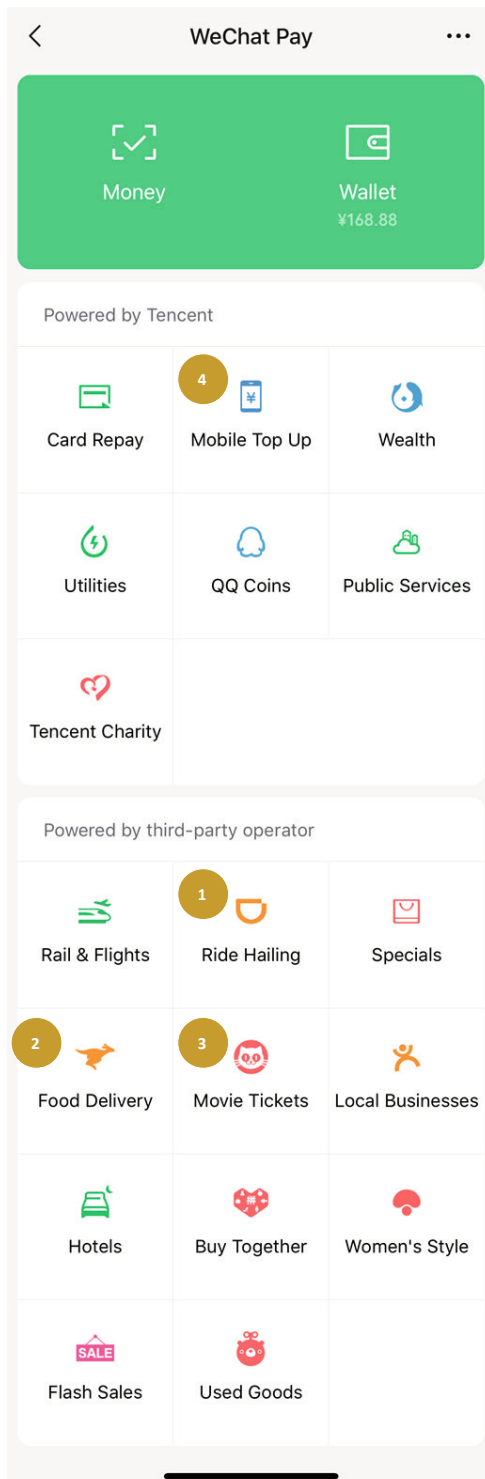


Figure 7: WeChat Pay - the WeChat wallet (Source: Ginkgo Research, 2019)

**07:00** The alarm goes off. Time to get up and go to work. While waiting for my taxi, which I have called via Ride Hailing **1**, I walk across the street to one of the vendors to buy my breakfast, which I pay by scanning the vendor's QR code.

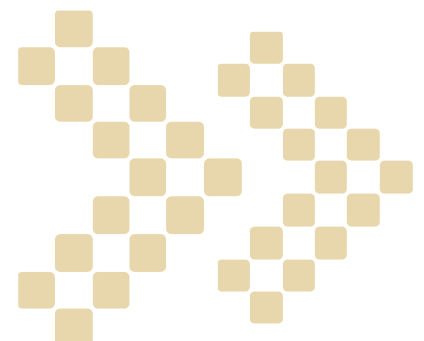
**08:17** Arrived at work. Just quickly need to pay the taxi driver via WeChat In-App payment before heading to the office for the first meeting of the day.

**12:02** Time for lunch. But not having the time to go out due to back-to-back meetings, I opt for Food Delivery **2** – after ordering the food you can pay directly from within the app.

**16:51** While thinking about tonight's plans, I suddenly remember that I absolutely wanted to watch a movie, so I book tickets via the mini program Movie Tickets **3**. While at it, I also quickly top up my mobile phone **4**.

**19:38** Packing up work and hailing another taxi to the nearby cinema and unwinding for the remainder of the evening.

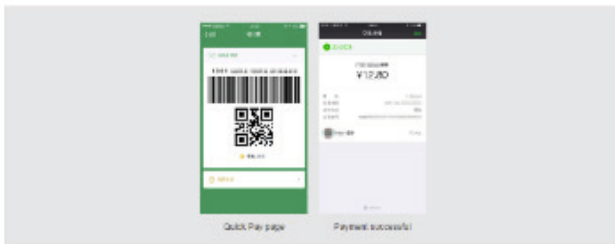
**22:46** After the movie it is time to go home and get some sleep before starting a new day in the Middle Kingdom.



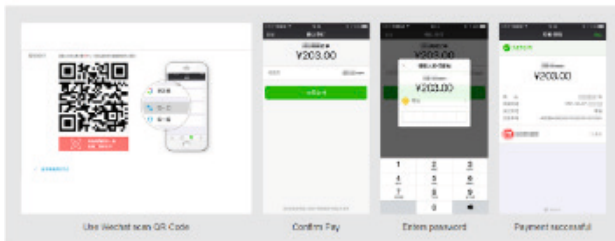


As it can be seen in the example, Chinese hardly need to leave WeChat to go about their days, as more and more functions are being integrated. In general, WeChat Pay offers four different kinds of payment methods for their users depending on the type of merchant interaction.

- 1 Quick Pay:** buyers can present a pay code; the vendor will scan the code to finish the transaction:



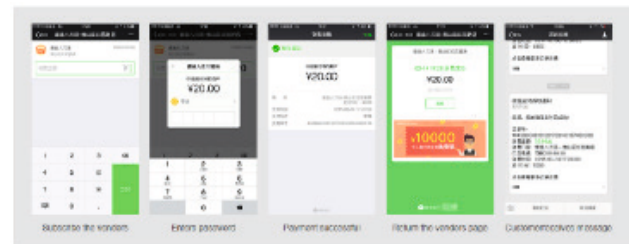
- 2 QR Code Payment:** Buyers can scan a QR code to finish the transaction:



- 3 In-App Web-Based Payment:** buyers can purchase products on a shopping page in an official account:



- 4 In-App Payment:** when buyers make an in-app payment, it will open up WeChat to process the payment:



In comparison, Alipay offers more or less the same features and functionalities as both applications became pretty similar in nature over time.

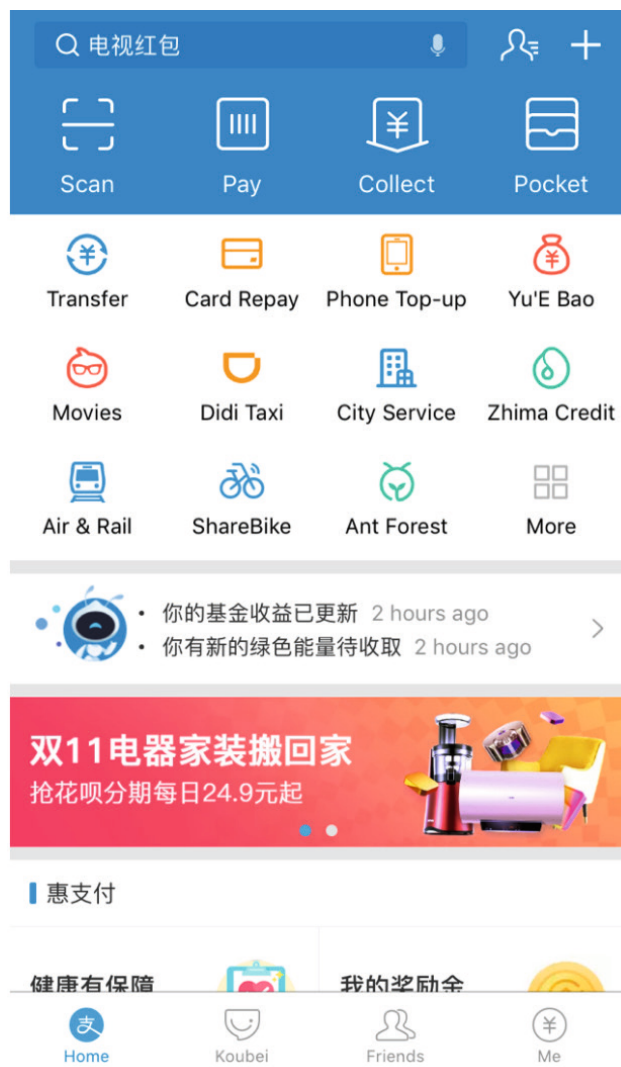


Figure 8: Alipay (Source: Ginkgo Research, 2019)

The main difference lies in their respective marketing strategies – WeChat Pay coming from and focusing on a more social aspect of eCommerce and user experience due to the social nature of WeChat and Alipay coming from and focusing on a more commercial aspect and payment processing due to the business-like nature of Alibaba.

Alipay's focus helped the company to become favored for oversea transactions as it provides better

currency exchange rates, quicker tax refunds, an international money transfer service as well as promotional coupons for certain foreign shopping malls.

Other differences between both providers include red envelope amounts, currencies supported as well as transaction fees. WeChat red envelopes are limited to 200 Chinese Yuan (around 30 US Dollar\*) per red envelope, while Alipay does not have any limitation. Furthermore, Alipay currently supports 18 currencies worldwide, while WeChat Pay only supports nine and in terms of transaction fees, WeChat Pay charges 0.1% for all withdrawals of more than 1,000 Chinese Yuan (around 150 US Dollar\*) and Alipay charges 0.1% for withdrawals of more than 20,000 Chinese Yuan (around 2,982 US Dollar\*). All internal transaction within the respective ecosystem are free of charge.<sup>11</sup>

All in all, when it comes to mobile payments, usually both applications can be used with whichever merchant, from large-sized shopping malls to street food vendors.

\* Exchange rate of 1 Chinese Yuan equals 0.15 US Dollar (April 2019)

## Use cases & future outlook

Both companies are capitalizing on their position in the market and continue to develop cutting edge innovations as well as integrate evermore useful features and functionalities to bind their users. Some few selected ongoing developments include but are not limited to:

### 1 **Alipay Investment Platform** **Yu'e Bao (余额宝)**<sup>12,13</sup>

Yu'e Bao was launched in 2013 and has become the world's biggest money-market fund with assets of some 1.13 trillion Chinese Yuan (168 billion US Dollar\*) and more than 500 million users. The fund works by transferring user's savings / spare change into an investment vehicle, where users then receive daily interest returns based on the money they have stored in their account – the platform is mostly being used for small investment amounts and more than 70% of Yu'e Bao accounts have a balance of less than 1,000 Chinese Yuan (around 150 US Dollar\*). Nonetheless, investments have been capped at 20,000 Chinese Yuan (around 2,982 US Dollar\*) per person. Following Alipay's lead, WeChat Pay introduced a similar service – Ling Qian Tong (零钱通) – and hence daily interest returns quickly became yet another area of competition between the two platforms.

### 2 **Alipay 'Smile to Pay'**<sup>14</sup>

KFC-diners in Hangzhou can place their order at a terminal, which then scans their face for payment. The terminal matches the scan to an image of the photo ID which is stored in the system. If the pictures match, the customer only must enter his / her phone number to pay. The software analyzes more than 600 facial features to make a match and uses a 3D camera with "liveness" algorithm to make sure people aren't trying to fool it with photos or videos of someone else. Recently, to attract more female users, the company has now also rolled out beauty filters for its facial recognition

payment systems, which will be automatically applied when users scan their faces to make purchases.

### 3 **WeChat Electronic Identification System**<sup>15</sup>

Citizens of Guangzhou can verify their identities through facial recognition technology, the government then links the verified identities to the ones in their database. Verified users will be able to do anything that requires an identity card (e.g. hotel check-in, government services). The software authenticates the identities through an artificial intelligence system.

### 4 **WeChat Convenience Store 'WeLife'**<sup>16</sup>

Customers were able to shop in the WeLife convenience store in Shanghai (which opened as a pop-up store for two weeks in early 2018 and is supposed to return as a fixed store featuring facial recognition at a later point in time) without cash and cashiers. Customers simply scan a QR code to enter the shop and after picking up all the items they want to purchase, they scan another QR code to leave. During that final scan, the system will automatically detect which items were selected and tally up the purchase.

### 5 **Cashless City Week / Cashless Day**<sup>17</sup>

Alipay's parent company Alibaba rolled out annual "Cashless City Week" events in its hometown Hangzhou as well as several other Chinese cities from August 1<sup>st</sup> to August 8<sup>th</sup>, 2017, promoting cashless payments. WeChat Pay followed suit and quickly announced its own annual Cashless Day (August 8<sup>th</sup>). During these events, business can send out coupons over social media, while customers can earn platform-issued rewards, digital red envelopes filled with digital money and other prizes.

### 6 **Alipay Waste-Sorting Guide**<sup>18</sup>

Due to strict new waste-sorting regulations, Alipay has launched several mini-program to help citizens to understand which bin to use for which

\* Exchange rate of 1 Chinese Yuan equals 0.15 US Dollar (April 2019)

waste by looking up the object they want to throw away or by taking a photo of it. The app provides sorting tips, waste image identification and offline-to-offline recycling, while future features potentially will include voice recognition and augmented reality. Four mini-programs are currently available while a total of 75 waste-sorting programs are planned (most of them still under development).

## 7 Alipay ride-hailing for Chinese Tourists<sup>19</sup>

Alipay recently launched a ride-hailing mini-program aimed at Chinese tourists, which allows users to book rides in around 33 cities in ten countries worldwide. The mini-program is accessible via the Alipay app and connects to ride-hailing platforms such as Careem (United Arab Emirates), Gett (United Kingdom) and Grab (Singapore, Thailand). The program furthermore allows users to interact with maps and text drivers in Chinese and pay in Chinese Yuan. Alipay plans to extend the service to more than 100 cities and more than 20 countries in 2019.

## 8 WeChat Medical Services<sup>20</sup>

WeChat is currently testing the implementation of real-time clinic services / e-health services such as online consultations, medication delivery and online appointments for hospitals via a mini-program in Shenzhen. The Tencent-backed e-health startup “Tencent Trusted Doctors” provides online consultations with more than 440,000 qualified Chinese doctors and pharmacy chain Star365 offers over-the-counter (OTC) medicine sales and delivery via WeChat.

The cases illustrate selected examples and give an insight into China’s cashless future, which has already begun. Ginkgo believes that, as mobile payments develop and become more advanced and universal, it is to be expected that they will improve the financial credit rating systems and increase the vitality of an inclusive financial system in the long run (e.g. citizens who lack credit records can accumulate credit worthiness via mobile payment data from

everyday life). Nonetheless, with every new feature or emerging technology, mobile payments need to be duly regulated (e.g. financial infrastructure and governance, security enhancements and privacy protection).

Both companies have already started their internationalization crusades, primarily aiming at Chinese outbound tourists as they are considered one of the most voracious spenders. According to the United Nations World Tourism Organization (UNWTO), China has become the world’s top spender in international tourism in 2012 and has remained so ever since, with tourism expenditure of 261 billion US Dollar in 2016, which equaled 21% of the world’s international tourism spending.<sup>21</sup>

In a first instance, Alipay and WeChat are aiming for local partnerships with partners who are more commonly visited by Chinese tourists (for example airport duty free shops, scenic spots, etc.) in geographically close regions / countries such as Hong Kong, Japan, Korea and Thailand. In a second step, the firms are not only expanding their global footprint to farther regions and more developed countries, but also strategically move towards local users by investing in or partnering with local companies to enable financial services within the respective local economies.

Even though Alipay and WeChat have already invested in multiple local e-wallet and fintech startups, the expansion progresses slowly, as both firms face a lot of regulations when setting up payment services in a foreign country. Alipay, in particular, might encounter additional scrutiny as it may well be seen as a potential competitor towards the local banking systems in overseas markets due to its previous successful disruption of China’s traditional banking system. Ultimately, both companies aim for synergy effects between them and their respective partners as a result of sharing technologies, data, users and consumption scenarios.

## Conclusion

Without doubt, China is leading the cashless revolution and living the future of mobile pay already. In the trilateral constellation of users, third-party mobile payment providers and banks, users value the simple life without having to think about cash or credit cards and only need to rely on having their mobile device(s) on hand, while Alipay and WeChat are able to collect incredible amounts of data.

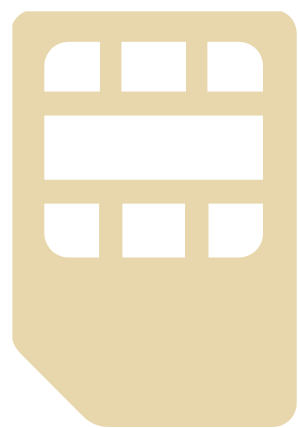
Since both applications are not only being used to pay for the occasional shopping in the supermarket, but rather handle many other aspects of social life as well (e.g. hailing taxis, ordering food, paying for utility bills, purchasing movie tickets, interacting with family, friends and colleagues, etc.), both companies sit on a treasure trove of data, ultimately resulting in an increasing deprivation of privacy and personal rights for the consumers. Banks on the other hand need to prepare themselves for the upcoming tasks (e.g. app development / refinement, over-the-air provisioning, customer training and issue resolution, etc.). In order for the financial institutions to succeed, they will most likely have to commit themselves to wallet partnerships and to learn to simplify customer engagement and enable relationships digitally. Similarly, other third-party wallet and payment providers might want to consider strategic alliances and partnerships in order to gain market share.

Beyond just being payment enablers, mobile wallets have the capability to transform the overall retail experience by utilizing the customers location, interests and time of day to create highly targeted, contextual offers. But this transformation comes at a price: the loss of privacy. Customers will have to pay for the convenience of being able to purchase almost everything almost everywhere via their mobile devices by revealing personal information and consumption behavior to the wallet providers.

Nevertheless, for the time being, Chinese are more than happy to do so as they value convenience over privacy. Other countries are catching up and following China's footsteps already. India for example is working on its huge potential to modernize their payment infrastructure as momentarily a vast majority of its citizens are unbanked.

India's government and central bank are accelerating the development with initiatives such as for example the demonetization in 2016, which recalled small-value bills and due to the temporary cash shortage triggered an increased usage of mobile payments. Companies like WhatsApp, for which India is its biggest market, already began testing its digital payment service and so far, processed around one million transactions per month.

However, the expansion is sluggish as regulations dictate that payment data is supposed to be processed in India and not on Facebook's servers. In the Western economy on the other hand, consumer protection plays a much greater role and is of utmost importance. Additionally, since banks provide more rights, respectively a better consumer protection via their bank cards, consumers are adopting mobile payments at a slower pace. Nevertheless, mobile payments are on the rise and mobile wallets are expected to surpass the use of both credit and debit cards in the near future.



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