Berkeley
UNIVERSITY OF CALIFORNIA
BERKELEY ROUNDTABLE ON
THE INTERNATIONAL ECONOMY

BRIE Working Paper
2016-6

MOBILE INTERNET BUSINESS MODELS IN CHINA: VERTICAL HIERARCHIES, HORIZONTAL CONGLOMERATES, OR BUSINESS GROUPS?

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Mobile Internet Platform Business Models in China: Vertical Hierarchies, Horizontal Conglomerates, or Business Groups?

July 27, 2016

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Acknowledgments: The authors thank Roger Bohn and John Zysman for helpful comments. The authors remain responsible for all remaining errors.

ABSTRACT

The current understanding of the dynamics of digital platforms and strategy for their concomitant ecosystems has emerged from an analysis of firms in Western market economies. Our contribution arises from a detailed study of the business strategies of the current leaders in the Chinese mobile internet industry—Tencent, Alibaba, and Baidu. We find that they have developed business models significantly different from those of US firms. We argue that these Chinese firms are developing a "platform business group" strategy predicated upon horizontal expansion through organic growth, acquisition, and the purchase of significant equity positions in vertical industries, such as ride sharing, online-to-offline commerce, and travel. As a generalization, their western counterparts were much more oriented toward vertical expansion integrating either upwards or downwards in their respective software stacks. A central component of the business group is an online payment system that operates with its other platforms to cross-feed traffic and use internal cross-platform personal data to customize its offerings to users. We show that the different environmental conditions in China versus Western market economies allow firms there to pursue different business strategies. The key differences are the market protection, different antitrust considerations, and different consumer behavior in mobile usage. Our extension of platform studies to non-Western market economies, with their different regulatory and consumer environments, enriches and extends theoretical and practical understanding of the development and dynamics of digital platforms.

1. Introduction

The peculiar economics of industries based on information and communication technologies has attracted increasing attention (Baldwin and Clark, 2000). In the 1990s, economists and management scholars began to understand that the strategies of the leading firms in these industries was based upon building and controlling software platforms (Cusumano and Yoffie, 1998; Meyer and Lehnerd, 1997: 39; Parker et al., 2016; Rochet and Tirole, 2003). Successful platforms experience economic returns based on network effects and often-skewed outcomes that resemble a power law with the successful firm capturing far more financial return than its competitors and, very often, its complementors. In such markets, platform owners strive to create ecosystems of value adding and, at times, innovative complementors (Cusumano, 2010; Eisenmann et al., 2006; Jacobides et al., 2006). The research and concomitant theorizing are based upon platforms that formed and grew within Western (in particular, the US) economies, with the lone exception being studies of Japanese iMode mobile telephony (Funk, 2009; Tee and Gawer, 2009).

The launching and popularity of the mobile internet[1] increased the significance of platforms as a method for organizing markets (Bresnahan and Greenstein 2014; Van Alstyne et al., 2016; West and Mace, 2010). In the West, the mobile internet is characterized by a particular competitive configuration. Apple and Google battle over the operating system (OS) and associated application (hereafter, app) stores, while firms competing in the application ecosystem are diverse and independent, in particular, offer particular services that form the foundation of their own platforms. Frequently, only one or two firms dominate a particular service, for example, Uber and Lyft in ride sharing, Airbnb

[1] By "Mobile Internet", we mean internet access from mobile devices, such as smartphones, wearable devices, etc., rather than desktop computers.

in alternative lodgings, Facebook in social media, Facebook's WhatsApp and Messenger in messaging, and LinkedIn in professional networking. The central question we explore is whether the platform structure emerging for the mobile internet in the US is the only possible configuration. If not, what might the organizational principles for another industrial structure for platforms?

To explore this question, we examine the evolution of the mobile internet in China. We find that because Chinese firms confronted challenges in the convergence process vis-à-vis the mobile internet, they expanded horizontally to other platform-enabled services that, superficially, are not directly related to their traditional core businesses.

The three Chinese firms that became dominant in the mobile internet—Tencent, Alibaba, and Baidu (henceforth, TAB)—did not use the OS as a platform but, rather, established several intertwined, higher-layer platforms and used synergy, such as cross-platform feeding and often cross subsidization, to enter yet other vertical markets. As a result, the mobile internet in China is characterized by cross-market horizontal oligopolistic competition—a model that differs dramatically from the winner-take-all vertical US market structure. In fact, Chinese mobile internet firms developed an industrial structure that resembles the Asian business group structure or what we term a "platform business group." Studying the Chinese market can offer new insights into the dynamics of platform-organized markets.

Section 2 lays the theoretical foundations to explain the strategies that platform owners use for expansion, either vertically between layers in the information technology (ICT) stack[2] or horizontally on the same layer in the stack. Section 3 is a brief description

[2] By "ICT stack," we mean the way in which ICT functionality is built upon layers of software and hardware with each layer communicating with those above and below it using standardized interfaces.

of the competitive environment in the US and in China. In Section 4, we describe the reasons that three Chinese firms, TAB, became dominant in the mobile internet industry and examine the evolutionary trajectory of their strategies. We posit that they are creating a "platform business group" structure. Section 5 summarizes how the Chinese case can broaden understanding of platform dynamics more generally. We further advance the reasons for the structural differences between Chinese and US firms in Section 6. The conclusion suggests what can be learned from the Chinese experience and speculates as to whether the three Chinese giants will prove successful in other countries.

2. Theoretical Foundations

2.1. Platform Expansion: Vertical or Horizontal

In ICT industries, a platform ecosystem consists of different layers in an ICT stack that must work together to provide users with functionality. Smartphones have four layers that are relevant for our study: the device, OS, app store, and cloud-based services (Kenney and Pon, 2011). The question for firms located on different layers is how they can garner value from the entire stack (Jacobides et al., 2006; Pisano and Teece, 2007). To solve this problem, platform theory emphasizes the importance of "bottlenecks," or control over a critical resource or position that has high complementarity and low mobility in the industry architecture and therefore empowers the platform owner to establish and sustain a competitive advantage (Jacobides et al., 2006; Pon et al., 2015). In the era of the personal computer (PC), the bottleneck was the OS, in which Microsoft dominated the market, while, for the mobile internet, value creation and capture are in cloud-based services (Kenney and Pon, 2011).

Given the diversity of mobile internet services, it is difficult to define what will be a bottleneck. Key ICT firms that were once market leaders, such as Microsoft, are confronting profound challenges and, at the same time, new opportunities (Eisenmann et al., 2010). It is tempting for incumbents to expand by bundling with other subsystems to increase control and add value. Here we define two strategies, vertical integration and horizontal expansion. Vertical integration means firms absorb new layers along the stack. The other strategy is horizontal expansion, whereby a firm expands on the same layer to other services. For example, Apple used a vertical integration strategy by controlling the device, OS, and the app store. On the other hand, Facebook adopted a horizontal expansion strategy when it acquired WhatsApp, which is on the same service layer. Of course, firms are not limited to a single strategy and they often execute both vertical and horizontal expansion simultaneously.

2.2. Platform Business Group: Exploiting Synergies

A recent study by Walton (2014) argued that internet-based firms, such as Amazon, Google, Apple, and Facebook are becoming conglomerates whose businesses cover multiple markets and exploit the benefits of their platform ecosystems. The classical definition of a conglomerate is a firm with non-interdependent operations managed through financial control. We believe that, in the Chinese case, the firms are not becoming conglomerates but, rather, are developing a business group structure. Business groups are "firms which though legally independent, are bound together by a constellation of formal and informal ties and are accustomed to take coordinated action" (Khanna and Rivkin, 2001). Of course, business groups are not a new organizational form and have been common in emerging economies (Carney et al., 2011; Yiu et al., 2005). Business groups

are linked together and cross-market their various operations, but also drive commerce through the various constituent members.

AGAF and indeed most other US-based internet firms often have operations in layers or vertically, but only rarely do these multiple platforms lead to a variety of revenue models. For example, Google built its business model around its cloud-based services that sell advertising. Remarkably, at the service level Google's offerings appear to be isolated and easily replaced. A user can replace Gmail with Yahoo Mail, Google+ with Facebook, the Chrome browser with Firefox or Internet Explorer; the least replaceable service may be YouTube, though Facebook is creating a video service. The key synergies for Google are having a more complete overall profile of its users, data that can then be sold to advertisers, and the economies of scale offered by Google's enormous data center capacity; the economies of scale with respect to the handling of its chief commodity, user data, allows Google to have economies of scope. From this perspective, Google's business model is leveraging its core source of revenue, search/advertising, surrounded by wide variety of properties/platforms that do not create immediately obvious synergies (of course, the Android OS is another platform and it does have direct synergies with Google Play store). For example, monetization of the extremely powerful platform YouTube is through advertising. While Google has expanded to other sectors, the multiple platforms have not resulted in a variety of revenue models.

The significance of the mobile internet is its ability to become an intermediary in many economic activities. For example, it can connect online users in real time to services such as food delivery, calling a taxi, and booking tickets. The many monetization schemes available can provide opportunities for diversifying an internet firm's revenue models.

Nevertheless, it is remarkable how dependent US firms have remained on a single revenue model; by contrast, Chinese firms have diverged from the US model and have built multiple platforms with different business and revenue models. These models include cross-platform feeding and often use cross-subsidization to penetrate markets, but probably most important are their payment platforms, which are becoming the key to monetization of the services provided. The remainder of the paper focuses on a description of the development of the platform business groups in China.

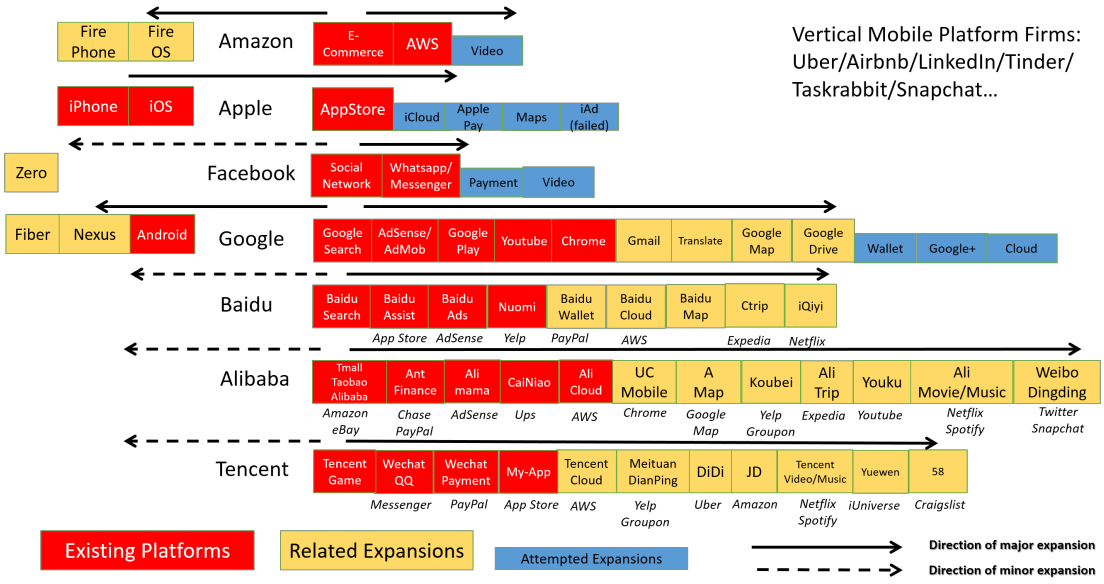
3. The Setting

China and the US have the two largest and most valuable mobile internet user populations. Of course, the US firms Apple/iOS and Google/Android defined the mobile internet industry, and venture capital–financed Silicon Valley firms dominate the global market outside China. Of the top ten internet firms in the world, four are Chinese and six are from the US; for each of these firms, the mobile internet is becoming increasingly critical in their continued growth (Meeker, 2016). This remarkable fact makes exploring the platform strategies the Chinese firms are developing a particularly interesting case study of how platforms in different political economic environments evolve.

The business models for US and Chinese firms are remarkably different. As Figure 1 indicates, AGAF and many other independent US firms have different loci of power, and, for the most part, their expansions do not directly clash with other US platform firms. With the exception of Google and Apple, most US firms have "best of breed" solutions. Moreover, even when giants such as Google or Apple enter new verticals, success is not guaranteed. For example, Google's Google+ attack on Facebook, Google Hangouts against Skype, or Apple's attack on Google Maps have not resulted in significant victories.

The Chinese business environment is quite different. Although the Chinese internet giants come from different sectors, they have expanded across a range of horizontal services, in a pattern that resembles business groups that compete with each other across a wide range of sectors.

Figure 1: Mobile Internet Platform Coverage Comparison of US and Chinese Firms



Note: The red blocks are the core platforms; the yellow blocks represent related successful expansions to other businesses; and the blue blocks represent expansions whose success is still uncertain. Underneath the Chinese blocks are the names of comparable US firm(s).

Their respective business strategies suggest that management in the two countries perceive different competitive environments and opportunities. As shown in Figure 1, the first difference is the relative narrowness of American firms' offerings, with the exception of Google. The second difference is the tendency of US firms to integrate down the stack, often with expansions that require significant technological capabilities. For example, Google expanded from search/advertising to the Android OS. The only American exception is Facebook, the social media firm, whose most significant expansion has been

into messaging. This contrasts markedly with Chinese firms, which adopted open-source OSs and built their business apps on top of them. The third difference is that all American players have been unsuccessful so far in building their own consumer payment systems (Ozcan and Santos, 2015). Although Amazon and Apple gained some market share in payment, Chinese companies have built powerful payment platforms and used these to develop their platform businesses further.

This brief introduction suggests that there are remarkable differences in the strategies for developing mobile internet platforms in the two nations.

3.1. US Market: Dominated by Silicon Valley

Nearly all ICT platform studies have concentrated on the pioneering Western markets, in particular, the US market. As a result, the platform models established in American industry seem "normal" and thereby inform thinking about platforms. This is not surprising because in the PC era, Chinese business models resembled those in the US. The US mobile market has two clear leaders, Apple and Google, which control the two dominant mobile OS and platforms (app stores) and provide a number of important services (email, maps, browsers, etc.). Other Western firms, including Facebook and Amazon, provide apps for both OSs and are platform agnostic, as their apps are gateways to their own platforms higher up in the stack. Importantly, these firms offer only core services and their expansions have normally been into adjacent services: Facebook launched Messenger, acquired WhatsApp and Instagram, and launched video sharing to compete with Google's YouTube. Moreover, with some exceptions, the new entrants remain independent and are not directly dependent upon or controlled by the dominant firms. To illustrate, Airbnb, LinkedIn, Pandora, Snapchat, Tinder, Twitter, Uber, and other firms were launched

independently and remain independent (with the exception of LinkedIn, which was recently purchased by Microsoft). This characterizes the industrial architecture and the way in which the overall mobile internet environment is organized.

Apple and Google originated in different segments of the ICT industry and adopted different strategies in their transition to the mobile internet (Kenney and Pon, 2011; West and Mace 2010; West and Wood 2013). Apple, a device maker, adopted a vertical integration strategy and used the iPhone to establish a tightly curated app store. In contrast, Google, whose business model is based on search and advertising, adopted a much more open strategy, as its profit was based on offering advertisement, not the device/OS itself. Although the OS and app stores formed a duopoly, both Google and Apple created application program interfaces (APIs) and software development kits (SDKs) so that other firms could become ecosystem complementors. Facebook and Amazon went from central positions in the PC-enabled internet to the most powerful ecosystem complementors. To strengthen further its position, Facebook acquired an instant messaging firm, WhatsApp and Instagram so that it could offer applications that were particularly useful on smartphones. The centrality of social media usage on smartphones made Facebook a particularly powerful platform built on top of the two dominant OSs.

One reason that the US internet industry architecture is organized into vertical silos is that laws governing antitrust and competition have a powerful effect upon expansion decisions, especially in the case of acquisitions. For example, Google's purchase of Waze, while not opposed, was scrutinized (Forden and McLaughlin, 2013). Similarly, prior to being approved, Facebook's acquisition of WhatsApp was examined by both US and European Union regulators (Lunden, 2014).

3.2. China: A Protected Environment

China offers a unique opportunity for examining alternative platform business models. Two important features are its enormous size and its protection from foreign competition. Government policy has essentially kept the internet market closed to outside competitors. In 2015, more than 620 million people used smartphones (Strategy Analytics, 2016). While a PC-based internet ecosystem had emerged, it occurred slightly later than in the West, and Chinese consumers, as late adopters, became mobile phone–centric as an ecosystem of downloadable games and various other services developed.

As was the case in the US, the incumbent Chinese internet firms faced threats and opportunities when they entered the mobile internet era. In contrast to most American firms, TAB rapidly expanded horizontally into other sectors that may not appear to have a direct relationship to their original businesses. In the process, they formed "business groups" that, as much as possible, tried to exclude competitors. Given their scale and scope, TAB dominate the mobile internet industry in China. This difference is notable, given the reasonable expectation that China's internet industrial structure would replicate that of the US.

Existing platform theory usually assumes that a firm has a single platform that it is trying to manage, whether it is a social media platform such as Facebook or an operating system platform such as Microsoft (Cusumano and Gawer, 2001; Evans and Gawer, 2016). The central concern of these theories is how to manage the interdependent relationship between the platform owner and its complementors. This perspective cannot fully explain the strategy adopted by TAB. The initiatives of the leading Chinese firms provides insight into platform business strategy in a political economic context that is different from that of the West.

4. Chinese Leaders' Business Models

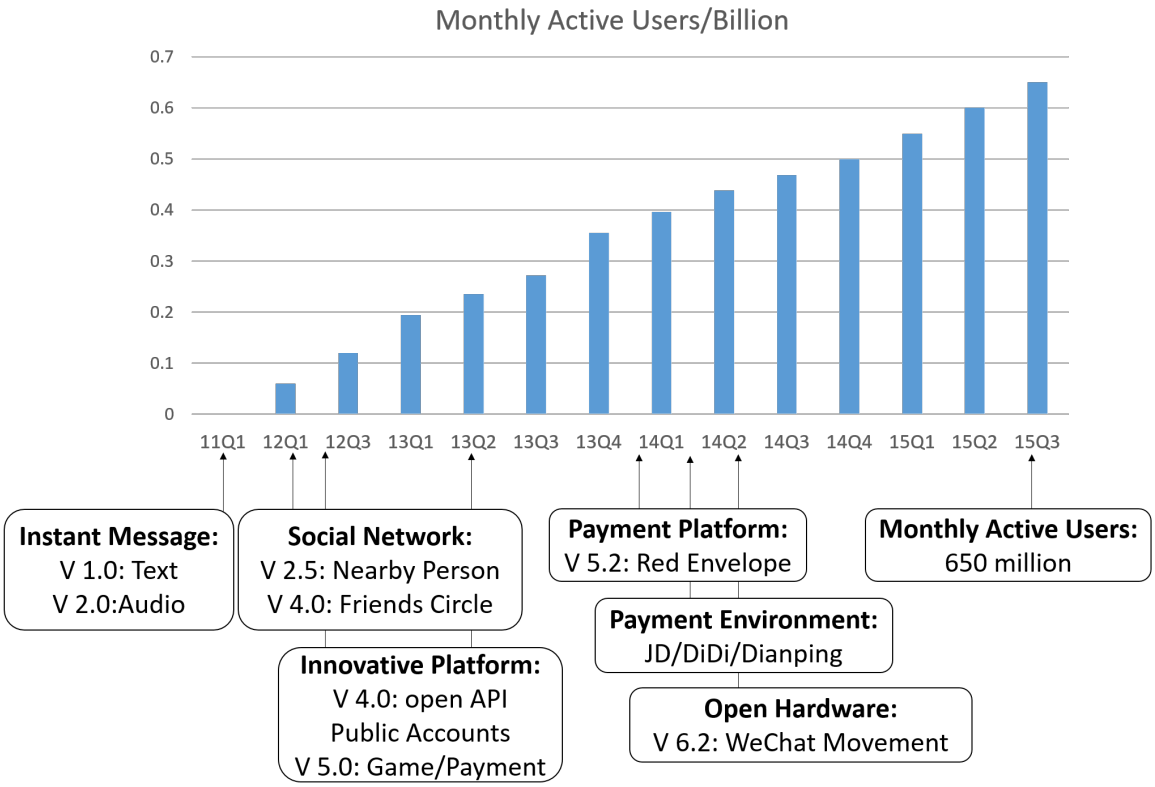
4.1. Tencent

4.1.1. Transition to the Mobile Internet Era

In the PC era, the two most important Tencent services were instant messaging, QQ, and its game products available from QQ Game, the latter of which was the main revenue source for the whole group. By leveraging its huge user base, Tencent expanded into other activities, such as social networking, a web portal, search, and e-commerce. However, instead of interconnecting the platforms, these services were largely isolated. The mobile internet challenged this business model.

The first challenge came from the smartphone manufacturer Xiaomi that introduced an instant messaging service, Mi-Talk. The rapid adoption of Mi-Talk was a direct threat to Tencent. In response, WeChat, which was custom made for the mobile internet, was introduced and was successful enough to allow Tencent to retain its leadership. WeChat simplified the instant messaging function on smartphones and soon became a critical platform connecting different transactions as well as promoting complementary innovation (on the evolution of WeChat, see Figure 2).

Figure 2: WeChat Monthly Active Users by Quarter, 2011-2015



Source: Tencent Quarterly Reports.

When introduced in 2011, WeChat only allowed text messaging, but later integrated new functions such as "audio messages" and "nearby person" (this allowed users to add people nearby as contacts based on their location). In version 4, released in 2012, WeChat adopted a platform strategy. The new version not only integrated the social network function called "Friends Circle" that allowed users to update their status and share pictures and words with friends, but also opened an API to third parties enabling them to include WeChat in their services, thereby allowing users to share the service with friends. A "public account" function was added, allowing users to subscribe to third-party content published by organizations or individuals. In version 5, WeChat integrated a payment

function that later became a platform by connecting it to other services. Version 5 also included the "service account" function, allowing third parties to customize services for WeChat users, and the "game" function, which allowed developers to upload games to WeChat. In October 2014, WeChat integrated "WeChat Movement," which opened an API to third party devices to transmit data to WeChat, allowing users to share or monitor in real time. All the services provided by third parties require permission from Tencent. By 2015, WeChat reached 549 million monthly active users.

Inspired by WeChat, Tencent restructured its former instant messaging service, QQ, and adopted a differentiation strategy that made QQ popular among young people. As of 2015, QQ had 642 million monthly active users. Based on these two super apps, Tencent expanded horizontally to other sectors and created its platform business group by leveraging the traffic and related data collected on WeChat.

Blocking Google Play in China created a space for an app store based on Android OS. By channeling traffic from WeChat and QQ, Tencent increased the market share of its app store, MyApp, from 10 percent to 40 percent and became one of the dominant platforms. Through a series of mergers and reforms, Tencent built several platforms based on user-generated content (UGC) offering online video and online reading material. Because of the powerful distribution channel on WeChat and QQ, these UGC platforms became leaders.

Unlike Google, which also extends horizontally to other services but focuses on search and advertising, Tencent has no single core platform. WeChat and QQ are important because of their attraction to users. However, the app store and payment platform are critical, too, and have gradually become important revenue sources. More importantly, these platforms cross-feed traffic and data, mutually reinforcing each other.

4.1.2. The Payment Platform

In China, one of the fastest-growing market segments is the use of smartphones for online ordering of offline services (known as O-to-O, i.e., online-to-offline). Payment is a particularly powerful functionality because it can easily be monetized: as the merchant pays the platform a percentage of each transaction. The payment function is substituting for credit cards. While Alibaba already had Alipay, Tencent integrated a payment function into WeChat. Tencent had the powerful advantage of being able to leverage its social network.

After it had attracted users, Tencent extended the payment service to other vertical industries, thereby increasing its usefulness to both consumers and service providers. Rather than merely persuading other firms to adopt its payment service, Tencent chose horizontal expansion strategy by directly investing in key complementor firms in its ecosystem and actively guiding traffic to them, thereby creating synergies for the entire business group. For example, in March 2014, Tencent purchased 15 percent share of JD, which was Alibaba's largest Chinese e-commerce competitor. Immediately after this transaction, JD integrated WeChat payment into its e-commerce platform, from which it had already removed Alipay. Of course, WeChat also integrated JD into its app, thereby channeling users to JD. Tencent soon expanded horizontally to other vertical sectors including ride-hailing, O-to-O, etc. Through this aggressive expansion, by 2015, Tencent's payment platform accounted for 20 percent of all mobile payments, trailing only Alibaba's Alipay.

Tencent's payment platform is being extended to other financial services; all of which benefited by leveraging WeChat data. Although not yet as developed at Alibaba, Tencent has established a bank and began providing other financial services.

Figures 3 and 4 compare the structure of Tencent before and after the introduction of smartphones. In the PC era, Tencent provided a number of products that were not synergistic and nearly 95 percent of Tencent's revenues came from value-added services, such as games and in-product purchases. However, in the mobile internet era, by establishing several intertwined platforms that create synergies, it now operates as a platform business group. This structural transformation is evident from its revenue composition. By the end of 2015, value-added services had decreased to 75 percent, while advertising revenues increased to 20 percent. By expanding horizontally to other sectors, the revenue sources will likely become even more diverse, particularly if its finance products achieve wider adoption.

Figure 3: Tencent Product Structure in the PC Era

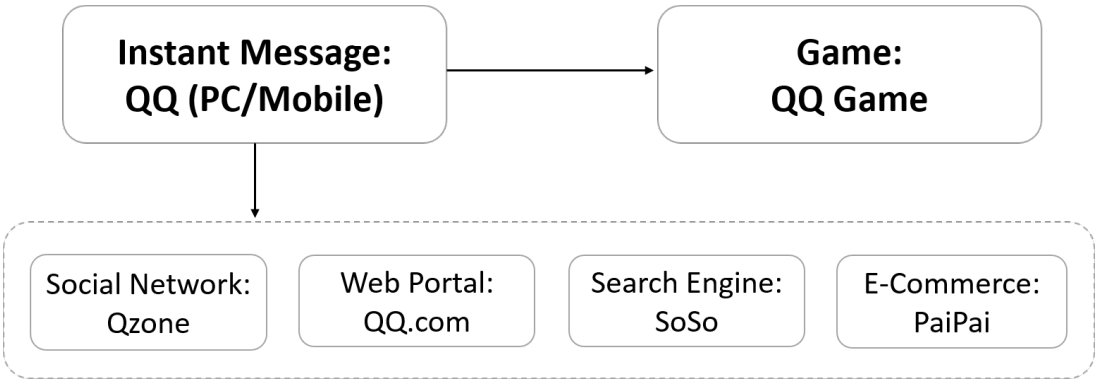
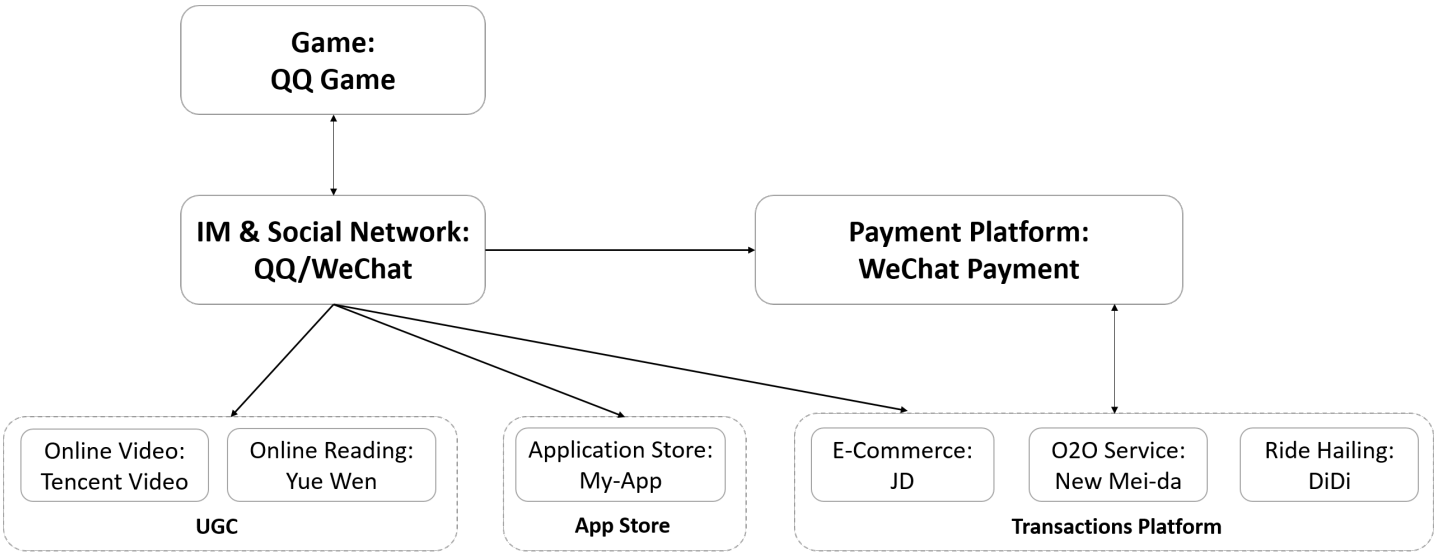


Figure 4: Tencent Platform Business Group Structure in the Mobile Internet Era



4.2. Alibaba

4.2.1. Transition to the Mobile Internet Era

In the PC era, Alibaba established a comprehensive e-commerce system including "business to business (B2B)," "customer-to-customer (C2C)," and "business-to-customer (B2C)"—around which it also successfully built the payment system, Alipay, and other complementary products, including an advertisement server, a delivery network and cloud service. However, the mobile internet created both challenges and opportunities.

In 2015, Alibaba's founder, Jack Ma, stated that e-commerce was now only one component of its group strategy. As was the case with Tencent, Alibaba expanded horizontally to other sectors by developing new platforms. Figures 5 and 6 compare the structure of Alibaba before and after the mobile internet. What is important is that services that once simply facilitated the e-commerce platform now had become central components

of the platform business group. These platforms are now coalescing into a new multiplatform business model that encompasses, but is no longer limited to, e-commerce.

Figure 5: Alibaba Product Structure in the PC Era

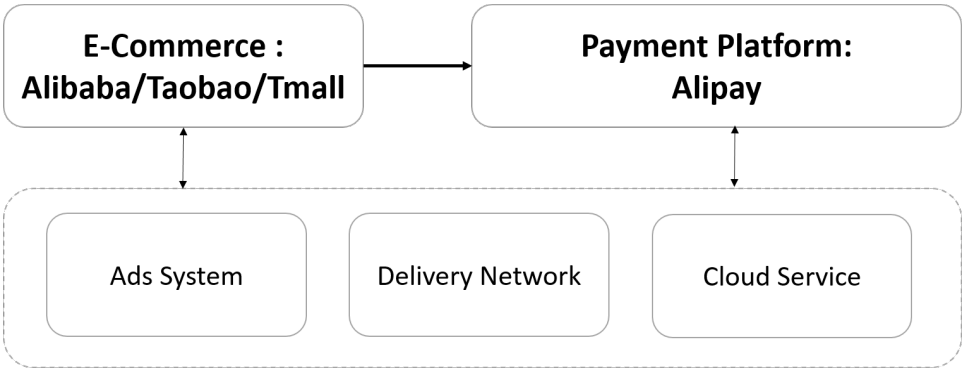
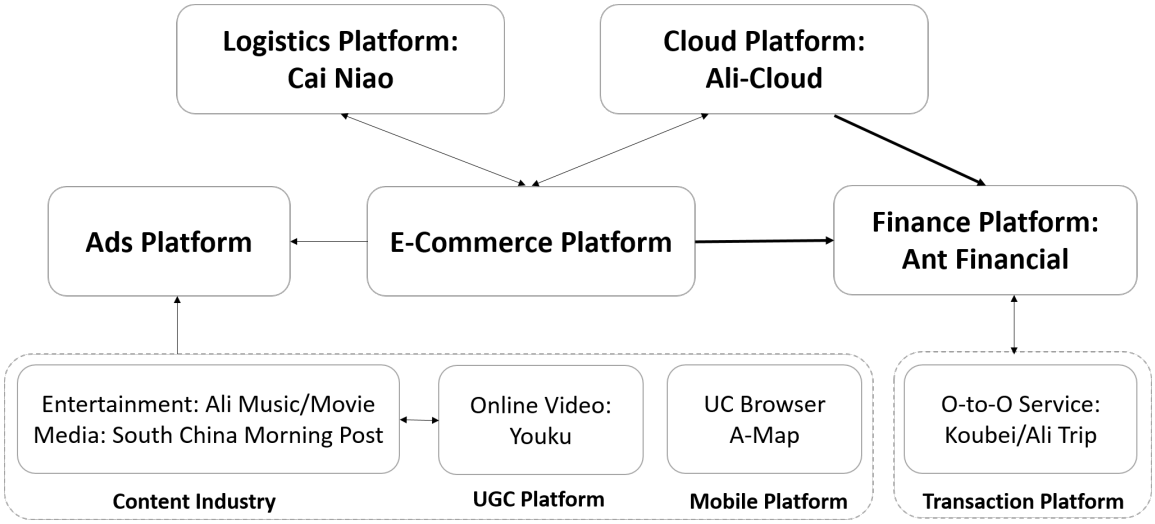


Figure 6: Alibaba Platform Business Group Structure in the Mobile Internet Era



The ads platform extended an earlier ads system. Rather than only providing advertising services for e-commerce platform sellers, the ads platform is now a universal ads-matching service. To strengthen the platform and retain mobile internet traffic, Alibaba

made several important acquisitions, including the important Chinese browser firm, UCWeb, and a popular streaming-video firm, Youku. Although Alibaba only operates in the Chinese market, its share of the global mobile Internet advertising market trailed only that of Google and Facebook (eMarketer, 2014).

Alibaba also introduced Ali Cloud, which sells the cloud as a service to a wide variety of businesses. Not only does Ali-Cloud provide cloud services directly, but also it interfaces with third-party developers so that new startups can customize their own services. In the first quarter of 2016, the cloud platform revenue exceeded $160 million.[3]

Alibaba's dominant position in online sales means that more than 70 percent of the packages delivered in China originate from a transaction on the Alibaba e-commerce platform (Internet Retailer, 2016). To leverage its volume and transaction data, Alibaba invested significant sums to build a national backbone of warehouses and then opened the platform to other sellers and to third-party delivery companies. The entire operation employs approximately 1.7 million people, though most of them are not employees of Alibaba (Internet Retailer, 2016).

Alibaba's business originated with the e-commerce platform. As it evolved, components that were once considered facilitative of the earlier e-commerce platform became platforms in their own right and key constituents of the entire platform business group. These platforms operate separately, focusing on different revenue models, while also mutually reinforcing one another to create synergies. The final critical component of Alibaba's platform business group is the finance platform based on Alipay.

[3] In the first quarter of 2016, Amazon Web Services generated $2.6 billion in revenue (Frommer, 2016).

4.2.2. The Payment Platform

Alibaba's payment platform initially supported e-commerce transactions but has since expanded to include transactions, deposits, loans, credit, and even derivatives trading. Today, Alipay is the most widely used online payment service. While Chinese banks have long issued debit cards, the country had no universal cross-bank clearinghouse until the establishment of China Union, who mainly focused on offline businesses and left the online space unoccupied (in the US credit cards filled this function). Alipay, after much negotiation with various banks and the rapid growth of e-commerce, successfully established its payment system (Chen, 2014). It was built for PC-based e-commerce, but its true potential emerged only as smartphones became ubiquitous.

Similar to Tencent, Alibaba expanded horizontally to other sectors by leveraging Alipay. It acquired equity stakes in key ecosystem firms. For example, Alibaba acquired Koubei.com, an app offering O-to-O services such as food delivery, local services, and restaurant reservations. Using the same strategy, Alibaba entered ride-hailing, travel booking, etc. In each case, Alipay became the exclusive payment service.

The potential of Alipay is not limited to payments. Alipay is now a multi-faceted financial platform, collecting transaction data on the one hand while making targeted loans to customers or micro and small enterprises on the other hand. In 2014, Alipay was restructured into a separate financial company called Ant Financial, which started to provide credit service for Chinese based on the transaction data accumulated on Alipay. Although challenged by Tencent in payment services, Alibaba remains dominant, with a nearly 70 percent market share.

The mobile internet resulted in a dramatic change in the Alibaba business model. As

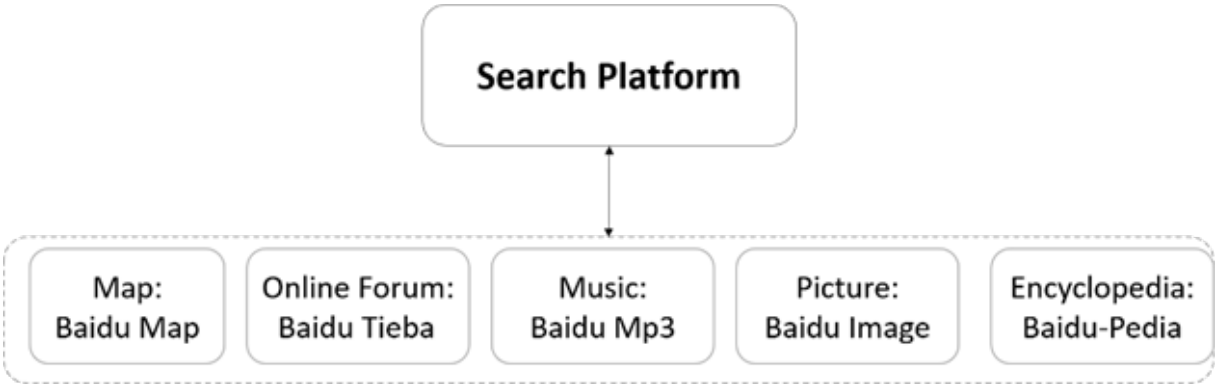
was the case of Tencent, Alibaba used the shift to the mobile internet to expand horizontally and establish a platform business group. In the PC era, the services included payment, delivery, and cloud computing, but had the potential to evolve into platforms and, at the time, were complements to the e-commerce platform. The mobile internet allowed Alibaba to leverage its payment system developed in the PC world into a full-fledged platform that created synergies with its other platforms and services.

4.3. Baidu

4.3.1. Transition to the Mobile Internet Era

Established in 2000, Baidu was the largest search engine in China in the PC era. In addition, Baidu also successfully developed a series of products, including an online forum, music, and maps, all of which focused on controlling online traffic and monetizing it through advertisement (see Figure 7).

Figure 7: Baidu Product Structure in the PC Era



However, the challenge of the transition to the mobile internet is the fact that apps bypass its core search engine. Previously irrelevant competitors— Tencent and Alibaba—

entered the online ad market. Baidu responded to the mobile internet by introducing mobile search and maps. To secure an app store, Baidu acquired an existing mobile internet firm, 91 Wireless, which owned the largest Android-based app store in China. Baidu used its search engine and app store to feed traffic to each other to encourage synergies. This allowed Baidu to maintain its dominant role in mobile search.

Connecting smartphone users to offline services presented new opportunities that were particularly significant. Since 2012, Baidu has transformed its strategy from one of "connecting people to data" to one "connecting people to services." To accelerate its growth, Baidu began acquiring existing firms and then used its search dominance to funnel traffic to them. As part of this strategy, in 2014, Baidu acquired Nuomi, a firm that offers group-purchasing services (similar to Groupon), then in 2015, Baidu invested more than $3 billion in expanding Nuomi into an all-encompassing platform with sectoral services, such as restaurant recommendations and reservations, ticket booking, and discount shopping. In 2014, Baidu established a delivery platform, Baidu Waimai, which provided access to services such as purchasing food and flowers and hiring cleaning services. In 2015, Baidu became the largest shareholder in Ctrip, which controlled more than 70 percent of the online travel market. With these moves, Baidu also diversified its revenue stream from ads only to including transactions. Finally, like Tencent and Alibaba, Baidu established its own payment system

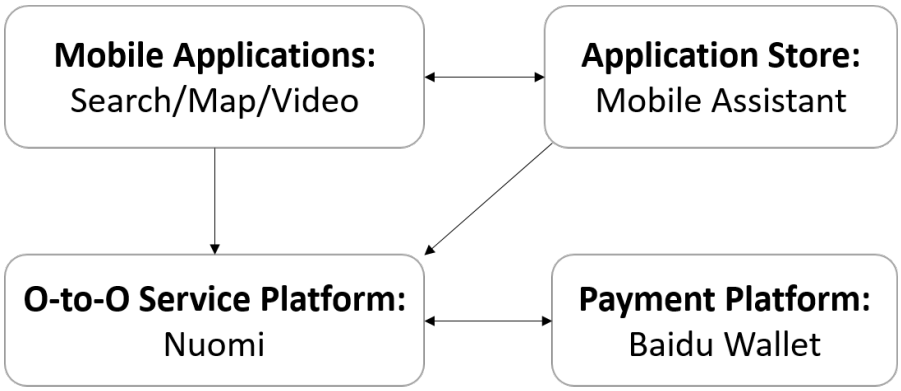
4.3.2. The Payment Platform

Because Baidu is a late entrant, its payment platform is far weaker than that of Tencent and Alibaba. Yet Baidu found it necessary to introduce a payment platform. Based on its O-to-O platform, Baidu introduced Baidu Wallet. With the help of various subsidies

and massive investment in a general expansion to integrate more services, Baidu Wallet is gaining market share gradually. One indicator of the importance Baidu attaches to payment is that, at the end of 2015, the operation was separated into an independent department equivalent to its core businesses, search and mobile.

Although Baidu has recognized the importance of the transition to a smartphone-centric world, it has been less successful in managing the transition. As Figure 8 shows, its business group is not yet as diverse and encompassing as those of Alibaba and Tencent are.

Figure 8: Baidu Platform Business Group Structure in the Mobile Internet Era



5. Discussion

Existing platform theory has focused on strategies for integrating vertically in the stack (Gawer, 2014). This theoretical understanding is quite consistent with the Western experience. The Chinese case indicates that another expansion path is viable. It is possible to leverage a platform horizontally to create business synergies. The other aspect of Chinese firms' expansion is that they aim to control directly more of the complementary platforms in their ecosystem.

Platform business groups have three common characteristics. First, the platforms are interconnected so that they reinforce one another, thereby creating a multicenter structure with referral and a payment option driving adoption and increasing revenues. Second, each firm absorbs other services from the ecosystem. Third, some applications initially established as complements can evolve into a new platform. Payments and other central functions can actually become a powerful platform in their own right, spawning their own ecosystems. The most salient example is Alipay, which was initially a payment function for the e-commerce platform. However, today it is a core platform in the Alibaba group and has become the basis upon which new platforms, such as O-to-O services can form. The payment platform is becoming a fulcrum of horizontal expansion. Effectively, as is the case in the Japanese *keiretsu*, in which the main bank was at the core of the system, the payment platform is becoming the center of China's mobile internet business groups.

This structure has interesting dynamics. First, competition between the business groups is particularly fierce because the firms can and do use cross-subsidies. As is the case in the US, during the PC era, TAB competed in their own vertical segments, as suggested by platform theory where their rivals were far weaker because of the well-known platform network effects. Along with the horizontal expansion, the competition among TAB focuses not only on new markets, such as ride hailing or local services, but also on traditional markets, such as payment, e-commerce, and social network.

Second, the dominance of platform business groups may depress the ability of new entrepreneurial firms to establish new businesses based on mobile applications. The business group strategy of horizontal expansion may reduce the potential for new entrants to create/exploit new vertical industries as these three firms constantly search the horizon—

either in China or abroad—for new opportunities. Effectively, this might lock China into an oligopolistic market structure for mobile internet-related businesses.

6. Explanations for the Differences between the Two Markets

The reasons for the divergence between the US and Chinese industry architectures in the mobile internet are complex. First, due to government protection the Chinese mobile internet market has been a walled garden. This protection not only helped Chinese companies succeed in the PC internet era but also continued in the mobile internet era. This is the fundamental fact of the environment, which permitted the development of a uniquely Chinese mobile internet industrial structure. Yet this condition cannot explain the different industrial structure that emerged.

Second, Chinese firms were second-movers and have seen little advantage in integrating downstream into the OS, considering that inexpensive open source alternatives were available. Further, in competitive terms, even if they had developed a de novo OS, their competitors or handset suppliers would have had no reason to adopt it.

Third, China emerged from a communist collectivist environment only in the 1980s and became a mass consumer society even more recently. Thus much of the infrastructure is only now developing. This is particularly the case in consumer payment systems, which are critical for e-commerce purchases. As smartphone penetration became broader, consumers increasingly wanted to order and purchase directly through their phones. This gave the mobile internet giants an opportunity to offer payment systems to consumers without credit cards, and thus no incumbents had to be dislodged.

Fourth, TAB appear to have a different understanding of what an “ecosystem” is. Their tendency has been to integrate various new vertical platform services into their

business groups. One possible explanation of this behavior is that TAB do not have OS bottlenecks, making it difficult for them to centralize power and extract value. This forces them to find other ways to generate income. For example, TAB expanded to O-to-O services, in which they replaced existing intermediary platforms. This did not affect direct service providers, who are the complementors and can multi-home on different O-to-O platforms—again showing their lack of a monopolistic lock in.

The fifth and final explanation is, perhaps, the most intriguing. Chinese firms operate in a market less constrained by antitrust and competition regulators. While China passed an antitrust law in 2008, enforcement has been limited. For example, all the major mergers between the top two internet vertical segment competitors were approved. Expansions into fields such as payments also attracted little attention from antitrust regulators, with the exception of some working out of the boundaries between banking and the online payment giants (see, e.g., Lok, 2015).[4]

In contrast, in the West, while mergers receive enormous attention, anticompetitive behavior is equally important. For example, the US Federal Trade Commission (FTC) and EU regulators have repeatedly investigated alleged anticompetitive behavior by Google and other US firms. In 2016, the EU Commission issued a "Statement of Objections" regarding the fact that Google forced phone makers to feature its applications on phones using the certified Android OS. Facebook also faced EU scrutiny concerning whether its dominance gave it inordinate power to force users to agree to its terms for data usage (Matussek, 2016). Chinese firm strategies concerning cross-subsidies, driving traffic to related platforms, and favoring their own internet properties or alliance partners would certainly

attract the attention of Western regulators.

7. Conclusion

Platform theory has made remarkable advances in explaining how competition in ICT industries operates. However, nearly all the findings are from established Western economies, a serious lacuna in a world in which developing countries already have more smartphones than developed countries have. We examined the differences in the mobile internet industrial structures in China and the US. We hypothesized that in the mobile internet, Chinese firms are building their platforms in a business group structure, in which the different platforms can both feed one another and be leveraged to expand into other business areas. This suggests that the importance Western firms attach to encouraging ecosystem growth by independent firms is not as strong in the Chinese environment. In some respects, the expansion strategies of the Chinese leaders resemble the strategic action described in Eisenmann et al.'s (2011) concept of envelopment, but these strategies evolve not only through organic activity, but also through the creation of equity relationships or outright ownership. TAB can leverage their ability to tie and direct traffic flow to affiliated firms. With the rise of the pay/banking function platforms, they also have access and the ability to influence the flow of capital. These facts suggest that their power will continue to grow.

The fact that this platform configuration grew within the confines of the Chinese system raises questions about whether these firms have developed the requisite competencies to expand outside China. Some of the technical innovations and, perhaps,

[4] Another example is the acquisition of Hengsheng Group by Alibaba in 2014. Hengsheng was the largest IT supplier for financial institutions in China and gained a more than 80% market share. After a nearly

the business model innovations might be successful in other markets, but each component platform may not have the reinforcing platforms to sustain it. WeChat technology has been acclaimed as first rate and even superior to technologies offered by US firms, including Facebook (see, e.g., Chan, 2015). Similarly, the functionality of Chinese mobile internet payment platforms is sophisticated (Mozur, 2016) and seems to be well suited to other developing country environments in which credit card penetration is low. However, TAB do not yet appear to have generated significant revenues from operations outside China. For TAB, globalization might be accelerated through acquisition. For example, Tencent recently purchased the Finnish game maker Supercell, the developer of the Clash of Clans. Could Supercell's reach outside China assist in the penetration of WeChat? Alibaba is also purchasing equity positions in foreign firms. Despite these acquisitions, in environments without the favorable conditions they experience in China, will they be able to overcome the US incumbents and the vertical business model they use?

With respect to platform theory, we have shown how the regulatory environment can shape the way in which firms structure their platform businesses and their expansion strategies. The platform business group concept is a lens for understanding why oligopolistic competition in the mobile internet emerged in China, instead of a more vertical winner-take-all business model that characterizes the mobile internet in the West.

The US experience or, more specifically, Silicon Valley dynamics shaped platform theory. This is understandable as US ICT firms have been pioneers and are now world leaders. Yet, our research suggests that in other political economies the structural and competitive outcomes can be different. These differences confirm the proposition that

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four-month investigation of this merger, the Department of Commerce approved it unconditionally.

technological outcomes are not given but, rather, are shaped by the political economic context.[5]

[5] For a more general statement of thesis in relationship to the "Platform Economy", see Kenney and Zysman (2016).

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