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Business Trends in the Digital Era

Evolution of Theories and Applications

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Foreword

By virtue of the great breakthroughs in digital technologies, the information revolution, which began in the 1950s, initiated an upsurge in mass entrepreneurship and innovation at the turn of the century. In the digital age, a dazzling array of novel ideas, technologies, products and business models spur companies forward, while those who react sluggishly will fall into ruin. Even as they cleave to the proven models, traditional industries will still need to tap into the colossal mobile Internet community to achieve global reach. In our ever-changing world, making the most of the present and seeing into the future are no small tasks. Through mining and analyzing mountains of data, Prof. Zhu Xiaoming and his team have identified ten mega business trends (big data, cloud computing, platforms, mobile Internet, software-defined anything, outsourcing and crowdsourcing, the demand-driven model, the long-tail market, digital finance, and the O2O model), offering us a vivid and richly detailed panorama of the digital age.

No matter for business or pleasure, this book offers a wealth of knowledge and insights for the reader.

Prof. Wu Jinglian
Renowned Economist
Baosteel Chair Professor of Economics
CEIBS, Senior Research Fellow
Development Research Centre
of the State Council of P.R.C.

Foreword II

It is a rare to find a book of such timeliness and insight into the business strategies of the digital and Internet age.

Dr. Zhu Xiaoming, CEIBS Professor of Management and former President, has an extensive background in science and engineering. He rose through the ranks of businesses and governmental bodies and has acquired vast management experience in the process. Over the past decade, he has engaged in teaching and research at CEIBS. His wealth of knowledge and experience is reflected within this work, which offers penetrating theoretical analysis and many fresh ideas.

As a professor of an international business school, I am deeply impressed with his industry and intellectual rigor. The data in the book are based on extensive research and surveys of companies, and Prof. Zhu deserves special praise for the array of topical cases used to illustrate and support the book's views. This is a work that will be of great value and interest to the academic, political, and business communities.

Prof. Liu Ji
Eminent Strategist
Honorary CEIBS President
Former Vice President
Chinese Academy of Social Sciences

Author's Preface

In the age of digital technology and Internet, user-centric thinking, iteration, platform, freemium, and sharing have caught on; the tide of openness and inclusiveness, deconstructing and disintermediation have sprung up; garage culture, café culture and grassroots culture have taken hold all over the world.

Which underlying business trends merit special attention? In my mind, ten mega business trends in the digital age described in this book demonstrate sound logic: Trend I, Trend II, Trend III, and Trend IV, "Big Data, Cloud Computing, Platforms and Mobile Internet", predict the changes in infrastructure; Trend V, "Software-Defined Anything", focuses on changes in productivity; Trend VI, "Outsourcing and Crowdsourcing", anticipates changes in production organization; Trend VII, "Prosumer Economy", explains the changing forces of economic growth; Trend VIII, "Long Tail", forecasts an altered competitive landscape; Trend IX, "Digital Finance", analyzes changes in financial entities and technologies; Trend X, "collaboration", probes into changes in operations models.

Business Trends in the Digital Age will give you some enlightenment as to how to gain a solid foothold in the market amidst fierce competition. This book is also a must-have to innovation, investment, M&A, business transition, and start-ups for entrepreneurs.

Some readers may ask why digital technologies can change business trends. One of the basic theories in economics and management is to reduce transaction costs, and transaction costs can be reduced by addressing information asymmetry. In the digital era, data can be mined, resources be shared, long-tail and blue ocean strategies can be leveraged to drive down costs and enable companies to transform themselves and thereby reshape the industries and rewrite the business trends.

In the age of digital technology and Internet, it has been quite common that "following trends" outweighs "building up advantages". Thus, those who follow the beaten track may breathe a sigh of regret that they have been "out" before getting down to SWOT analysis.

It is my great honor that *Business Trends in the Digital Age* has received the 1st prize for academic works at the 4th Chinese University Press Book Awards. We are convinced that academic works can't be separated from teaching (in particular

case teaching). Only by continuous learning and interaction in the class can academic works be as fresh and compelling as ever.

On this occasion, we, Zhu Xiaoming (朱晓明) and Song Bingying (宋炳颖) would like to express our thanks to Ning Yingzi (倪英子), Ren Yifan (任轶凡), Li Rui (李蕊), Cao Xuehui (曹雪会), Luke R. Krawec, Wang Yan (王燕), Wang Chen (王晨), Zhou Wei (周伟), Huang Xie'an (黄协安), Xu Qian (许茜), Yu Rui (俞睿), Zheng Youjia (郑幼佳), Zhao Nan (赵楠), Fan Jingjing (范晶晶), Guan Peng (关鹏), Zhang Yu (张羽), Xiao Yingjun (肖颖君), Zhu Yezi (朱叶子), Shi Tianyu (施天瑜), Huang Chengyan (黄成彦), Ma Lan (马蓝), Wang chengde (汪承德), Jiang Junzhe (姜浚哲), Wang Danping (王丹萍), Zhu Yifan (朱奕帆), Zhang Yingwen (张颖文), Ma Ning (马宁), and Zhang Junrui (张郡芮) for their great efforts made in translation and proofreading of the book, and special thanks go to Yang Yemin (杨烨旻), Han Feng (韩丰), Chen Haimin (陈海闽), Xie Jun (谢隽), Lee Yong-Fatt (李永发), Wu Shengshan (吴晟姗), Meng Hao (孟浩), Tian Minwei (田珉炜), Ma Li (马利), Jiang Jiawei (姜嘉维), Li Angda (李昂达), Wang Yi (汪毅), Zuo Jiqing (左冀卿), Wang Dongqing (王东卿), Sun Wei (孙伟), Deng Qin (邓琴), Dmitry Andreev, Ramiro Gomez Lopez, Alberto Miranda Ordono, Kevin James Shimota, Upendra Pratap Singh from CEIBS MBA 2016 and 2015 cohorts for their excellent voluntary work in the whole translation and proofreading process. I still remembered that on January 17 one of CEIBS MBA students Wu Shengshan asked me during the book launch ceremony if this book can be translated into English through crowdsourcing. If the second edition of the book is to be released in the future, I will definitely write a case on translation through crowdsourcing and add it into the second edition.

In the age of digital technology and Internet, everyone has an opportunity to realize their dreams. For entrepreneurs or educators, nothing matters more than commitment for them to follow the ever-changing business trends or to keep pace with the fast-growing S&T innovation. Only by trying to surpass the front runners and going beyond ourselves can we make a foray into uncharted territory to create a brave new world.

CEIBS Shanghai Campus
December 2015

Dr. Xiaoming Zhu
Professor of Management and Former President
(June 2006–March 2015), CEIBS

Preface

> The ICT (Information Communication Technology) Revolution is a "story about the service sector"… By virtue of the ICT, efficiency in the service sector has substantially risen in tandem with its transition.
>
> —The Choice of China's Growth Model (2013 edition), Wu Jinglian

> I find that the great thing in this world is not so much where we stand as in what direction we are moving.
>
> —O.W. Holmes (1841–1935)

On October 22, 2014, Prof. Samuel Chao Chung Ting, a Chinese American scientist who received the Nobel Prize in Physics in 1976, delivered a lecture as part of the Master Class Series on CEIBS Shanghai Campus. He noted, "It is my first time to deliver a speech to MBA and EMBA students at a business school." It was also the first time CEIBS had hosted a Nobel Laureate in Physics for a lecture. As noted by Prof. Ting, physicists are capable of not only seeing beyond the edge of the Milky Way (10^{25} m) and observing more distant galaxies, but also probing entities as small as quarks (10^{-17} m). From the largest galaxies to the tiniest particles, our point of view about the objective world changes over time; from basic research to applied technologies, the frontiers of science have been pushed forward and the number of applications has grown.

Although Prof. Ting's lecture dealt with physics theory and applications, the basic idea also applies to the business world. Since the division of labor and market transactions began, people have sought new ways to reshape the business world. From macroeconomic trends to micro-organizations, economic law to business strategies, and technological innovation to business model innovation, we have gained deeper insight into the business world and enhanced the diversity of business applications.

In the digital and Internet age, companies may be facing the toughest competition, the fastest business shifts, and the largest number of innovations in history. New ideas, models, and businesses are mushrooming. Business schools need to keep pace with the times to help entrepreneurs understand the business

trends in the digital age so as to grasp opportunities for innovation. This is why we named the book *Business Trends in the Digital Era: Evolution of Theories and Applications* (hereinafter referred to as *Business Trends in the Digital Era*).

To understand these business trends, we need to delve into the works of management gurus, including *The Choice of China's Growth Model* by Wu Jinglian, *The Theory of Economic Development* by Joseph A. Schumpeter, and *The Practice of Management* by Peter F. Drucker, while making management theory part of our own business practices.

This book originated from the lecture notes Prof. Zhu Xiaoming and his research team prepared for students. So far, no fewer than ten classes have taken Prof. Zhu's course. Converting the lecture notes into a book didn't seem overly difficult, at least until we actually put pen to paper. First, in class, we can supplement our lecture notes with PowerPoint presentations or with audio and video materials to capture and hold students' attention. But in writing the book, we had to rely on key points of view, content and internal logic, rather than on auxiliary tools. What also important were ensuring the writing itself was vivid and that the cases were up-to-date. Second, for students, we need to boil down the course content into lecture notes to bring out its essence; for readers, we must instead go to great lengths to expound our views and strengthen them with cases. Third, as digital technologies and business models are advancing by leaps and bounds, we need to keep abreast of and incorporate developments in the issues and cases referred to in the book, ensuring we can substantiate our points of view with up-to-date information.

We have poured all our mental and physical energy to writing the book. Seeing the book published provides us with a great deal of comfort, as our efforts have borne fruit at last. It is my sincere hope that the book will serve not only as a textbook for business schools, but also as a guide to innovation, investment, M&A, business transition and start-ups for entrepreneurs.

Contents

Introduction

A Business World Reshaped by Digitization

Around 3,200 B.C.E., the Sumerians invented one of the earliest known systems of writing, Cuneiform script, adding a brilliant new page to the history of human civilization. In the sixth century A.D., the Chinese invented movable type. In the nineteenth century, people learned more about electricity and magnetism, which kick-started the progress of information technology. In the 1990s, the World Wide Web enabled 200,000 computers worldwide to connect to the Internet. By 2012, a vast majority of people worldwide owned a mobile phone, as mobile Internet was growing by leaps and bounds. In 2013, cloud computing and cloud storage really took off. In 2014, among a global population of seven billion, the Internet's population amounted to three billion.

Presently, as social media platforms have connected people from all over the world with each other, time and space are no longer barriers to communication. The micro-blogging site Sina Weibo is home to 500 million users, WeChat to 500 million users, QQ to 800 million users, and Facebook to 1.2 billion users. The quantity of information released on Sina Weibo in a single day exceeds everything published by *The New York Times* over six decades. If you tried to play back-to-back all the videos uploaded in a single day on YouTube, the world's largest video sharing website, it would take 98 years.

Along with the rapid evolution of digital technologies, the flood of information sweeping all over the world at virtually no cost, and closer links between humans, between things and between humans and things, we have every reason to predict that no individual, company, industry or country will be able to sit on the sidelines when the revolution on the horizon arrives.

Kodak: Missing Its Own Moments

A more-than-130-year-old giant in the imaging industry, Kodak created many "firsts": It came out on top in the imaging and photographic film market and had 8000 sales outlets in China; it created the world's first digital camera using a Charge Coupled Device (CCD), a major piece of technology for digital imaging. Kodak was the undisputed king of photographic film, with two thirds of global market share; in its heyday, Kodak could be likened to Google or Apple today, and had over 145,000 employees all over the world. Nevertheless, Kodak, which started as a photographic film producer, failed to capture its own moments and became the first company to flame out in the imaging industry.

It seems that fate has brought Kodak and me together. While acting as the first General Manager of Jinqiao Development Zone Company, I brought Kodak's executives round to my idea of opening its China headquarters in Jinqiao of Pudong New Area. Life is unpredictable, however, and film cameras were replaced by digital cameras in the blink of an eye. During the APEC Summit in Shanghai in 2001, gifts of colorful photos printed with Kodak's Thermal Dye Sublimation were all the rage. Kodak's followers, as well as upstream and downstream companies, were puzzled at how this pioneer in digital technologies was defeated by those technologies.

The fundamental reason is that the company failed to keep abreast of digital technologies. In the current era of digital cameras and mobile phone cameras, people are increasingly inclined to store their photos on their computer, iPad or mobile phone so that they can browse through their photos whenever and wherever they want. They are used to sharing their photos via WeChat, Weibo and other social networking sites, processing images with software like iPhoto and Photoshop, and converting photos from 2D to 3D images with video-editing software like iMovie. There is a robust demand for digital imaging software today, when many people take photos just to amuse themselves or to share with others.

Unfortunately, Kodak didn't act effectively amid these changes, and instead chose to rest on its laurels from the era of photographic film. And so the company was sidelined by the digital revolution.

Motorola: Losing Out in the Mobile Internet Era

In July 1969, as he walked cross the moon, the US astronaut Neil Armstrong uttered the immortal line: "That's one small step for (a) man, one giant leap for mankind." It was Motorola's wireless device that transmitted the live TV signal and Armstrong's historic words from the Moon to the Earth.

Motorola was synonymous with wireless communication. Since its founding in 1928, Motorola has brought numerous "firsts" to the IT and telecommunication sectors: the first hand-held two-way radio in 1943; the first pager in 1956; the first

mobile phone in 1973; the first commercial cellular phone, GSM digital mobile phone, and smartphone. Motorola was a leader in the information industry in the twentieth century and top dog in the era of analogical mobile communication.

Since Apple's iPhone hit the market, smartphone makers have pitted themselves against each other not in hardware but in the ecosystem. To meet the market demands for mobile software, Apple Inc. has given developers worldwide access to the Software Development Kit (SDK) based on the iOS platform so as to bring minds around the world together to develop diversified Apps. As a result, Motorola's competitors have shifted their focus from hardware to the business ecosystem of the "iPhone plus App Store".

Motorola has met considerable challenges from OEMs and counterfeit phone makers in the low-end market. By integrating cell phone chips with a mobile software platform, Taiwan headquartered Media Tek Co., Ltd. can offer solutions that make mobile phones that are more than 60 % complete, so that handset manufacturers can launch new products more rapidly after minor processing. By adopting Media Tek's total solutions, knock-off smartphone makers are cannibalizing the low-end of the market with low prices and rapid product manufacturing.

Motorola has fallen a long way, going from a frontrunner to an also-ran in the communications sector. In January 2011, Motorola was spun off into Mobile Solutions and Mobile Mobility. Mobile Mobility was acquired by Google for 12.5 billion dollars on August 15, 2011 and then sold to Lenovo for 2.9 billion dollars in February 2014.

This is hard to believe, and we can't help wondering why Motorola has sunk so low.

The Ever-Changing Digital Business World

The demise of Kodak and Motorola is a warning that even the leaders in the digital age can easily fall behind. Aside from Kodak and Motorola, many other companies have fallen because of a resistance to reform. Many more markets outside the camera and mobile phone sectors have undergone disruptive changes.

It is lamentable that Nokia and Blackberry ended up selling a slew of assets. Microsoft, Intel, HP, and Yahoo have been dethroned by Apple, Google, Amazon, and Facebook. In China, since the threat from JD.com began to grow in 2009, offline store giants have run out of steam and have seen their glory fade considerably. Amap and Baidu Map have made the onboard navigation system in cars redundant; Tencent's WeChat has moved the cheese away from China Mobile, China Telecom and China Unicom. Though flush with funds, these lumbering behemoths will struggle to escape their doom.

From window-shopping to supermarket shopping to shopping via Taobao.com in the area of consumption; from batch production to customization to 3D printing in manufacturing; from landline phone calls, faxing and text/image transmission to wireless communication, email, Weibo and WeChat in tools of communication;

from cash, bank cards, and e-wallets to the little-known quantum money in payment tools; from newspapers, radio and TV to web portals and We Media in mass media; from external hard drives and CDs to USB flash drives to cloud storage in storage tools… Each sector, including the traditional advertising, educational, retailing, hotel, service and healthcare industries, will be flooded by the digital wave to varying degrees. A growing number of industries will thrive on the digital economy.

While crippling traditional business models, the digital economy has given almost all sectors a new lease on life. Fast companies are at a premium, and companies light on assets are making a name for themselves. New business models run the gamut from web portals, search engines, B2C, B2B, C2C, P2P, and SNS to group buying, Weibo, LBS, and O2O formats. The aircraft cabin can become a first-class international social networking platform, the hot pot restaurant the best nail salon, the café a VC gathering ground, and the waiting area in a bank a small bookstore. The blurring of lines between industries and the falling barrier to entry have made cross-sector collaboration possible everywhere.

In the days of the commodity economy, the mere mention of "infrastructure" conjured up the image of railways, highways and airports, or roads, bridges and tunnels, or water, power and gas lines. Nowadays, the term is perhaps more closely associated with software infrastructure, calling to mind big data, cloud computing, platforms, and mobile Internet. In the future, whether priced low or high, products will not be sold without big data; industries, low-end or high-end, will not flourish without platforms; regardless of their target customers, services will not be made available without cloud computing; whether it comes from near or far, demand will not be satisfied without mobile Internet. The emphasis on big data, cloud computing, platforms, and mobile Internet is by no means a passing trend. These are matters of urgent importance in building up software and hardware infrastructure.

In a nutshell, by invigorating existing social and economic patterns, digitalization provides companies with opportunities for innovation and transition while exposing businesses to the risk of collapse. In the current age, everything can be reinvented: The structure of industry is being reshaped, business players' thinking rewired, and the world at large remade.

Market Players Inspired by the Internet

Charles Darwin once said, "It is not the strongest of the species that survives, nor the most intelligent that survives, but rather the one most adaptable to change." The Internet is undoubtedly the greatest change brought by the digital age.

The Internet is not only a new technology and a revolution in itself, but also a new operations platform and system for all industries, companies and organizations. In the Internet era, digitization will profoundly change our lives, production methods, society, business and thinking.

As shown in research conducted by BSG, if the Internet were a national economic entity it would rank in the world's top five, only behind the US, China, Japan and Germany. The Internet economy of the G-20 nations will grow more than 10 % a year from 2011 to 2015. In developed markets of the G-20, the Internet economy will grow approximately 8 % annually; in developing markets, it will grow more than twice as fast—at an average annual rate of 18 %. The Internet economy will contribute a total of 4.2 trillion dollars to the G-20's total GDP in 2016.

In the digital age, the Internet can cater to people's shopping, social networking, entertainment and reading needs. Homebodies and members of the net generation, in particular, regard Internet access as a staple of life, like air, food, and water.

Today, supply is abundant and profound ideas spread widely; diversified demand and time confetti are the norms; "the long tail", "crowdsourcing" and "makers" are buzzwords on everyone's tongue; user experience and word of mouth carry greater significance; precision marketing, interactive marketing and community marketing have caught on. A new scene is unfolding before us: the value of space is eroding while that of time is climbing; tangible factors are decreasing in importance while intangible ones are increasing; the center is shifting, hierarchies are breaking down, authority is tottering and personality is growing; entrepreneurs, employees and consumers are being reshaped by the Internet.

Don Tapscott said, "The losers launched websites. The winners launched vibrant communities. The losers built walled gardens. The winners built public squares. The losers innovated internally. The winners innovated with their users. The losers jealously guarded their data and software interfaces. The winners shared them with everyone".[1]

In the Internet age, ideas about user orientation, iteration, and platform, freemium and sharing models have taken hold; creating a mutually beneficial ecosphere rather than going it alone is gaining traction as never before; the values of being open and inclusive are pervading every facet of society, with the tide of de-organization, deconstructing and disintermediation running strong. Thus, prosumers, who combine the roles of producer and consumer, are making their voices heard all over the world; rather than go to an office every day, a growing number of people work on flexible schedules or work for themselves; garage culture, café culture and grassroots culture have taken hold all over the world.

The future of the Internet can be defined in one sentence: Everyone and everything will be interconnected, stay online, and interact everywhere and all the time. According to one research report, we are able to connect to less than 1 % of the things around us for the moment. What will happen if the ratio rises to 100 %? The Internet has the potential to connect anyone to anything in any way you can imagine, whenever and wherever. Every player in the market must be well prepared for the future.

[1]Wikinomics, China Youth Publishing House, released in October, 2007.

The Third Industrial Revolution: The East Vies for Dominance with the West

The Industrial Revolution, which broke out in the UK in the eighteenth century, was a great revolution in the history of technologies, ushering in the era of machines that replaced hand tools. The revolution began with the invention and extensive application of steam engines. After 1870, the economy was kick-started by an array of new technologies applied to industrial production. This is what we refer to as the 2nd Industrial Revolution. Some of the most notable advancements in science and technology were the wide use of electricity, creation of internal-combustion engines and new means of transport, and invention of new tools of communications.

In the previous two industrial revolutions, the West reigned supreme as it spearheaded innovation in technologies and business models. In today's ongoing digital revolution, also known as the 3rd Industrial/Technological Revolution, the invention of computers and rapid popularization of communication devices have given a huge push to technological, economic, social and cultural changes. Facing the digital revolution and new energy revolution, the East and the West are now operating on an even playing field, an unprecedented situation.

"Blacksmiths weeping into their beer about their inability to sell horseshoes in the era of railroads doesn't make horseshoes more popular. Blacksmiths learning how to become auto mechanics, on the other hand, put food on their table," said the science fiction writer Cory Doctorow. During the 3rd Industrial Revolution, Chinese entrepreneurs, much like the blacksmiths who learned how to become auto mechanics, have undoubtedly given up the low-cost strategy in favor of transition and innovation.

Taobao has prevailed against eBay, Tencent QQ against MSN, and Baidu against Google, becoming three world-renowned companies. Even if someone argues these Chinese companies were just in the right place at the right time to pull it off, no one can deny that their deep insight into the Chinese market and unwavering determination were key to their resounding success. On the morning of September 19, 2014 (local time in the US), Alibaba Group began trading on the New York Stock Exchange. As of the end of that day, its shares closed at 93.89 dollars, skyrocketing 38.07 % from the initial public offering price of 68 dollars. With a valuation of 231.439 billion dollars, Alibaba surpassed Facebook as the world's second largest Internet company, just behind Google.

Xiaomi Inc. threw down the gauntlet in a challenge to Apple and Samsung by mobilizing 1 million fans to develop, produce and promote smartphones. In the course of just over four years, Xiaomi's valuation reached a staggering 16 billion dollars. In 2014, Xiaomi reached 14 % of market share in China, knocking Samsung (12 %) from the top position for the first time.[2]

[2]Based on the latest data from the US' market survey firm Canalys.

When Japanese e-commerce traders went bankrupt due to the monopoly of Amazon.com in the Japanese book market, dangdang.com took the top spot in the Chinese B2C book market in Q2 2014, beating out the runner-up, Amazon.cn, by 15 %.

Targeting the 80 % of Chinese Internet users reluctant to pay for anti-virus software as customers, Qihoo 360 has grabbed the lion's share of the Chinese security software market and converted its sizeable number of users into advertising resources. In 2013, its market capitalization reached 10.971 billion dollars.

Run by ten team members, the "Hotel Butler" app received a valuation of tens of millions of US dollars after just 18 months. Over the past year, 58.com, autohome.com.cn and qunar.com have listed in the stock market. Over the past few years, the CEO Chen Ou successfully steered jumei.com onto the New York Stock Exchange.

Presently, the market capitalizations of Baidu, Alibaba, and Tencent (BAT) have each topped 100 billion dollars, and there are over ten Internet companies with a value of more than 10 billion dollars in China. Alibaba and Tencent are ranked among the world's four most valuable Internet companies. In addition, some start-ups have been focusing on achieving a global footprint. All these developments indicate that Chinese Internet companies are no longer sticking to their niche at home.

Michael Moritz, Chairman of Sequoia Capital in the US, noted in an article that "Alibaba is now the world's fifth most valuable TMT (Technology, Media and Telecom) company… Thirty years ago, U.S. companies accounted for the vast majority of this number. Today the U.S. share has fallen to about 66 %. The Chinese share, which was smaller than a ladle of rice 30 years ago, has climbed to 10 %. If anyone wants proof of the manner in which the balance of power in the technology world is shifting from the U.S. towards China, the IPO of Alibaba offers irrefutable evidence."

Over 1000 guests from over 120 countries and regions attended the first World Internet Conference held on November 19–21, 2014 in Wuzhen, Zhejiang Province. Attendees included global Internet moguls and leaders of the world's top Internet companies. It was China's first time presiding over an Internet conference of that scale, and one unmatched in size and influence anywhere in the world. The US-based *China Press* commented, "China is moving into the era of mobile Internet with a mighty force at a stunning pace. Perhaps, what matters most is not how many bigwigs attend the conference or how many new consensuses have been reached but where the Chinese Internet will be headed."

In his letter to investors included with Alibaba Group's Prospectus, Jack Ma noted, "In the past decade, we measured ourselves by how much we changed China. In the future, we will be judged by how much progress we bring to the world." This isn't true only for Alibaba. Other Chinese entrepreneurs have also moved from trailblazing to maturity, and today they are at the forefront of the 3rd Industrial Revolution. Standing with other industry giants in the same arena, they will battle it out for primacy in the digital age.

Business Trends: Predicting the Unpredictable

Ours is an age in which spotting trends outweighs gaining an advantage. The new technological revolution has opened up immense possibilities, and entrepreneurs can no longer restrict themselves to making incremental additions to the existing model; instead, entrepreneurs need to break away from the old business model entirely in search of a new one. This necessitates profound insight into future trends.

Steven Best and Douglas Kellner noted in *The Postmodern Turn* that "the postmodern turn results in fragmentation, instability, indeterminacy, and uncertainty". This comment on postmodern culture also applies to the current digital business world.

Jack Ma, the Chairman of Alibaba Group who had never worked a day at a bank, established Alifinance; Ma Mingzhe, who had never worked in insurance sales, runs an influential insurance company; and Elon Musk, who had no experience in the automotive industry, rolled out the Tesla car to great fanfare. We are treated every day to fantastic stories about the success of the underdog and cross-sector innovation, and given choices that never existed before. As Nassim Nicholas Taleb noted while discussing the black swan concept, uncertainty has never haunted us so much, and it has become the new normal.

Instead of throwing up our hands, we can grapple effectively with uncertainty. As noted by the management guru Peter Drucker, "Certainty arises from uncertainty. The future is both predictable and unpredictable. The accurate picture of the future is unpredictable, while the mega trends are predictable."

Among the traditional theories and models, the Petty–Clark Law, Simon Kuznets' theory about industrial structure, Walt Whitman Rostow's theory about the expansion effect of the dominant industry, Hollis B. Chenery's theory about the stages of industrialization, W.G. Hoffmann's law for industrialization, and the Lewis Turning Point enable us to predict industrial changes in a country or a region; Wassily Leontief's Input–Output Model, Marie-Esprit-Léon Walras General Equilibrium Model, Solow Growth Model, Harrod–Domar Model, Lucas Islands Model, and Romer's Endogenous Growth Model can be used for macroeconomic forecast. But how can we predict the industrial revolution and business trends in the digital world?

Presently, Moore's Law, Gilder's Law and Metcalfe's Law are used to predict the growth rate and value of the IT industry and networks. Moore's Law states that the performance of microprocessors doubles every 18 months while prices drop by half. According to Gilder's Law, network bandwidth will double every 6 months in the next 25 years, three times faster than the growth rate for CPU power predicted by Moore's Law. Metcalfe's Law states that the value of a telecommunications network is proportional to the square of the number of connected users of the system. Yet these laws by themselves are nowhere near enough for us to keep abreast of the constant change in the digital business world.

"Listen to the technology," advises Carver Mead, one of the inventors of the modern computer chip. "Find out what it is telling you." By coincidence, cyberculture observer, prophet and spokesman Kevin Kelly has said, "By imagining what technology wants, we can imagine the course of our future." The facts show that it is technological innovation that inspires model innovation.

The digital world may be the most radical thing that individuals and companies have dealt with. They will need to figure out the new rules of the game as soon as possible in order not to be defeated by new companies. The business school, which is undoubtedly the best option for entrepreneurs for further education, is duty-bound to offer participants guidance on how to spot the key business trends.

The business school of today should position itself as a platform rather than as a traditional institution of higher education, while staying open-minded and maximizing services. Regarding the student as a prosumer of management expertise, the business school should integrate analysis of industrial trends, management practice and demand for business education with professors' management theories for better case writing and teaching. Students should be taught how to grapple with uncertainty and complexity in the digital business world. They must learn how to grasp opportunities for win-win cooperation in the unpredictable future, and how to do so by following a strategic vision, instead of blindly plunging into the red ocean of cutthroat competition.

Overview of the Ten Mega Business Trends

Friedrich August von Hayek, the Nobel Laureate of Economics in 1974, delivered an acceptance speech titled "The Pretence of Knowledge". When commenting on the limitations of human knowledge, Hayek noted, "Owing to the growth of scientific knowledge, we overestimate our ability to understand the subtle changes that constitute the world, and what weight needs to be imparted to each such change." Nonetheless, we strive to see through the ever-changing, information-rich, and highly uncertain business world so as to gain a head start. This book is aimed at offering a panorama of key business trends to help readers rethink the new business logic.

The ten mega business trends are as follows:

- Trend I: Big Data: From Raw Data to Big Data;
- Trend II: Cloud Computing: From Offline Computing to Cloud Computing;
- Trend III: Platform: From the One-sided Market to the One-sided Market + Two-sided Market;
- Trend IV: Mobile Internet: From PC-Based Internet to PC-Based and Mobile Internet;
- Trend V: Software-Defined Anything: From Software-Defined Hardware to Software Defined Anything;

- Trend VI: Outsourcing and Crowdsourcing: From Building All-round Capabilities to Outsourcing and Crowdsourcing;
- Trend VII: Prosumer Economy: From Supply Chain to Prosumer Economy;
- Trend VIII: The Long Tail Market: From Economies of Scale to Economies of Scale and the Long Tail Market;
- Trend IX: Digital Finance: From Traditional Finance to Digital and Internet Finance;
- Trend X: The O2O Model: From Online/Offline to the O2O Model.

Trend I, Trend II, Trend III, and Trend IV predict the changes in infrastructure and industrial priorities in the digital age from big data, cloud computing, platforms, and mobile Internet; Trend V focuses on how software will become the most important force of production in the digital age; Trend VI anticipates changes in production organization methods; Trend VII explains the changing forces of economic growth; Trend VIII predicts companies' shifting focus on market players; Trend IX analyzes changes in financial models; Trend X weighs the pros and cons of online/offline models and reveals why the O2O model is the best option.

Conclusion

A new age of intense competition is just beginning, one in which the winner takes all. Never has the path to new business models been wider. Will digital technologies transform the business world? The answer is yes. Will digital technologies give a new lease on life to the business theories repeated year after year at business schools? In my opinion, the answer is also yes.

In the digital age, change is the only thing that is permanent.

Chapter 1
Big Data—From Raw Data to Big Data

The core of big data is to make a forecast. Big data will create an unprecedented and measurable dimension for human life. Big data have already been the source of invention and new service.

—Big Data: A Revolution That Will Transform How We Live, Work, and Think

Data will become the fundamental factor for success or failure in all industries. In the end, data will become a critical natural resource for humans.

—IBM

On April 4, 2014, a domestic agency forecasted that Mount Tai would be the most crowded scenic destination in China in the upcoming weekend. The next day, Mount Tai indeed appeared at the top of the list of tourist destinations released by CCTV. Who was responsible for this incredibly accurate forecast, helping tourists escape the crowd? It was Baidu! Baidu built a tourist forecast model based on big data that predicts the number of visitors to main tourist attractions around the world. Research indicates Baidu's forecasts are more than 90 % accurate compared with actual visitor numbers.

More amazingly, Baidu used big data to accurately predict that Germany would be the champion of the 2014 FIFA World Cup in Brazil. In addition, Baidu predicted the outcomes of all the other matches with 93.7 % accuracy, except for the semifinal between Brazil and the Netherlands. How did Baidu do it? Over the previous five years, it had dug into data on 37,000 matches of 987 football teams (including national teams and clubs) worldwide. Meanwhile, Baidu worked with data providers both in China and abroad, introducing the forecast data from the gambling market, and built a forecast model covering thousands of players and hundreds of millions of data points.

Using big data, Baidu has also launched a disease prediction system that can paint a broad picture of the incidences and trends of the flu, hepatitis, tuberculosis,

X. Zhu et al., *Business Trends in the Digital Era*, DOI 10.1007/978-981-10-1079-8_1

and STD in every province in China and in most of the prefecture-level cities and counties nationwide. In the future, Baidu's disease prediction system will cover 30 types of common diseases and epidemics, helping those who use forecast results prevent those diseases and epidemics more effectively. Interestingly, Baidu successfully predicted the key words embedded in the composition titles for 12 sets of college entrance examination papers in China based on the voluminous standard essays and related data search.

Big data is like a crystal ball that enables people to know what is happening in the world without going outside. But what exactly is big data? Where does big data come from? What is the value of big data, and how can we make full use of it?

1.1 Getting a Glimpse of Big Data

1.1.1 The Essence of Big Data

People in the IT industry summarize the four key traits of big data as "Volume", "Variety", "Value" and "Velocity". Volume refers to the size of big data, measured not in terabytes but in petabytes.[1] Variety refers to the many types of data. As mentioned before, blogs, video clips, pictures, and geographical information can all be incorporated into the category of big data. Value refers to identifying the data of high business value. For example, we might analyze vast amounts of video data to identify a useful clip that is only one or two seconds long. Velocity refers to the speed of information processing.

Unlike traditional data, big data in the Internet age emphasizes not the amount of data but rather using new thinking to interpret the data, with the help of the Internet.[2]

- Online: First of all, big data must be made available online access and analysis immediately, instead of being stored locally.
- Real time: Responses to big data analysis must take place in real time. When users browse through Taobao. com, data on billions of goods, millions of stores, and hundreds of millions of consumers will need to be matched in real time.
- Broad picture: Big data doesn't emphasize a "sample" view but a holistic thinking. People want all the data they can get.

[1]The petabyte (PB) is a unit of digital storage capacity, equal to 2^{50} bytes, or 1000 terabytes (TB). The terabyte is of course another unit of computer storage capacity, equal to 2^{40} bytes, or close to 1 trillion bytes. The futurist Raymond Kurzweil has extended the definition of PB, estimating that humans have a functional memory capacity of 1.25 TB. This means the functional memory capacity of 800 people amounts to only 1 PB.

[2]Based on the opinion of Zengming, Senior Vice President of Alibaba, http://i.wshang.com/Post/Default/Index/pid/33960.html.

The usage of big data is different from the usage of traditional data. The differences can be demonstrated in the following three areas:

Consciousness versus Unconsciousness. Traditional data collectors must know their objective in advance, and then gather the data on their own initiative. Each company has different computing capabilities, costs, data retention times, and selection standards. The data providers can accept or reject the request for cooperation at their discretion. For example, if a company conducts a market survey, 80 % of interviewees may opt out, while the other 20 % may ask for some compensation for taking part. But using big data, data collectors don't need to segment their audience in advance. Anything people do on any website will be automatically recorded. The data collectors can view unconscious and self-interested behavior. Each click people make for their own needs is a source of information, whether done to buy goods via Taobao.com, browse Weibo, or search for information on Baidu.

One-way versus Two-way. Traditional data analysis is one-way: The data collector sets an objective in place, and then uses the collected data to analyze user behavior, and at last decides whether the data analysis is accurate. With big data, however, people can derive value from data applications while helping to create new data. It is an interactive positive cycle, in which both data users and collectors can generate valuable data.

Post processing versus High speed synchronization. Most traditional data applications are based on post-processing, with processing speed varying from individual to individual. Big data inputs, however, need to be rapidly processed in sync. The higher the processing speed, the greater the value big data can generate. For example, you may see the results from Google based on one keyword are quite different from the results you get later in the day, as Google delivers optimized information for users by recalculating all the clicks worldwide over the previous hour. Thus, the faster big data is processed, the greater the value it can create, and the larger the number of users are engaged.

1.1.2 The Evolution of Big Data

As early as 1980, the famous futurologist Alvin Toffler spoke highly of big data as "the third wave of cadenza" in his book titled *The Third Wave*. It is only recently that "big data" has become a buzzword in the Internet and IT industries. Created by Gartner, a world renowned technological forecast company, Hype Cycle offers us the best avenue to understanding the evolution of big data.

Two senior research fellows at Gartner wrote a book called *Mastering the Hype Cycle* (the first Chinese edition was translated by Cao Xuehui, Ren Yifan and others, and was published in October 2014). Professor Zhu Xiaoming wrote a preface to the Chinese version: the Hype Cycle is a double-coordinate or two-dimensional curve. Thinking it over, you might understand how the curve can be seen in three dimensions. This third dimension can be a measure of "under two years", "two

to five years", "five to ten years", or "more than ten years". Gartner defines the third dimension as a period of time required for a new technology to move into the mainstream market. The Hype Cycle's horizontal axis can be divided into five stages: "Technology trigger", "Peak of inflated expectations", "Trough of disillusionment", "Slope of enlightenment" and "Plateau of productivity". Meanwhile, the vertical axis represents the expectations for innovative technologies in the market. Gartner updates the Hype Cycle in the second half of each year, so we can find the different positions of big data along this curve in 2011, 2012 and 2013. In 2011 and 2012, big data was in the "Technology trigger" stage, and in 2013, it moved up to the stage of "Peak of inflated expectations", implying that market expectations for big data reached their peak. This fits in well with the public perception. Just three years ago, big data was foreign to many people, and some of them even never heard of it. Just a year later, many people had become familiar with the concept. And by 2014, almost everyone knew about big data.

Of course, big data is not independent from other technologies. The evolution of big data calls for a cheaper computer memory, faster connectivity, and cloud computing-based processing. Sensors, an important part of the Internet of Things, and other information gathering technologies are generating more and more data. Rapidly changing software and analytical tools also play an essential role, transforming raw data into user-friendly information.

1.2 The Value of Big Data

1.2.1 A Mass of Data: A Gold Mine Rather Than a Treasure Chest

A lot of organizations possess a great deal of data, including banks, insurance companies, government institutions, schools, hospitals, e-commerce companies and media providers. But "Volume" is only one of the four key features of big data.

According to the US's Internet Data Center, the amount of data online grows at a rate of 50 % annually, doubling every two years. More than 90 % of the data that exist today were generated in just the past few years. The Internet of Things, cloud computing, mobile Internet, telematics, mobile phones, tablets, PCs and various sensor technologies around the world are sources or carriers of data. Countless digital sensors in industrial equipment, cars and electrical meters measure and transfer such information as location, movement, vibration, temperature, humidity and even changes in chemical composition in the air, generating large volumes of data.

People must identify patterns in the mass of data to acquire valuable information, which goes beyond the capacity of traditional scientists. Another way to think about this mountain of data is not as a treasure chest, but as a gold mine—there is great wealth to be discovered, but you had better be ready to dig for it.

One survey by McKinsey illustrates the value of big data. The financial value generated each year by big data for the healthcare industry is as much as 300 billion dollars in the US and 250 billion euros in Europe. The value of finance-oriented big data for personal global positioning services is more than 100 billion dollars in the US. The value created by big data for end users is in excess of 700 billion dollars. For example, big data has let US retailers increase net profit growth by over 60 %; in the manufacturing industry, big data has reduced assembly and development costs by 5 % and operations costs by 7 %. These achievements may not even reflect the full possibilities of big data once its application becomes more extensive.

You may wonder how the gold is mined from big data.

1.2.2 Data Mining: A New Business Competence

Data mining is the key to turning vast amounts of data into treasure.

Operators own a large amount of communications-related customer data, which range from voice to SMS and location information. These data, even more vast than that of any Internet giant, have been underused. Similarly, government agencies and software companies leave a variety of data in their possession "dormant", due to difficulties in applying data mining technology.

Data mining is the process of drawing valuable information and knowledge from massive, incomplete, vague and random data sources, and of helping decision-makers identify patterns, predict trends, and take preventive measures. Data mining includes database design, artificial intelligence, machine learning, statistics, model identification, and high-performance computing. From data gathering, storing, cleaning, masking, categorization, labeling and structuring to model analysis and application, all of these require server clusters, data application models and data processing algorithms (Table 1.1), and then the packaging and presentation of mined results.

Google searches, Facebook posts and Weibo messages enable us to measure human behavior and emotion. Data mining makes it possible for us to provide customers with optimized products and services that cater to their preferences and habits.

Nowadays, whenever you use a PC or mobile browser, you leave traces everywhere. Big data makes your gender, age, hobbies, locations and credit records visible online; we seem almost transparent in the digital age. It can be overwhelming—through search engines, e-commerce platforms and travel websites, your browsing history will be recorded, and your habits and preferences analyzed. A large number of vendors have prepared different products for you when you celebrate your birthday, go out for dinner, take a trip, get married, celebrate a new baby, or buy a house or car, and you may end up seeing ads for discount flights, wedding gowns, diapers, milk powder or a scenic villa overlooking the ocean.

Table 1.1 Four mathematical tools for accurate data mining

Model types	Model principles	Model characteristics	Model applications
Decision tree analysis	Presents a tree-like categorizing or decision-making process according to different critical characteristics	• Simple and straightforward; • Expertise not required	Life cycle management
Cluster analysis	Provides categorizations based on data similarity	• Advance parameters not required; • Explorative • Weak stability	Customer segmentation
Logistic regression	Selects some variables and assigns them weights based on the regression equation to predict the probability of events	• Capable of solving complex problems; • Highly accurate model; • Highly interpretable results	Precision marketing; Credit rating; Risk control; Life cycle management
Neural networks	Capable of self-learning and continuous optimization based on logical regression	• Ability to learn; • High tolerance of error; • Not easily interpretable	Financial fraud prevention

Source Accurate Data Mining for Big Data, by Wu Yu, Chemical Industry Press, March 2014 (first edition)

Data mining has given an important push to every industry. The IDC found that 62 European and North American companies that adopted data mining technology posted a three-year average ROI as high as 401 %; among them, 25 enterprises delivered an ROI of more than 600 %.

As you can see, data mining enables big data to reshape the business world. But it should be noted that data accuracy is the foundation of effective data mining. Using raw data gathered online sometimes confuses us for several reasons. Firstly, multiple identities: One person may have multiple accounts. Secondly, sometimes multiple people use a single account for transactions or search. Thirdly, it can be difficult to judge whether customers are looking to make online purchases or are just browsing. As a result, there is a wide gap between scientific calculation and business application in terms of big data. More technologies, in turn, requires further research.

1.3 The Application of Data Mining

1.3.1 A Boost to Financial Institutions

Some experts think that accurate data mining models can cover risk management, investment portfolio management, consumption pattern prediction, customer service, investment transactions, illustrated in Fig. 1.1. Customer classification

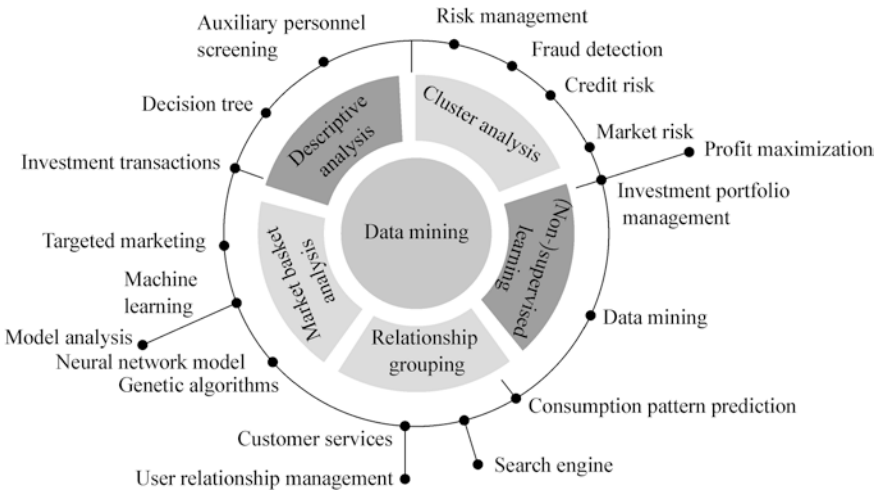

Fig. 1.1 Precise data mining categorization for banking. *Source* Shanghai Institute of Digitalization and Internet Finance

models, sales models, customer attrition models and potential customer identification models are commonly used by traditional financial institutions. In the era of big data, mathematical tools, such as the decision tree, neural networks, logical regression, and cluster analysis, will produce more accurate and valuable results for financial institutions in decision-making. ICBC is a role model in big data application among financial institutions.

After 30 years of development, ICBC has accumulated tens of petabytes of data stored in different databases: data warehouse that stores structured information and information bank that keeps non-structured information. In the case of non-structured information, ICBC stores it using the Hadoop[3] document system, in addition to traditional documents if necessary.

With development of big data technologies, ICBC has gone deeper with its data analysis application. Almost every business unit and management module of ICBC has incorporated with the data analysis application. For example, ICBC has already given credit ratings to all its customers. When customers swipe their cards to pay for something, they will receive a text message that says "Dear customer, you've just paid ____ yuan. Do you need an installment plan?" If the customers reply yes, the payment will go back to their accounts immediately, and the loan will be made. This application has been launched as a loan product called Yi Dai (Easy Loan). The challenge of this product is customer screening. Based on the big data technology, ICBC has designed a customer selection model, which allows ICBC's systems to automatically add/remove customers from the prospective loan list each day.

[3]Hadoop refers to a distributed architecture that can store and process hybrid data.

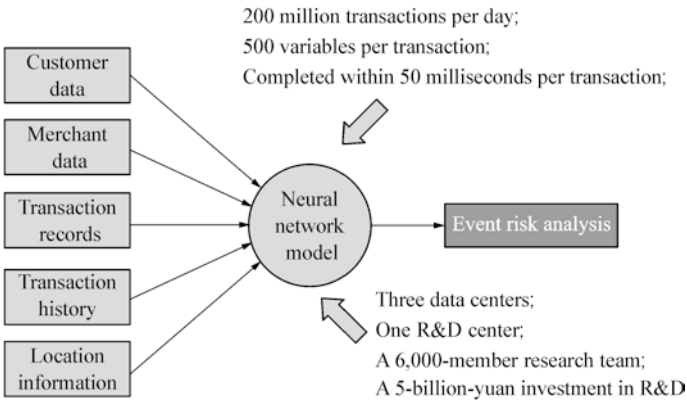

Fig. 1.2 ICBC's Application of neural network model to big data mining. *Source* ICBC Data Center (Shanghai)

Around 200 million transactions are made through ICBC every day. Beside its anti-fraud requirements, ICBC uses a variety of models to monitor all kinds of transaction risks, which requires advanced hardware and software. For example, ICBC has developed a neural network model to prevent fraud transactions. ICBC also used big data technology to develop a credit card anti-fraud system (Fig. 1.2). Using its fraud risk evaluation model, ICBC monitors millions of inbound and outbound credit card transactions in real time and decides whether if any are high risk transactions, blocking them in milliseconds if deemed necessary. This means computing capability and speed are crucial factors. How did ICBC make this possible? The answer is that ICBC has one R&D center and two data centers available, 6000 tech professionals and an investment of more than five billion yuan per year.

ICBC is committed to making further progress in big data development and application in three key areas. Firstly, improving the application of structured data. ICBC has over 4 million business customers, over 400 million individual customers and more than 200 million transactions daily. It is crucial to make structured data more conducive to business growth. Secondly, improving capabilities for non-structured data gathering and analysis. Thirdly, enhancing applications of data mining in sales & marketing, risk management and customer services. In a nutshell, ICBC will apply big data technology for the following objectives: (1) achieving rapid and real-time processing of and value creation for vast amounts of data, in order to promote business growth and product innovation by centralizing, consolidating and sharing big data; (2) enhancing customized services with a customer-centered mindset; (3) fine-tuning and improving management; (4) boosting precision marketing; (5) improving risk monitoring, and making risk control faster, more proactive and more systematic.

Tips Data Mining Models in Financial Institutions

1. **The Customer Segmentation Model in the Banking and Insurance Sectors**

Banks have many customers but limited resources; this explains why banks will devote high-quality resources to their core customers, and the key to this is customer classification. In Fig. 1.3, the vertical axis represents customers' contribution to credit card business, and, based on the money they spend with credit cards, customers are classified into 5 categories. The horizontal axis represents non-credit-card contributions, such as from wealth management, deposits, insurances, funds and loans. Customers are also classified into 5 categories along the horizontal axis. Obviously, if the scores on both axes are negative, it indicates that the customer's rating is low, while the high scores on both axes indicate the customer has the highest rating, namely, category A. There are four sideways L-shaped areas and a square with Level 1, 2, 3, 4, and 5 customers. Top customers represent only 0.9 %, but there is an exception—a customer group shown in a circle has made no contribution to card business; members in this group can be reclassified as Level 2 customers. This classification scheme serves the purposes of customer retention through personalized services. If you are a top customer, the bank will offer you the best service. If you are not in the top category, however, the bank will not give you the same treatment. Of course, this customer classification requires cooperation among business units and a platform for information sharing.

* Data as an example only			Bank-wide contribution (except for credit cards)					
			Negative	Low	Medium	High	Extra high	Total
Credit card contribution (CLPM)	Negative	< ¥0	0.8%	5.4%	5%	4.3%	1.3%	16.8%
	Low	¥0 ~ 100	2.6%	15%	19.7%	16.8	4.3%	58.4%
	Medium	¥100 ~ 300	0.3%	2.5%	5.4%	6.1%	2.2%	16.4%
	High	¥300 ~ 1,000	0.1%	0.4%	1.4%	3%	1.3%	6.2%
	Extra high	> ¥1,000	0%	0.1%	0.3%	0.9%	0.9%	2.2%
	Total		3.8%	23.4%	31.8%	31.1%	10%	100%

Level 5 customers Level 4 customers Level 3 customers Level 2 customers Level 1 customers

The bank is required to maintain and increase bank-wide revenue;
The bank needs to provide customers with differentiated services based on the bank-wide business relationships (not just the credit cards). Such a tool can help the business department draw up a specific customer management strategy.

Fig. 1.3 Diagram of customer segmentation model in the banking and insurance sectors. *Source* Shanghai Institute of Digitalization and Internet Finance

2. **Sales and Marketing Model in the Banking and Insurance Sectors**

Imagine a bank offers Products A, B, C, and D, whose prices are shown in Fig. 1.4. On the basis of the consumer's consumption/operating behavior in the database, the bank evaluates the purchase intention of Customer A and Customer B with respect to the four different products. By multiplying the product price and purchase intention, the bank is able to recommend the product with the highest possible value for Customer A and Customer B respectively. According to Fig. 1.4, the bank needs to market Product A (2.5 yuan) to Customer A and Product B (3.6 yuan) to Customer B. This is so-called precision marketing.

Customer A:

Product No.	Product Price	Product Price Purchase Intention	Product Value	Product Recommendation
A	¥10	25%	¥2.5	✓
B	¥12	10%	¥1.2	
C	¥3	15%	¥0.45	
D	¥5	30%	¥1.5	

Customer B:

Product No.	Product Price	Product Price Purchase Intention	Product Value	Product Recommendation
A	¥10	10%	¥1	
B	¥12	30%	¥3.6	✓
C	¥3	80%	¥2.4	
D	¥5	50%	¥2.5	

* Data given as an example only

Fig. 1.4 Diagram of Precision marketing model in the banking and insurance sectors

3. **The Customer Attrition Model in the Banking and Insurance Sectors**

As shown in Fig. 1.5, the dotted line represents the sequencing group.

The sequencing of customers is based on the expected probability of attrition. It is most likely that customers will be lost from group 1, 2, and 3, while customer stability is greatest in group 8, 9, and 10. Using statistics based on one year of observation in the figure on the left side, we can see that sequencing group 1 accounts for 38 % of attrition and sequencing group 2 for 23 %. Customer attribution declines with each group, and the last group has almost no customer loss. The diagram on the right side shows that the accumulated attribution for the first three and first five groups makes up 76 and 92 % respectively. As a result, it only takes efforts targeting 50 % of groups to address 92 % of customer loss.

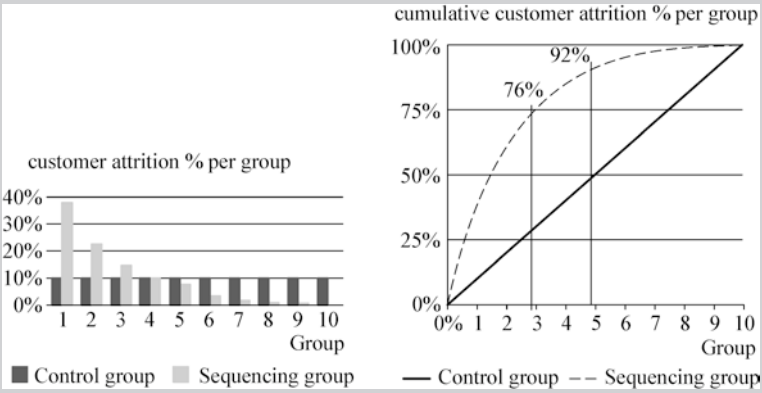

Fig. 1.5 Customer attrition model in the banking and insurance sectors. *Source* Shanghai Institute of Digitalization and Internet Finance

4. **Potential Customer Acquisition Model in the Insurance Sector**

An insurance company markets its insurance products through offering free insurance products. Similar to the previous model, customers fall into ten categories, and customers who are calculated to have a high purchasing probability based on the forecast are ranked first (see the left vertical axis). This reveals that the top 3 customer groups account for 70.5 % of total insurance purchases (see the right vertical axis). As a result, it only takes 1/3 of the efforts to successfully convert over 70 % of potential customers into real ones (Fig. 1.6).

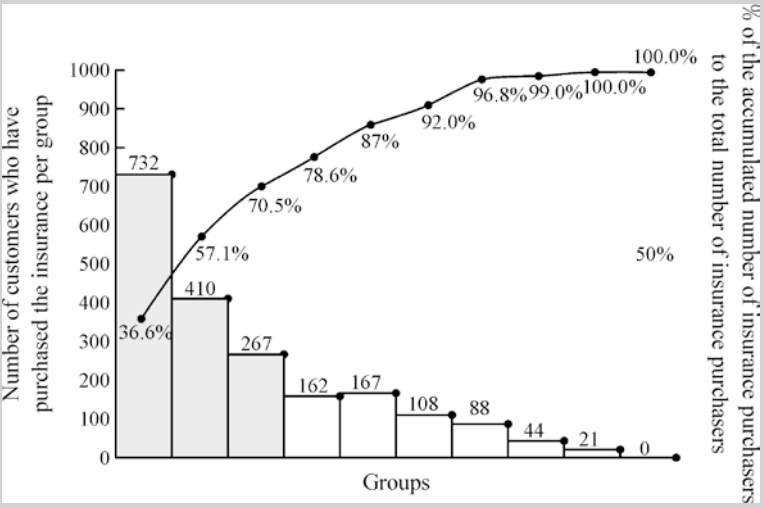

Fig. 1.6 Diagram of the potential customer acquisition model in the insurance sector. *Source* Shanghai Institute of Digitalization and Internet Finance

1.3.2 Big Data Application in the Pharmaceutical Industry

Traditional antitumor pharmaceutical treatments are used in chemotherapy regimens according to the tumor's location. However, because tumor formation is caused by gene mutation and because the location gene mutation occurs on a random basis, different individuals may develop different types of mutations. Patients can face varying clinical, toxic or side effects from the same dose and therapeutic regimen. That is the primary reason why the efficiency of traditional antitumor drugs is less than 30 %.

Since the 2003 human genome mapping project was completed, we have gained a deeper understanding of gene expression. "Pharmacogenomics", which connects gene expression with drug efficacy, have drawn attention from the public. Research fellows have started to analyze the possibility of selecting different pharmaceutical treatments based on the different disease-causing genes for each patient, so as to achieve a "customized treatment" program.

For customized treatment of tumors, it is necessary to zero in on the specific disease genes through genetic sequencing so as to restrain expression of the problematic gene with medicine. But it is difficult to match medicines with genes due to the volume of data. There are 23 pairs of chromosomes in the somatic cell of human, and each chromosome has a certain amount of genes linearly sequenced. According to the initial analysis of human genomes by scientists worldwide, there are 30,000 to 35,000 genes in the human body. Assuming there are 30,000 genes in human body, if every two genes were paired, there would be 450 million combinations; if every three genes were grouped, there would be 12 trillion combinations. Therefore, the challenge of finding the "gene-disease relation" ends up similar to that of finding the switch in an extremely complicated circuit diagram. As a result, the identification of tumor markers usually takes years of study and requires a huge investment. The first genomic sequencing in human history took 3 billion dollars over ten years across six countries. Although a US life science company had invented and launched a new-generation sequenator by the end of 2005, the cost of genomic sequencing for each individual was reduced only to several million yuan.

Take antitumor drugs for example: through analysis of human genes, researchers have found that every tumor patient has 23,000 genes, but as the external environment changes, the number of variants reaches as many as 100,000. As long as the patient's sample has ten genes that are sensitive to a certain drug, we can confirm the drug is suitable for that person. In C_n^m, the value of m is put at 10,000 and the value of n is 10; C_n^m is equal to 10^{43}.

Things will make more sense if we make a simple comparison between data mining and traditional calculation models. In the traditional model (without the assistance of accurate data mining models), if 10,000 super computers were used to calculate all the possible gene combinations of 1000 patients, it would take half a year, or 26 weeks, to complete the project. But if accurate data mining models were used, the same project would take one week. The efficiency would be 26 times greater! At present, a company named 3D Biopharm is engaged in such

study. Its core competence lies in using an accurate mining model to transform the analysis process into simple, problem-oriented solutions. The results are only 1 KB in size. The company is currently raising funds in the US and may become a pioneer in the application of big data to China's biopharmaceutical industry (as shown in Fig. 1.7).

1.3.3 Alibaba's Secret to Success: Big Data

It is big data that gives Alibaba its dominance in the business world.

The ten-year history of Alibaba's building "*big data*". As you can see from Fig. 1.8, Alibaba began collecting data via Chengxintong in 2002 and via Taobao and Alipay in 2003. Alibaba then developed Chengxintong index and designed business loan products based on the application of big data.

According to Alibaba group, as of 2014, the server at Alibaba Data Platform Division had accumulated more than 100 PB of processed data, around 104 million GB, the equivalent of 58 billion books or 40,000 Seattle Central Library collections. Every day, Taobao and Tmall continue to produce plenty of diverse data, including data on monetary transactions, finance, SNS (Social Networking Services, or online application services that help people establish social networks), and map tools, life services and so on. To some extent Taobao and Tmall are breaking down the barriers between individuals, goods, transaction behaviors and banks, and are becoming the important cornerstone for Alibaba to build its data platform and products.

Moreover, Alibaba has a complete ecological chain of big data applications, which can handle everything from data production and processing to applications within the group. The wide coverage and constant accumulation of data, along with strong data mining capabilities, make it easy for Alibaba to build detailed personal profiles and make precise behavior forecasts for customers, maximizing the value of data.

In February 2014, Jack Ma claimed in an email to Alibaba's employees that the IT era that started from control is now moving toward the DT (data technology) era, which aims to activate the forces of production. According to Ma, Alibaba's objective in the upcoming ten years is to build the infrastructure for Chinese business development in the DT era, namely "Cloud + Big Data". In his eyes, the big data strategy of Alibaba is "not just a technological upgrade, but a great change in ideology".

AliFinance provides small loans using big data. Alibaba established microloan companies in Zhejiang and Chongqing in 2010 and 2011 respectively. For most banks and microloan companies, the cost of data review, business management and risk control is similar to that for small-and-micro businesses and large companies. But meager yields make it difficult for small-and-micro businesses to receive bank loans. How is Alibaba able to provide small loan services? Big data! This data comes from nine sources: (1) sales data from the sellers; (2) authentication

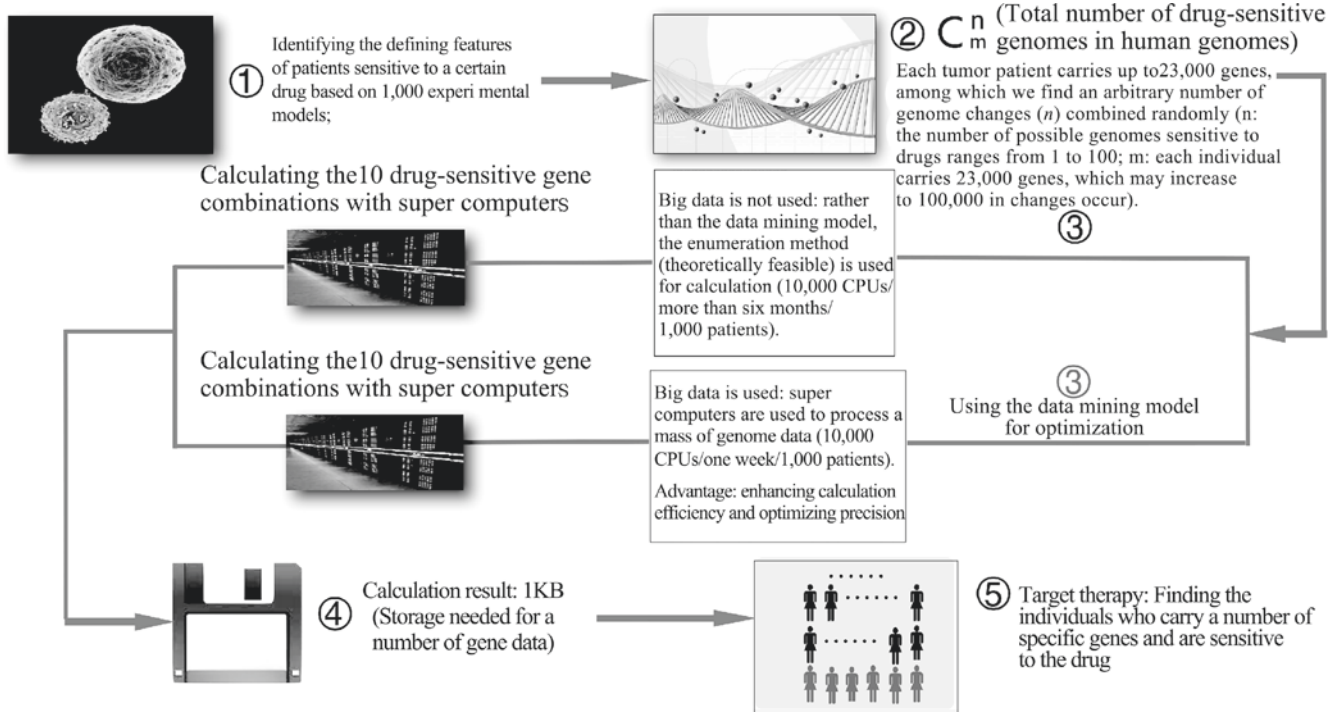

Fig. 1.7 Efficient and precise services based on big data during drug development for targeted therapy. *Source* 3D Biopharm. *Notes 1* Big data must be used so healthcare professionals can find individuals who carry a number of specific genes and administer the drug to them so as to enhance clinical efficacy; *2* If designated by the FDA as a breakthrough therapy, the drug with higher efficacy will see a shorter approval process, a higher success rate in development, and a longer patent; *3* Presently, the majority of calculations by supercomputers worldwide target drug research and development

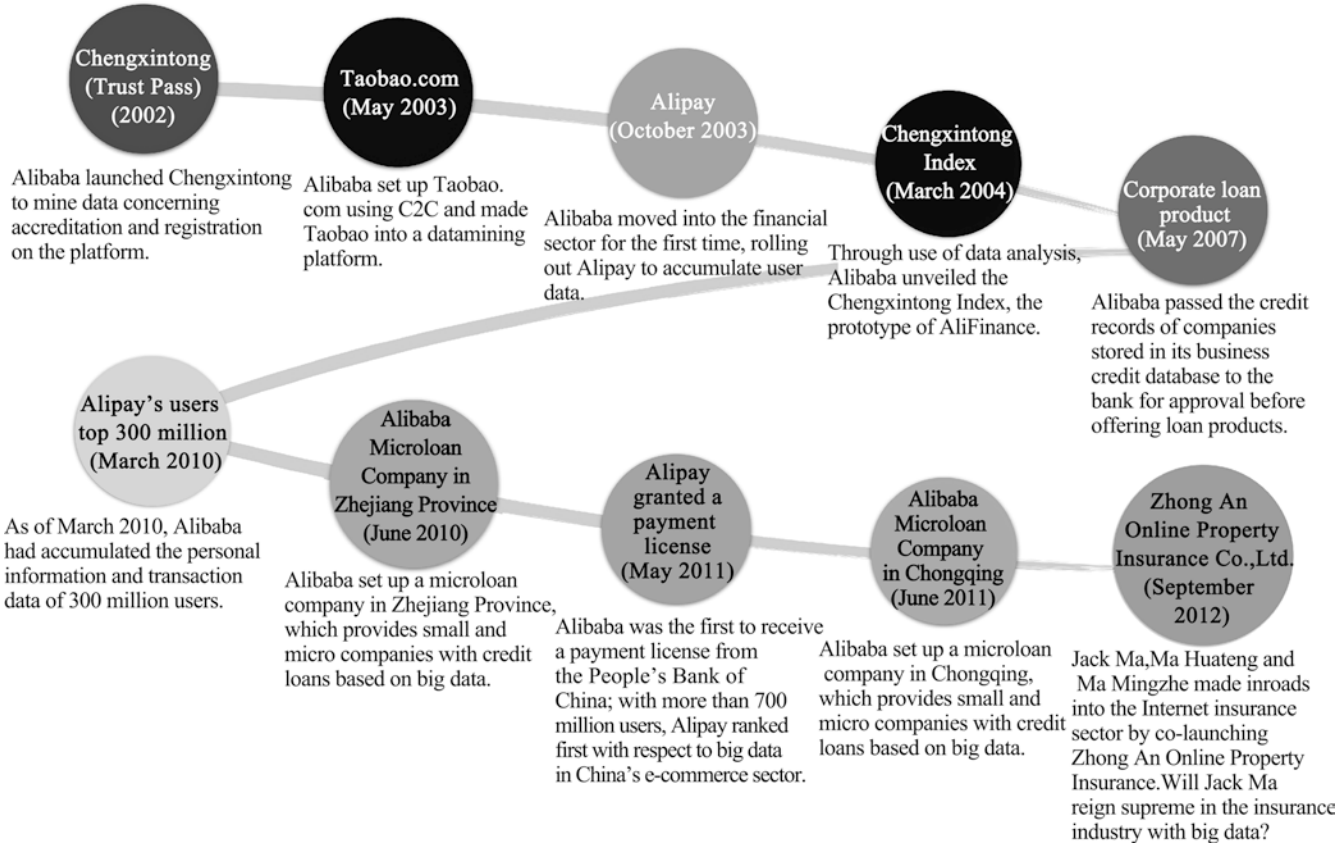

Fig. 1.8 Drivers of Alibaba's advancements from 2003 to 2013. *Source* Shanghai Institute of Digitalization and Internet Finance

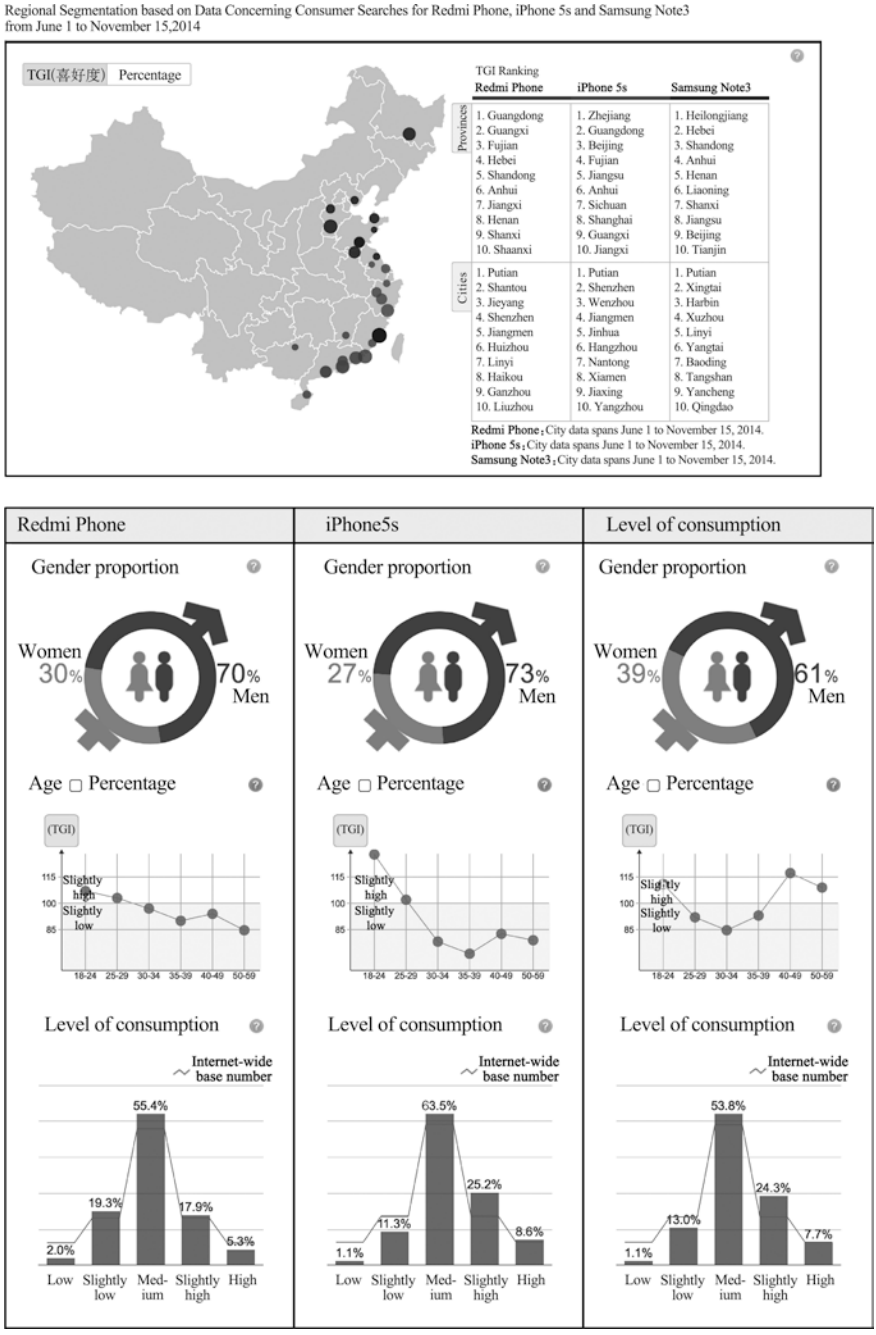

Fig. 1.9 Example of Taobao index inquiry. *Source* Taobao Index

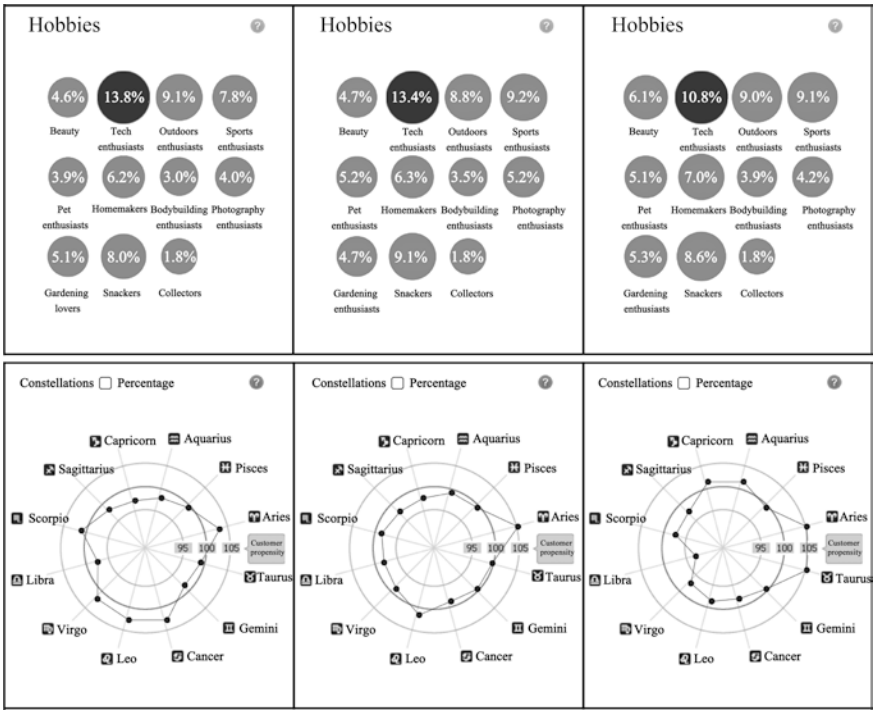

Fig. 1.9 (continued)

and registration information from the platform; (3) psychological test results; (4) credit rating; (5) historical transaction records; (6) marital status; (7) import and export information from customs; (8) customer interaction behavior; (9) utility bill payments. In addition, Alibaba's microcredit bears three hallmarks: daily interest calculation, online payment, and no collateral requirements. It is big data that enables AliFinance to issue loans without requiring collateral. According to the China e-Commerce Research Center, Alibaba's microcredit service has entered a period of rapid growth since 2013, with new loans increased close to 100 billion yuan. As of February 2014, Alibaba's micro-credit service had offered loans worth a total of 170 billion yuan to more than 700,000 small-and-micro businesses, with a default rate of less than 1 %.

Terrific Taobao Index. The Taobao index is a platform for Chinese consumer data research. Taobao sellers, media practitioners, and market researchers can all use the Taobao index to figure out the most popular searches on Taobao, get transaction trends, position their products and find target consumer groups, and think about market segmentation. Alibaba has dominated the market with big data, helping other companies reap market shares with Taobao Index (as shown in Fig. 1.9). Let us draw a comparison among MiPhone, iPhone 5s, and Samsung. The Taobao Index can offer us a glimpse of data concerning these three cell phones in the past

7 days, the past 30 days, or another specific period of time. The comparison of the search index and transaction index can help us understand the overall online sales trends; the sales rankings by provinces and cities can give us an insight into geographic segmentation and positioning of these cell phones. The Taobao Index can even provide us with more information about the buyers, such as their constellations, hobbies, genders, age, levels of buyer, and levels of consumption. These pieces of information are quite useful, as suppliers can determine which kind of goods should be provided in the next phases and sellers can know how to target segmented customers more precisely. But, can you imagine? Such a valuable index is completely free of charge!

1.4 Entrepreneurs: How Far Away Are You from Big Data?

The media are popularizing big data at a large scale and it seems the buzz has brought big data closer to industry overnight. However, numerous enterprises still lack confidence in using big data: Sometimes they can't find the breakthrough point that would let them combine big data with their business, or struggle with data collection and analysis, or face a shortage of talent in data mining, etc. Based on the above problems, entrepreneurs should focus on the following points.

1.4.1 Will Big Data Support Cross-Sector Innovation?

Netflix specialized in the online DVD rental business, which accumulated a large amount of data on DVD rentals and consumption insights. In 2013, Netflix set about making a transition by releasing the TV series *House of Cards*, which took the world by storm and was likened to the popular show *Empresses in the Palace*. Let's probe into how big data have contributed to its success. In early 2013, by analyzing the playing records of over 30 million users, Netflix predicted that *House of Cards* would be a hit. Not surprisingly, the series made over 48 million dollars in the first month of release. Netflix did not stop there. It was not possible to neglect the vast amount of data on hand, and after the first season, the director analyzed the preferences and demands of users according to the data to improve the plot of the series, achieving resounding success in the subsequent seasons.

The success of Netflix teaches us that the successful application of big data requires not only technology, but also a deep understanding of users in that industry. This insight is the key to big data's success. As a product of the information era, big data is no longer just a concept—like air, it surrounds around us, and every one of us is a producer of data. Because all of us produce data through different devices, we see an expansion in the quantity of data. However, the simple

increase in "quantity" has greatly challenged enterprises' ability to understand the demands of each user: How should they understand different demands of the user in different situations? How can they better understand the generated value after data integration?

To put it simply, in order to successfully realize cross-industry transformation, companies have to understand their future business, understand the core of the industry they will be engaged in, analyze user data and implement trans-enterprise and cross industry data exchange and integration, restore the user's real demands and then make full use of big data, so as to ensure old users can get more convenient services in new situations and promote new products more effectively among potential users. In this way, the data will be useful to users and it will be possible for enterprises to successfully realize cross-industry innovation.

1.4.2 How Should Small Companies Embrace Big Data?

One of the existing problems in big data application is the mismatch between data users and owners. In other words, the entity that demands data most does not own the data needed, while the entity that owns the data is unable to extract value from it. There are obstacles to exchanging data in the areas of data security, value evaluation etc. For small and middle-sized enterprises, this problem is particularly prominent.

Baidu Recommendation is a tool that recommends network content for users based on Baidu's big data technology. The tool aims to improve click thru rate and website traffic by recommending individualized content to different website visitors. Generally, through the mining and analysis of mass media on Baidu, one can get an accurate portrait of site visitors. On one book-oriented website, for example, Baidu's data once showed that 88 % of readers on the website were young people between 10 and 29 years old. They enjoyed online games like "League of Legends", "Cross Fire" and "Dungeon & Fighter", and tended to be fans of online shopping.

Some new websites have begun to analyze the nature and hobbies of network users with Baidu data to optimize the content and operations, shorten the "content-user" distance, improve the user experience, and expand or trigger user demand, so as to improve website traffic and commercial value. They will also use Baidu's big data to help websites find more paying users, and determine and balance strategy regarding free versus paying users through effective data analysis. It has been shown in the data that after some reading websites (e.g., catering to romance novel readers) installed Baidu's specialized novel recommendation tool, website traffic increased by 11.9 % and the average number of pages per user visit improved by 17.8 %.

For small-and-medium-sized enterprises which are incapable of platform deployment and data collection, this case offers great insight. They can leverage data offered by governmental, social network and other third party platforms to analyze various business models quickly, reduce dependency on big data and

complicated models, and verify and select effective models based on feedback. Using big data with simple models is more effective than using small/partial data and complicated models.

1.4.3 You Have the Technology, but Do You Have the Talent?

In the future, big data application will pervade all aspects of company operations, including the supply chain, production, logistics, inventory, and website or store operation. To successfully apply data, companies must find talents, professionals who truly understand how to manage data, establish analysis systems and interpret data. Big data talent will be few and far between.

EMC Company, an American company and the leader in cloud computing, big data and security IT solutions, has confirmed this by recent survey of data scientists. 83 % of those surveyed thought that the growth of new technologies will stimulate enterprise demand for data scientists; 64 % believed that the current supply of talent is inadequate for enterprise demand. McKinsey Global Institute released a report in 2012 and predicted that by 2018, America alone would need 140,000–190,000 experienced professionals in "deep analysis" and at least 1.5 million administrators who have knowledge in using the necessary tools to analyze big data and make reason-based decisions.

The big data era demands more talented experts, but it also challenges the talent structure of big data. Take data mining professionals as an example—they can be divided into three basic groups that are stacked in an inverted triangle: the first group includes software engineers or IT technicians; the second group is made up of academic researchers, mainly scholars and professors in universities, who specialize in mathematical modeling and are proficient in algorithmic models; the third group is made up of analysts, generally people with rich experience in and good knowledge of IT technology and mathematical methodologies. They also know how to transform the actual business issues into mathematical problems that can be solved easily (as shown in Fig. 1.10).

Technical experts must complete the implementation of a big data plan, so their expertise directly decides the depth and scope of big data projects in enterprises. Experts who are proficient in developing market applications and distributed storage are needed for the application and development of traditional databases. In other words, software engineers and academic researchers in Fig. 1.10 are indispensable.

More importantly, as there is no single big data solution for all industries, the use of big data must be tailored to each industry so that it can provide one-stop service for the user's needs by synthesizing storage, analysis, mining and other emerging technologies. Big data has traits that vary by industry, so "analysts" who know both the industry and all aspects of technology are hard to find today.

Therefore, enterprises first need to establish a definite strategic direction and understand what support for big data is required before they start looking for big

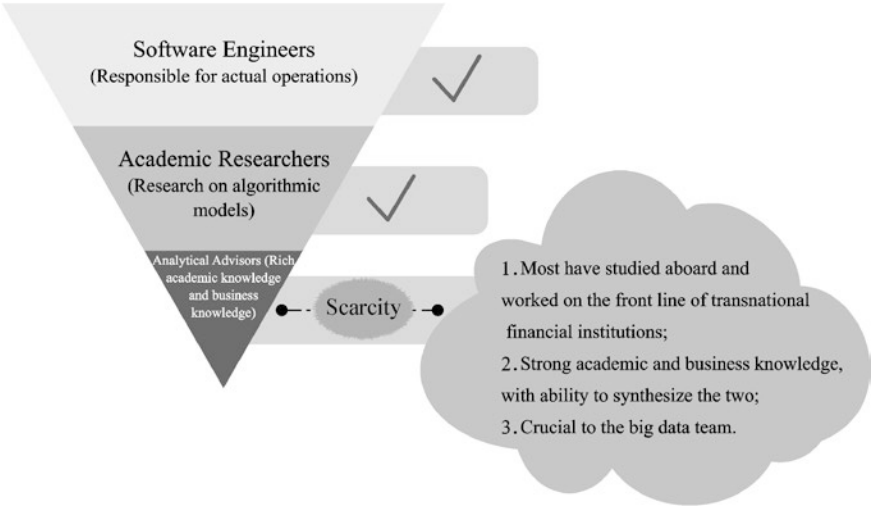

Fig. 1.10 Structure of big data talent. *Source* Shanghai Institute of Digitalization and Internet Finance

data experts. In enterprises that specialize in financial services, for example, talents who understand the financial industry and application platforms of big data like Hadoop/MapReduce are required. In addition, enterprises must choose a solution that combines employee training, recruitment and business outsourcing based on their specific talent demands to fill the gap.

1.4.4 Structural or Non-structural Data?

At present, 20 % big data in China is structural data (such as numbers or symbols that can be used in logical expressions with a two-dimensional structure) that can be used in statistics easily, 80 % of big data is nonstructural data (documents, reports, pictures, audio/video information in different formats). For example, there is over 360 TB of structural data in the database of ICBC, versus 59 PB of nonstructural data, 200 times more than the former.

As it is difficult to process non-structural data, most companies choose to analyze structural data only, neglecting the nonstructural data on which they have spent lavishly for storage. The basic idea underlying nonstructural data applications is "structuralization". Taking document process as an example, the system can capture and analyze consumers' (positive or negative) comments on the Internet and even predict the user behaviors. In the area of image recognition, if you use "Google Brain" to view 1000 pictures of cats, the general character of cats will be recognized and remembered, making them easier to identify. Similarly, this kind of image recognition technology has been used in satellite image recognition.

Table 1.2 Common Structured Methods

Type	Common structured method
File 	Inverted index, key information, field analysis, word frequency analysis, lexical analysis…
Pictures 	Image recognition, image matching….. (e.g., plate number, human face, shape…)
Audio 	Voice recognition, audio conversion…
Video 	Picture recognition: shape, color, subtitle… Audio recognition: text-to-speech, audio recognition…

Source Shanghai Institute of Digitalization and Internet Finance

And for audio and video files, the big data era is featured not only with digitalization but also with structuralization (Table 1.2).

Companies with an effective big data strategy will be able to collect, analyze and integrate nonstructural data from social media, weblogs and audiovisuals. By structuralizing these data on a real-time basis and interacting with users, companies will benefit greatly from big data.

1.5 Conclusion

As mentioned in the preface to *Big Data: A Revolution That Will Transform How We Live, Work, and Think*, big data is ushering in a new age. Just as the telescopes has enabled us to understand the greater universe and the microscope made it possible for us to observe microscopic life, big data is changing our life and how we view the world, and it is spurring new inventions and services. More changes are bound to come, and big data will be critical in achieving business success.

Chapter 2
Cloud Computing—From Offline Computing to Cloud Computing

We do not care where the information goes… Cloud has reduced complexity for us.

—Kevin Marks, Social Media Expert at Google

We will be surrounded by 'Cloud Computing' in the future… What you really need is 'access' to Internet without actually owning it… What you have purchased is access rather than ownership.

—Kevin Kelly

Do you remember the movie Charlie and The Chocolate Factory?

In the movie, there was a flying machine that could move chocolate beans to each workshop to make chocolates; there were well-trained squirrels that could remove nutshells and throw bad nuts into the bin; there was also a delivery machine, which transferred chocolates directly to the TV screens of each household so that people could grab them by hand.

Fairy tales exist in a fantastic world, but technologies can turn that world into reality.

As Ruimin Zhang, CEO of Haier Group, said, "Now is the best of times as long as we can innovate; otherwise, it is the worst of times." As cloud computing changes our lives through social media, mobile Internet and the Internet of Things, there are people who predict a revolution in the workplace, corporate management and operations.

In September 2009 as Alibaba celebrated its 10th anniversary, the company announced the establishment of a new subsidiary, "Ali Cloud", that would focus on research and development related to cloud computing (Table 2.1).

In August 2011, Tencent announced the establishment of the East China "Cloud Computing" Center and e-Commerce Foundation. By the end of 2013, cloud computing had officially become a business unit in Tencent. Top management hoped to promote "Tencent Cloud" through Tencent's social networks and its well-developed open platform.

X. Zhu et al., *Business Trends in the Digital Era*, DOI 10.1007/978-981-10-1079-8_2

Table 2.1 BAT's involvement in the cloud computing sector

	Basic cloud	Capacity cloud	Resource cloud	Program cloud	Individual cloud	Notes
Baidu cloud	Baidu engine BAE (WEB + App), storage (high volume, CDN, large files), data pool (Relationship oriented, distribution oriented, KV). Similar to Google's application engine, Baidu Cloud conducts data repackaging on its base infrastructure and integrates high-volume-storage, big-data-processing and distributed-computing capabilities	Provides mobile developers with 14 different functions, most of which are owned exclusively by Baidu. These functions include cloud data, cloud push, LBS, multimedia (voice, face, and video), cloud crowdtesting, cloud test engine, mobile testing, end matching, translation, input, browser SDK, social modules, personal cloud storage (PCS)	Baidu has opened its traffic access capacity, user traffic base, embedded maps, POI data and user search data. Resource Cloud includes Baidu Mobile SEO, Mobile Search Alliance, Maps, Account Link and Mobile Statistics tools	Enables developers to create applications rapidly and at a low cost. Includes Frontia End Developing Framework, Clouda Development Framework, Site App Application Cloud, App Builder Light Application Cloud, Ueditor Webpage Editor and some other front-end open-source products	Still in early phase. Includes cloud storage, contact list, photo album, articles, notebook, text messages, find-my-phone, games, and health tools	Once 91 Wireless is fully integrated, capacity cloud and resource cloud services will be improved

(continued)

Table 2.1 (continued)

	Basic cloud	Capacity cloud	Resource cloud	Program cloud	Individual cloud	Notes
Alibaba Cloud	Provides virtual server services similar to Amazon's, akin to the offerings of traditional servers. Key advantages include data storage, parallel computing and security. Includes cloud server, Load Balance, Storage (relationship-oriented database, open storage, open structural storage, open cache, offline data processing and CDN) and Cloud Engine ACE (undergoing internal testing)	Cloud Security Network (Cloud Shield and Testing) includes domain registration, record maintenance, and company website creation. Cloud market: Alibaba attracts customers capable of providing cloud services, which cover operations, rendering, site creation (online stores, group purchase and social media), and app store (applications sold to developers, such as for data analysis, cloud storage, marketing and promotion, company management and office software). Instead of demonstrating its capabilities through the cloud, Alibaba has expanded Taobao's thinking to cloud services, with a view to "establishing a leading platform of data sharing"	Currently there are not many services derived from Alibaba users, traffic and data processing. Customers of Taobao have not been included in the Alibaba Cloud system. Parties acquired by Alibaba have strong application capabilities and abundant developer data, but they have not been integrated, according to Alibaba's website	Alibaba has acquired the Phpwind Community Framework, Dubbo Development Services Framework, LVS Load Balance, and Data Pool Connecting Pool Druid. As an activist in China's open-source community, Alibaba has taken the traditional approach to open-source software operations, which has not yet been included into Alibaba Could system	Includes browser bookmarks, contacts, photo albums, information, voice messages and notes. Amid competition with Android, Cloud OS is more low-key, and temporarily on hold with a small market share	From a product perspective, the network integration with Alibaba Cloud is close to completion. Progress in integrating data from its allies is unknown

(continued)

Table 2.1 (continued)

	Basic cloud	Capacity cloud	Resource cloud	Program cloud	Individual cloud	Notes
Tencent Cloud	Includes cloud server, flexible WEB engine, load balance, and storage (relational, NOSQL, CDN), leaving much to be desired	Includes cloud security, cloud monitoring and personal cloud storage PCS	Includes social advertisement, social communication, cloud payment, QQ login, user information, friend relationship information, value-added data and Tencent Compass (data analysis). Primarily opens up user data and social relationship; expands capability in promotions/communications and in data mining	Tencent has acquired Discus Community Framework, open-source iWeibo, JET, AlloyImage and image processing	Includes micro-cloud storage, micro-cloud photo album and micro-cloud clipboard	

Source Shanghai Institute of Digitalization and Internet Finance

In March 2012, Baidu officially announced its Baidu Cloud Strategy and signaled its intent to enter the cloud computing sector, launching Baidu Cloud for personal cloud storage and Cloud Platform for developers. In September 2012, the company unveiled plans for a cloud computing center backed by more than 10 billion yuan.

What impelled the three largest Internet Operators in China (BAT: Baidu, Alibaba and Tencent) to rush into the cloud computing? And what exactly is "the cloud", and why is it so attractive?

2.1 What Is the Cloud?

As the US author Nicholas G. Carr wrote in his book The Big Switch (2008), if generators shaped the 20th century and gave us a new way of life, the Internet will be what shapes the 21st century, and the era of the personal computer will be replaced by the era of public computing.

Although Carr did not provide a clear definition of the cloud, he did sketch out the cloud as a type of public service. A century ago, farmers and factory directors switched from diesel generators to wall outlets to get electricity, provided by power plants to the public. Similarly, we are seeing a shift from traditional methods of information collection to the cloud for any type of data or solution. Companies providing cloud services are collecting data and performing calculations throughout their global networks day and night so that their customers, whether enterprises or institutions, can access cloud services from anywhere and at anytime, as easily as they obtain electricity. Amazon is a typical example of a cloud computing service provider.

Founded in 1995, Amazon has become the world's most comprehensive online retailer and the second largest Internet start-up, leading the global e-Commerce industry. In the beginning, to deal with the challenges of concurrent access[1] and intensive transactions, especially during holidays like Christmas, Amazon invested heavily in computing resources and storing systems. But the computing power of these systems, designed to handle periods of peak demand, went largely unused most of the time.[2] At first, Amazon leased the excess capacity of such resources to third-party users. Its customers were originally individual developers and programmers, later expanding to include both small and middle enterprises. With an increasing number of leasing users, Amazon established an independent subsidiary—AWS, Amazon Web Services, to manage these resources. In 2006, Amazon launched its Cloud Computing Services.

[1]The number of concurrent users refers to the number of online users interacting with the server simultaneously.

[2]In a 2006 interview, Jeff Bezos, founder and CEO of Amazon, admitted, "Only less than 10 % of our system capacity has been put to use."

Presently, Amazon provides corporate users with more than 20 types of cloud computing services and offers flexible payment methods. Many technological startups whose business have not yet or matured or who lack sufficient capital stand ready to launch their products and services on the Amazon platform through a pay-for-use model, avoiding the need to purchase the IT infrastructure and operation systems themselves. Now over hundreds of thousands of companies are using such services, including Internet streaming media provider Netflix, photo sharing website Instagram, and even NASA.

According to Businessweek, data from Pacific Crest Securities showed that the revenue of AWS in 2014 hit 5 billion dollars, up 58 % over 3.1 billion dollars in 2013. Pacific Crest Securities estimated that Amazon's cloud computing services would continue to grow healthily, bringing in revenues of 6.7 billion dollars in 2015.

Although Dell, IBM and HP, the top 3 server manufacturers, can achieve sales revenue of 2 billion dollars, 2.2 billion dollars and 2.9 billion dollars respectively every quarter from server hardware sales, more and more customers are inclined to rent a server instead of buying one outright. To this end, Amazon's 1.25 billion dollars "cloud service" business model poses a challenge to the traditional server manufacturers.

Amazon has been successful not only in so-called technology innovation driven business model innovation but also in its cloud services, which had been disregarded as an unrealistic business in the past. So what exactly is cloud computing?[3]

Normally, cloud computing is defined as a business that provide customers public IT services such as computing, storage, application, etc. As early as in 2005, Bill Gates outlined a vision for cloud computing in an internal employee memo: "The next big innovation is waiting for us… The broad and rich infrastructure that Internet owns will trigger a wave of business opportunity of providing real-time application and experiencing service, the service will be able to serve millions or billions customers' needs and will dramatically change the character and price of providing solutions to different kinds of companies." IT analysts, industry experts and business leaders increasingly believe that cloud computing represents the next phase of Internet development and will bring revolutionary innovation to the whole Internet industry.

From 2011 to 2013, cloud computing's shifting position in the Gartner curve of technology maturity proved Gates was correct and illustrated that people were taking a more rational view of cloud computing. Both these points indicate that cloud computing will develop into a period of stable and growing.

[3]As defined by the National Institute of Standards and Technology (NIST), cloud computing is a model for enabling convenient, on demand network access to a shared pool of configurable computing resources (e.g., networks, servers, storage, applications, and services) that can be rapidly provisioned and released with minimal management effort or service provider interaction.

2.2 What Is New About the Cloud?

The key to cloud computing is the business model. We should not think about cloud computing just as a new technology but also as a new IT service business model. The biggest innovation of cloud computing lies in making computing capability a service and offering it to customers. There are three key ideas here: it is available through the Internet; offers a distributable resource pool; and is requirements based. Cloud computing is a kind of Internet based IT service based on a new supply, usage and delivery model, through which cloud computing surpasses traditional services in terms of cost, cycle of development and implementation, ease of access, scalability of functions, and flexibility.

Cloud computing demonstrates the value of economies of scale. Through Cloud computing, all users can share computing, storage and application services at a low cost. This coincides with the equation Samuel Insull, the creator of the electric grid, subscribed to: a greater scale means a high level of energy and lower unit price. As mentioned above, the transition from traditional IT service to cloud computing is similar to that from a single generator to a large power plant. In this way, it follows the idea seen elsewhere on the Internet of "use only when needed", lowering costs. It also lowers the barrier for individuals or companies to apply other Internet related technologies and offers more functions and services to the entire Internet ecosystem, expanding the breadth and depth of online service.

Cloud computing means a breakthrough in integrated and high efficiency mass data and information analysis capabilities. Cloud computing and big data can be compared to Siamese twins. For example, all mobile terminals, partners and users' personal information need to be collected, stored and processed by the cloud. If we want to analyze big data, we must have an open cloud that holds the data. The capabilities of cloud computing provide not only a technical method of handling an information explosion or flood, but also a method of accelerating future development through big data mining, mobile Internet and the Internet of Things.[4] For example, in the Internet of Things, the exchange of information not only takes place between people, but also between things. This may take the form of massive amounts of data that are transmitted and saved, or (milli)seconds-long computations on this data. This mass of information will require technical support from cloud computing. And in the mobile Internet industry, no matter how fast smartphones develop, small CPUs are necessary to them to remain light and handy. Application programs need an increasing amount of resources, and the use of these programs will rely on the immense storage and computing capability of the cloud.

[4]The Internet of Things refers to a network in which objects are connected to the Internet according to agree upon protocols and using information sensing technologies (e.g., RFID devices, infrared remote sensors, GPS tools and laser scanners). These technologies help the objects engage in information exchange and communication for the purposes of smart identification, positioning, tracking, monitoring and management in the network. The Internet of Things is in essence a manifestation and an extension of the Internet.

Table 2.2 "Cloud computing" versus Traditional service model

	Traditional service model	Cloud computing
Cost	Exorbitant expenses from hardware and software purchases, operations and maintenance, and higher IT staff costs	Lower cost due to sharing of a centralized resource pool
Cycle of development and implementation	Longer development cycle makes rapid implementation impossible	Automated and with self-service
Ease of access	Within the company	Anywhere with internet access
Scalability of functions	Long wait for patches and upgrades from software companies	Short cycle; new functions can be made online in real-time, and connected with mobile phones and other devices
Flexibility	Built to meet peak demand; lower resource utilization on average; weaker ability to address unexpected business changes	Pay based on time and traffic requirements; dynamic adjustment; lower scale in case of lower needs
Similar examples	Purchasing electricity generators for self use	Consuming electricity from the power grid

Source Shanghai Institute of Digitalization and Internet Finance

Cloud computing will increase speed of innovation in all of society. Having lowered the cost of starting a new venture, it allows startups and innovative companies to focus on their main business, helping them differentiate themselves from and compete with others. In addition, it becomes easier for these companies to expand their business to a global level in a short timeframe. Cloud-based tools for developers have accelerated the growth of technology not only by making it easier for new startups to pursue technology innovation, but also by letting large companies start an innovation project as quickly as a new startup company. Since these projects will not be restricted by initial investment forecasts, the innovative capacity of the whole ecosystem improves.

Higher efficiency, lower cost and more valuable resources are the internal forces driving the booming development of cloud computing, while the low cost of broadband Internet service and high power computer chips are the external ones. Cloud computing is gaining attention globally because of its dynamic resource allocation, customized service to need approach, and unique low-cost mass information processing (Table 2.2).

2.3 The DNA of Cloud Service

Now we will examine cloud computing from the cloud service provider's point of view. As mentioned above, the key innovation of cloud computing is transforming computing capability into a service delivered to customers. There are three kinds of service models or "cloud types" in cloud computing: SaaS (Software as a service),

IaaS (Infrastructure as a service), PaaS (Platform as a service). All Internet based, these three services work through thin[5] to complete processing tasks that would otherwise eat into large amounts of storage and computing resources.

The cloud computing industry has just gotten its start and faces a bright future. IaaS, SaaS, PaaS will enjoy a broad market. There will be a variety of models for cloud services, and IaaS, SaaS, and PaaS will be interconnected. Regardless of the service model, the heart is service. Although technical barriers to cloud service are extremely high, technologies cannot solve all service problems. The cloud service provider should have not only strength in R&D and years of experiences in building and operating the data center, but also a service-oriented mentality. All service offerings and technological innovations should focus not only on the human machine interface and connection, but also on customer need, service delivery, and service experience. The supplier that can build a broader ecosystem and a better customer experience will have the greatest bargaining power. This principle also applies to cloud service providers.

Tips SaaS, PaaS and IaaS

SaaS: Software as a Service

SaaS is a method of processing software programs that originally were installed locally on the user's machine but are now being relocated to the cloud. SaaS programs are services distributed to millions of users through the Internet using a multitenant framework. Users can order according to their needs, and payment is decided by the level of service and amount of time needed. Users do not need to perform maintenance on the software.

CRM (Customer Relation Management) was the first type of software to realize this type of online application. Salesforce is a company that provides CRM to companies through a wholly cloud computing service—SaaS. Its slogan is "The End of Software", so it is called the Terminator of Software. In the past, companies are afraid when sales people resigned, because once they did, all their customer information and records would be lost. But once Salesforce moved CRM to the cloud, the sales division could review communication with customers directly and, even while traveling, view all sorts of customer information easily. Customer management executives could check how many phone calls each salesperson made and how many customer interactions there were, then decide whether resource allocation matched up with

[5]A thin client refers to a computer terminal that doesn't need an application in the client-server network system. Thin clients use some protocols and servers for communications and connect with the LAN. Thin clients transmit the input from devices like the mouse and keyboard to the server, which sends the processing results back to the client. Different clients can log on to the same server simultaneously and work independently. Ordinary clients, on the other hand, try to process local data as much as possible and transmit only necessary data when communicating with the server or other clients.

income structure, and modify resource allocation as needed for greater efficiency. Through this online-based CRM business structure, customers do not need to purchase, install or test the equipment and software. They need only log in and start to use the service, significantly lowering IT expenses.

In the beginning, Salesforce's customers were mainly small companies, but later Sun Trust, Dow Jones, Siemens, Starbucks and Dell, all signed contracts with Salesforce, making it the leader in global CRM solutions. At of the end of 2012, Salesforce had 14 % market shares. According to its 2013 Annual Report, Salesforce pulled in 3 billion dollars in revenue, with 5.3 billion dollars in orders and 250 billion data center transactions. The Enterprise Cloud Computing brought in 2.8 billion dollars in revenues. In Q3 2013, Salesforce became the first cloud computing company to generate 1 billion dollars revenue in a single quarter.

Since then, software as a service quickly increased in popularity and reach. New companies were constantly applying this new model in various types of business applications, such as ERP (Enterprise Resource Planning), SCM (Supply Chain Management), and EHR (Enterprise Human Resources). Arguably, almost all traditional business applications can be delivered using a SaaS model. Built upon the resources provided by the infrastructure layer and the environment provided by the platform layer, the collection of these applications on the cloud was delivered to users through the Internet and formed the application layer of cloud computing.

PaaS: Platform as a Service

PaaS can be regarded as an extension of SaaS. This form of cloud computing provides users with a software development, execution, management and monitoring environment, allowing these universal and reusable software resources to be delivered from the providers' servers to users online. This enables users to create their own applications and run them on the providers' infrastructure. To the users, the advantage of this model is that the advanced APIs (Application Programming Interface) of the platforms are easy to use and that development, testing and execution are all based on the same platform. As a result, open resources can be fully utilized to develop customized applications. Moreover, thanks to a powerful and stable basic operation platform and a professional technical support team, PaaS can quicken the development of applications, become more responsive to the development capabilities of users and eventually bring substantial benefit to the users. From this perspective, we can see how the emergence of PaaS lowered the difficulty of developing SaaS and boosted its growth.

Microsoft officially launched the Windows Azure platform on Jan 1 2010. Windows Azure basically provides developers with a platform to facilitate application development. With the Azure service platform, developers can simply connect to services through the Internet, without needing to install

any development tools on their own computers. Based on their existing skills, tools and technologies, developers can use the storage, computing capability and network services from Microsoft global data center and further improve the flexibility and effectiveness of application development. Developers can also choose other development tools or technologies and create applications according to the Internet standards provided by the Azure platform. Microsoft runs and maintains these applications with its own data center. Similarly, IBM has established a cloud computing research center (RC2: Research Computing Cloud) in Zurich and India, Google has its Google AppEngine platform, etc.

Now, enterprises are increasingly paying attention to the new PaaS model.

Mentioned above, Salesforce has moved beyond online CRM service toward the infrastructure platform of a SaaS provider. It set up a software development platform, Force, in addition to an exchange platform, AppExchange. Using its programming language, Apex Code, third-party developers can develop certain add-ons (such as for human resource management and project management) and sell them through AppExchange. Third parties can benefit from this platform, and their participation also helps enrich the alternative application modules and expand the industry ecosystem, enhancing the competitiveness of Salesforce.

IaaS: Infrastructure as a Service

IaaS lets users obtain services, including virtualized computing, storage and network resources, from a robust remote infrastructure, and directly set up a platform and applications on top of the infrastructure layer. IaaS is the foundation of cloud services. Compared with PaaS and SaaS, IaaS means capital investment in large amounts and the construction of service platform at scale. Those companies that are strong in the traditional IT realm struggled while transforming to IaaS service, because unlike Internet companies, they didn't have the usage scenarios of large-scale computing and a large client base. This means that IaaS participants are those enterprises that have abundant funding or the corresponding resources, such as telecom and ecommerce companies. It is possible even for server manufacturers to enter this sector.

A typical example is the previously mentioned Amazon. According to data from Netcraft, as of May 2013, Amazon had 158,000 networked computers that provide hosting services for 11.6 million websites. EC2 charges only 15 cents per gigabyte of storage and the server rental costs 10 cents per hour. This has been launched in all 9 regions where AWS has business. Nasdaq and The New York Times are clients of Amazon's S3 service. Nasdaq stores its historical stock exchange records on Amazon's cloud computing platform. *The New York Times* stores 4 TB of news reports on Amazon's cloud computing platforms and used its cloud computing capabilities to process 11 million articles in less than 24 h at a cost of 240 dollars. This required far less time and money than if they had used their own servers.

2.4 The Cloud in Business

In your work, do you often encounter situations like the below?

Account manager Mr. Yang was on a business trip to another city when he received a phone call from the CEO in the departure lounge. Yang was told he needed to finish analyzing the financial report from the last quarter in two days. He became anxious upon hanging up the phone. He had not installed ERP software on his laptop; if he called his colleagues, it would still be impossible for them to get the complicated financial reports together in such a short while. If only the ERP system could push the financial data to his mobile phone in real time…

As the CIO of the company, Mr. Zhang was sitting in his office with a worried look on his face. The company's business was growing fast, and business processes were always being reorganized. Consequently, the ERP system needed to quickly respond and adapt to such changes. In the beginning of the year, the IT department developed a new business process, which had been in place for only three months. Now it needed further adjustment so it could be on boarded in one month. The company's IT hardware and personnel both faced bottlenecks. The scarcity of resources made it a challenge to keep up with the rapid development of the business and the variable demand. Given the limited annual IT budget, should they look for new solutions, or spend the time and money for hardware upgrading and redeployment?

Due to the friction between the company's various business needs and its huge information system, every day the company's IT engineers grappled with legacy problems from the redeployment. What countermeasures are there to these problems? The answer is cloud computing.

In recent years, enterprises have shown growing interest in cloud computing applications, particularly for cloud-based ERP. IDC forecasted that in 2014, the market size of cloud computing software would shoot up to 40.5 billion dollars, translating into an annual growth rate of 25.5 %.

2.4.1 Kingdee Helps Companies Look to the Clouds

With the rise of mobile Internet and more post-80s and post-90s people entering the society, both consumer demand and enterprise internal management are faced with new challenges. How should the relationship with consumers be rebuilt using new technologies? How should businesses respond to rapidly changing market demand? How can they improve internal operation efficiency and achieve transformation in the Internet age? The decision to disrupt traditional ERP with cloud computing, mobile Internet, and social technology as the foundation, and to adopt the "cloud + end" model in innovative ERP cloud services will become inevitable for enterprises pursuing transformation. And it appears Kingdee's K3Cloud emerged at just the right moment.

By leasing Kingdee's K3Cloud, enterprise clients no longer need to invest heavily in lots of servers. The ERP system deployed through the Internet is put to use once activated. Regardless of where they work, business and financial staff can access K3Cloud to manage the operations, including sales, purchase, inventory, outsourcing, and management of financial accounting and statements. Whenever enterprises run into any problem during use, Kingdee responds instantly, without the enterprise needing to arrange for IT personnel to maintain and update the system. To enterprises, the new cloud model is like a serviced apartment that people can move into conveniently and quickly. This greatly reduces enterprises' IT cost along with the headaches that arise from system installation, maintenance, server relocation, and damage. Staff can focus on their own work as part of the asset-light strategy. This is particularly valuable to those companies whose business and structure always change, helping them avoid the need to relocate computers and data centers when their offices move.

And once in place, K3Cloud is compatible with various types of equipment and devices. This easily satisfies enterprises' mobile demands, making ERP accessible anytime. Account managers no longer need to worry that they won't be able to address an urgent problem during a work trip, because they can deal with business easily and conveniently from their mobile phones.

2.4.2 Yonyou Seizes a Cloud Opportunity for Transition

Traditional software providers are now transforming into Internet platform providers by following the cloud trend. Yonyou group is a pioneer among them and has invested heavily in cloud computing. The company's key work is the planning and development of a cloud platform and driving a business transformation in line with its platform strategy. The core of this strategy is synthesizing Yonyou's resources (clients, applications and services) based on the new cloud computing and mobile Internet model. In the meantime, the company has fully integrated third-party resources to achieve high customer value, as well as Asia's largest and a world-leading enterprise cloud computing platform—Yonyou cloud platform.

Yonyou's cloud platform will achieve data consolidation and integration. Yonyou's platform strategy indicates that the company's existing operational model will experience a big change. All corporate clients' data will be integrated into a unified data platform, and all application systems and service will be embedded in the unified platform's service. Marketing/sales services for customers will be based on Yonyou's cloud platform.

An enterprise app store will be the core of Yonyou's cloud service platform. As an operation service platform that directly faces the end user, Yonyou's collaboration in the value chain is mainly seen in two areas: the construction of platform and operational capability. Centered on the app store, Yonyou's cloud service platform will follow the principles of partnership and mutual benefit between

platform operator and independent service developers, and will boost cloud-based application and product services, strive to develop the app store into a meaningful, profitable and reputable service brand, and achieve sound development in the platform.

2.4.3 AliCloud Propels Yu'E Bao Behind the Scenes

What is the driving force behind Yu'E Bao? The answer is AliCloud. On June 13th 2013, Alipay secretly launched its online deposit-service-like offering—Yu'E Bao. This service combines the functionality of Alipay with the sales of the Tianhong Zenglibao money fund. Its core is the sales of money funds. Though seemingly ordinary, Yu'E Bao has impressed both the business and financial world. According to the quarterly report of Tianhong Fund, as of November 14 2013, Yu'E Bao had 29 million users and had raised more than 100 billion yuan, a first hundred-billion fund in China. By March of 2014, it had raised more than 500 billion yuan in total and had become the fourth biggest money fund in the world.

Yu'E Bao, which holds more than 500 billion yuan, offers money management services to tens of millions of online customers, handles 11,000 real time transaction requests per second, settles 300 million digital transactions every 140 min and squares accounts in just 30 min, rather than 8 h for a traditional bank. How is Tianhong Fund able to handle such an astronomical number of transactions? The answer is AliCloud. Just by getting access to the cloud, Tianhong Fund is able to deal with millions of transactions every day and hundreds of millions of transactions during Singles' Day (November 11) in China. On that day, Yu'E Bao redeemed 6.1 billion yuan and paid for 16.8 million transactions yet did not suffer any serious technical problems. Yu'E Bao also developed a second direct fund selling system, and had collected, applied and mined a vast amount of data resources. This would have been difficult to imagine and impossible to realize for the traditional model.

2.5 The Cloud in Our Lives

In the book *It Is Not Important Any More*, Mr. Nikolas Carl said: "Once the 'Cloud Computing' service becomes mature, the concept of giving up personal computer will become more attractive. At that time, every one of us can use the abundant software service and can use unlimited online storage. We also can use the Internet from different devices (for example, mobile phone, television and etc.), and share our data and application. It is unnecessary to lock our files and programs into the hardware of personal computer." Today it looks like Carl's forecast is coming true.

With the rapid development of cloud computing, cloud services are getting closer. Cloud applications are diversifying and today include the education cloud, sound cloud, government affairs cloud, cloud storage, cloud safety, and cloud social contacts.

The Cloud is all around us, transforming how we live and work.

2.5.1 Remote Collaboration: Cloud Office

With the continuous development of cloud office,[6] today's cloud office applications are not only compatible with traditional office documents, but are also capable of editing and storing files professionally through an Internet browser client. In addition, more than one person can edit or modify one document at the same time, and share it at any time and at any place with mobile Internet. This lightens staff's working loads.

Rolled out by Apple in 2013, iWork for iCloud supports all kinds of operating systems (iOS, Mac OS, and Windows) and many web-browsers (Chrome, Safari and Internet Explorer). At the same time, iWork for iCloud can merge with a Word document seamlessly. For example, one can drag a Word document on the computer directly into 'Pages for iCloud', and then edit it after loading.

With iWork for iCloud, one can log into a web-browser on a laptop, whether Mac or PC, and store and edit documents in iCloud via the Internet client. iCloud will automatically sync any document across all connected iOS devices (iPhone or iPad) and the iWork application of the Mac desktop computer. Of course, the newly created or edited document will also be uploaded to iCloud. Thus, you can visit and edit documents in many ways.

Imagine such a scene: Before going on a trip, you only need to upload the documents to iCloud, and then it does not matter where you go: As long as you have access to the Internet, you can use your iPhone, PC, iPad or other device to search, read and edit documents that you had stored in the Cloud. The changes are then uploaded or synchronize directly to iCloud. For a company, this convenience enables staff to modify, edit and even annotate documents in the cloud.

2.5.2 New Experience: Sound Cloud

Under the traditional communication-computing model, sound is handled by a single communication device, for example, a mobile phone. With the support of cloud computing, you can convert file types, use voice recognition, and take

[6]In a broad sense, a cloud office describes a government or company office based entirely in the cloud; in a narrow sense, it can refer to providing the organs and companies with office-document-centric, cloud-based SaaS services, such as for document editing and storage, collaboration, communication, mobile office, and workflow.

advantage of other tools all through the cloud. The sound cloud supports continuous online sound recognition with fast speed and high accuracy. For example, when we ask Siri a question on the iPhone, the intelligent system behind it is the sound cloud platform. So it can be said that mobile devices and sound cloud function will not only make our lives more convenient but also bring a better customer experience.

The domestic finance company Pacific Insurance released its CPIC Voice system using the sound cloud platform. It is a kind of intelligent insurance follow-up system that allows agents of Pacific Insurance to manage its follow-up service without going to the home of the customer. It works by planting the standardized voice into the system and loading with the up-to-date sound recognition technology, and the voice or sound cloud allows recognition of the person's voice. This has not only improved the customer experience but also reduced costs from phone operations.

In situations where a person's eyes and hands are both occupied, the sound or voice cloud receives high demand. For example, a sound cloud system is used when it is impossible to use multipoint touch and control, as when driving a car. There is a kind of sound cloud driving system called iVoka, which after you install it in your car, recognizes your spoken requests and responds with accurate feedback. The system is hands free, helping ensure safety while you drive and use iVoka to play songs, find out the weather, get stock updates, hear flight information, etc. iVoka also has strong pathfinding functionality, searching for and suggesting the best route to your destination, as well as restaurants, entertainment options and scenic locations according to your tastes. For example, if you want to find a range of places to have fun in a city on the spur of the moment, you say your current location to the sound cloud service, and it will then find a destination from thousands of interesting places through the cloud server, plan the fastest and most direct route, and start guiding you to the selected venue.

In short, you only need to use your voice while relying on the sound platform through a mobile device, and then the rest will be taken care of without any extra effort. Thanks to this system, our lives will become more efficient and colorful.

2.5.3 Massive Space: Cloud Storage

One big innovation brought by cloud service is the shifting emphasis from equipment to information. Equipment, including computer programs, is just a short-term visitor, and the era of expensive hardware devices will have soon passed! Most valuable are the information stored in the devices and where it should be stored for a long-term. Thus cloud storage came into being.

To put it simply, cloud storage is a kind of solution for putting storage resources into the cloud for information upload and download. The user can store and get information conveniently at any time and any place by connecting to the cloud through the Internet. The key is actually to realizing the switch from storage

equipment to storage service by software application. When using cloud storage, the user has not only the necessary equipment available but also the data retrieval service offered by the whole cloud storage system.

Baidu took the lead in jumpstarting the "T era" in personal cloud services by providing 2 terabytes of free storage. Baidu's is a kind of personal cloud service catering to users' storage, synchronization and sharing needs. You can store hundreds of thousands of pictures and songs, and hundreds of hours of video. Unless you have a strong inclination toward storing HD film, you will likely never use up the 2 terabytes of storage.

2.6 The Future of the Cloud

The suppliers of cloud services not only offer all of the necessary Internet infrastructure, software, and hardware platforms, but also are responsible of a series of services including the initial system setup and ongoing maintenance to the increase practical value for customers. Customers in turn gradually hope to switch each kind of application program and infrastructure service to the cloud platform. Therefore, the previous question of whether to build a cloud platform has become a question of when and how to build it. For example, many enterprises start building their cloud capability by outsourcing it, switching the strategic emphasis from technology development to the power to manage business processes and key data. In this way cloud computing has become highly regarded by industry, and a series of platforms and services based on cloud computing have started to appear.

According to the *White Paper of Cloud Computing* (2014) issued by the Research Institute of the Telecommunications Ministry, presently, public cloud computing services in China remain in their infancy. In 2013, the national market scale of public cloud computing service was about 4.76 billion yuan, an increase of 36 % year-on-year, far higher than the global average. Although China's cloud computing services make up only 3 % of the global total (the US' global market share is 60 %), surging market demand in China will give a huge boost to the industry. By the end of 2015, it is projected that the size of China's cloud computing market will reach 13.669 billion dollars.

IDC forecasted in the newest report that the global expenditures in cloud computing in the next five years will grow six times faster than the traditional IT industry and triple in size. As of 2014, the global market size of cloud computing was 42 billion dollars, accounting for 25 % of the total increase in IT expenses. From the end of 2009 to the end of 2014, cloud computing brought China a net income of more than 1.1 trillion yuan.

The national trillion-yuan-size cloud computing market is on the horizon, with the industry on course to usher in a golden age. At the same time, cloud computing will become a new engine of economic development in China. Over the past ten years, the progress of IT technology has pushed the Chinese economy forward.

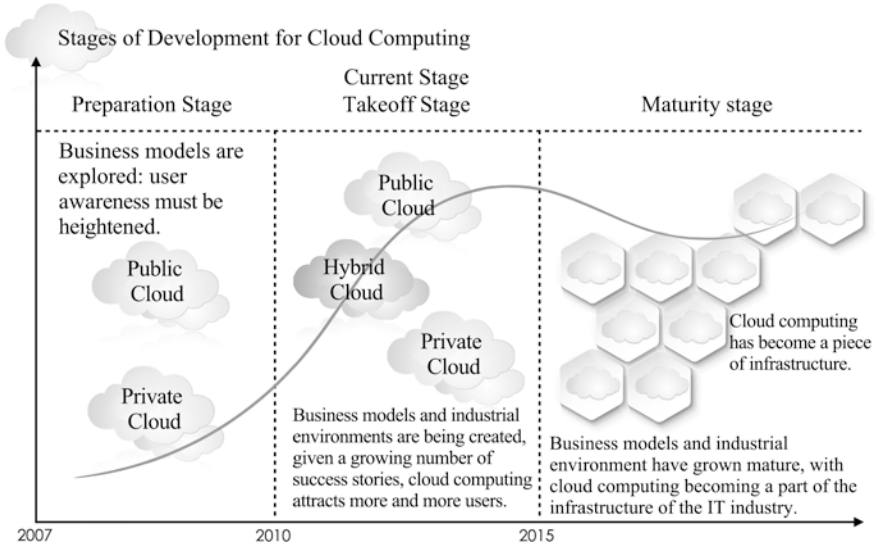

Fig. 2.1 Cloud computing at the takeoff stage (with more clouds to come) *Source* Gartner, Ping An Securities Research Institute

Cloud computing will contribute to companies' IT applications, industrial upgrading, economic restructuring, and business incubation.

Nevertheless, there are some doubts about cloud computing, particularly about its safety. Is it truly safe for companies to engage a data escrow agent via the cloud without building their own data center or implementing private data storage? Another concern involves the uncertainty of long-term IT costs compared with instant reduction in short-term costs. In an ITValue survey of CIOs, 19 % of the respondents said they were already using or deploying cloud computing, 28 % were considering implementation within the short term, whereas 53 % had no timetable at all. Most of the corporate concerns focus on safety and privacy (Fig. 2.1).

Tips Safety and Privacy in Cloud Computing
Concerns about cloud computing include:

- **Information Safety**
  Some data include confidential information or business secrets, the loss of which will greatly affect the prospects of a company.
- **Data Privacy**
  How to prohibit the unauthorized use of data stored in the cloud.
- **Integration with the existing IT system**
  Is it possible to ensure the continuity of pivotal working processes during the integration between cloud service and the existing IT system?

- **Implementation**
  Cost, feasibility and cycle of transition from the existing system to cloud service.
- **Maturity of technology**

No universal technical standards, interface standards in particular were designed out for cloud computing. This has presented great challenges to connecting among different services in the future.

For companies using the Public Cloud,[7] the biggest concerns are safety and privacy. Safety refers primarily to the loss of data in rare circumstances. It might sound hard to believe for some companies, but it really happens: on February 15, 2009, the EC2 service of AWS (Amazon Web Services) suffered a large-scale suspension during which the data of some clients was permanently eliminated (caused by a software deployment that mistakenly terminated some user instances). For clients in need of a safe and reliable platform, such a breakdown and loss of data, though rare, can be fatal. In addition, if a company stores its data solely on the cloud without any backup, the data remains at high risk.

While safety problems are more related to technology, privacy issues involve multiple areas. In 2011 alone, there were two large-scale leaks of private information. In March, a large leakage happened at Gmail, when 150,000 users found their emails and dialogues deleted; some even found their account reset. In April, Sony's PlayStation network and Qriocity were both hacked and stay offline for a week, during which information from 77 million user accounts was stolen. In fact, as long as data are shared from an intranet to the Internet, there is no way to physically isolate the information and guarantee that it can't be leaked. Major privacy issues for the cloud include:

- User data being accessed illegally or without authorization.
- The acquisition of private data by the government or other powerful institutions from the Cloud Service Provider for the purpose of regulating, manipulating and controlling information.
- The collection of data by the Cloud Service Provider for its own commercial interests.

The ongoing rise of the Private Cloud[8] and Hybrid Cloud[9] provides a better solution for possible safety and privacy issues in cloud services. Theoretically, the Private Cloud, unlike the Public Cloud, is not influenced

[7]Public Cloud (through the Internet) refers to a massive cloud system leased or sold to the public.

[8]Private Cloud (through an intranet) refers to a cloud system independently owned or leased by companies.

[9]Hybrid Cloud refers to a combination of the public and private cloud to deliver the IT service.

by bandwidth, safety or law. On a practical level, however, companies are facing unresolved cost and technological problems, and are especially concerned that the Private Cloud, which involves huge expenses and complex deployment issues, will one day be replaced by other innovations.

As a result, a combination of both public and private clouds, known as the Hybrid Cloud, has received great attention. With Hybrid Cloud services, companies often outsource less important data to the Public Cloud, while at the same time establishing their own Private Cloud for important data. In *Tech Trends 2012: Elevate IT for Digital Business* authored by Deloitte CEO White and CTO Briggs, it is stated that companies should regard the Hybrid Cloud as the long-term trend, instead of worrying over the concept of private and public clouds.

Information asymmetry between cloud service providers and corporate customers is another cause of concern about cloud services. As mentioned in the previous section, corporate users are embracing cloud computing, which for them is simply a black box. And users have little ability, both in terms of resources and professional knowledge, to access the details concerning the cloud service. On the other hand, due to commercial confidentiality and safety concerns, cloud service providers are unwilling to share a lot of key information concerning their cloud offerings, leaving the service uncontrollable to users. Consequently, although a cloud service provider can offer better solutions for data safety and backup, corporations tend to discount such benefits since hosting on the cloud poses possible threat to their key data and services. Additionally, worries about the integrity of cloud service providers, legal issues and regulations for cloud operations, as well as about hidden risks and loopholes resulting from the technology, add to potential users' fears about information security.

2.7 Conclusion

Cloud computing is evolving at a geometric rate, and still requires perfection and optimization as an innovation. Applications based on cloud services will not destroy the current market overnight, nor can cloud service capabilities be established in a day. A shift from technology to operations will be required, and it is possible that there will be a long period during which individuals and companies need to conduct business on the platforms of both traditional and cloud services. Nevertheless, one thing is certain: the future belongs to the cloud.

Chapter 3
Platforms—From the One-Sided Market to the One-Sided + Two-Sided Market

Competitions across the world have evolved from between countries, corporations and teams, to between alliances, systems and platforms. And the advantage of a large platform is becoming increasingly prominent.

—Marco Iansiti, Harvard University

Driven by the Internet, the 21st century will become the watershed for human beings to deploy platform strategy in all business activities.

—Platform Strategy

JD.com brought its B2C site (www.jdlaser.com) online on January 1, 2004, and in June 2007 renamed the company Jingdong Mall and adopted a new domain name, 360buy.com. In the second quarter of 2008, JD claimed its first place in China's B2C market with 18 % market share. In December 2010, JD opened its online platform to brand owners, charging a commission according to the type of service. JD provided multiple operational choices for brand owners: selling through JD's own platform, storing goods in JD's warehouses, delivering goods through JD's logistic team and processing payment via JD. By 2013, its registered users had exceeded 100 million, active users rocketed to 47.4 million and orders fulfilled reached 323.3 million.[1]

JD follows a motto of "Service First, Price Second". JD announced its "five-day-after-sale service" promise in 2007; established its national call center in 2008; put forward its "whole-team service" concept and made a commitment to deliver "100 % after-sale service satisfaction" nationwide in 2010. In order to maximize the efficiency of its services, JD established its own logistics and distribution system. In 2009, JD invested 20 million yuan in building up express companies and gradually set up fulfillment centers and warehouses all across China. In 2010, JD introduced

[1]See JD's annual report.

X. Zhu et al., *Business Trends in the Digital Era*, DOI 10.1007/978-981-10-1079-8_3

its "211 time-definite delivery" service in 18 cities and planned to enlarge service coverage to over 50 cities while increasing its own independent distribution volume by up to 90 % and fulfilling 3 million orders per day. In 2012, JD launched a supply chain finance service to enable every part of its supply chain to meet the funding requirements of its partners. JD also formally unveiled "JD Baitiao",[2] which functions as a finance platform for individual consumption.

JD Mall is a typical platform company. By comparison, transactions by which consumers head to brick-and-mortar stores, pay and get either products or services directly represent a one-sided market. A platform creates an entirely different business model: it connects two (or more) specific groups, provides them with a space and mechanism for interaction and realizes profit for itself while creating appreciation for the other parties. Studies on the platform economy are usually carried out based on the notion of "two-sided markets". Two-sided markets here involve industrial economics, regional economics, information economics and transaction cost theory. The operational model and features of two-sided markets are very different from those of one-sided markets.

3.1 The Catalyst of Platforms: The Internet

In terms of commercialized physical platforms, there were bazaars in ancient times and popular shopping malls in the past 50 years. Human beings are born with the innate need to connect and communicate with others, and companies are born with the impulse to shorten the distance between themselves and end-users. This need and impulse can be best met with the help of the Internet and a platform as the vehicle. Scholars and industry insiders used to regard physical spaces, such as industry parks, shopping centers and traffic hubs, as vehicles for these goals. These physical vehicles are referred to as "Platforms 1.0". Virtual spaces built on Internet and IT technology, such as social networks, bank cards and operation systems, can be regarded as "Platforms 2.0" (Table 3.1).

The Internet places emphasis on interaction, real-time transparency and infinite coverage, breaking the traditional limitations of time and space, greatly reducing explicit and implicit transaction costs,[3] significantly enlarging the customer base, unprecedentedly improving information and service availability and thus sufficiently preparing for the emergence of a large number of platform companies. In the meantime, the rise of Internet and IT technology provides platform companies

[2]This is a credit-based payment service for personal customers. JD will conduct a real-time online assessment of customers' credit standing, and provide qualified customers with deferrable (up to 30 days) or installment (3–24 months) payment services, with a maximum credit line of 15,000 yuan.

[3]Implicit transaction costs include information acquisition costs, information release costs, attention-drawing costs, and duplication costs. Explicit transaction costs include sales costs, warehousing costs, etc.

Table 3.1 Definitions of platforms in Academia

2007	Xu Jin	A platform in essence is a kind of space or place, existing both in the real world and in the virtual network. It guides and facilitates transactions between two or multiple parties, attracts traders to use the space or place by charging appropriate fees and maximizes profit eventually
2013	Wang Zhan	The platform economy, based on information platforms and third-party-payment technology, promotes transactions and integrates manufacturing and service industries by finding and creating business opportunities
2012	Fei Fangyu	The platform has three definitions: (1) A platform is a place that meets the core needs of customers and easily rolls out and modifies new products by the functions of addition, replacement and elimination. (2) From a perspective of business strategy, the platform is the value control point in an industry; it is a source of royalties and excess profits. (3) A two-sided market, where two or more groups complete transactions for products and services The "Platform economy" is a business model, based on a certain kind of transaction space, that facilitates transactions between two or multiple sides and obtains profits by charging appropriate fees
2012	Chen Hongmin	The platform economy is a new model of business operations. Its most striking characteristic is its ability to effectively build up a two-sided or multi-sided platform for two or more types of end-users to conduct transactions or exchange information
2011	Zhu Xiaoming	The difference between the platform-based company 1.0 and platform-based company 2.0 lies in that the latter is active in the two-sided market and is based on big data, cloud computing, platforms and mobile Internet, and enjoys the perks of mobile Internet
2013	Chen Weiru	The platform is a business model that connects two-sided (or multi-sided) groups, and exerts same-side and cross-side network effects
2007	Annabella Javier	The platform is a system composed of multiple interdependent components (or modules)

Source Shanghai Institute of Digitalization and Internet Finance

with better technological approaches, enabling them to optimize logistics, information flow and cash flow and present a graphic user interface to customers. By processing the information flow of customer needs in the front office while handling logistics and cash flow in the back office, platform companies can greatly improve their operation efficiency. It can be stated that, without the rapid development of Internet and IT technology, platform companies would have never sprung up and platforms would have stood no chance of being regarded as a business model today.

With the rapid development and increasing popularity of mobile Internet, it is becoming faster and easier for people to surf online via mobile phones, which will further boost the development of platform companies. If you examine Gartner's Hype Cycle for Emerging Technologies (2012 and 2013), you may discover that platforms were no longer listed, implying that they might have entered into the mainstream market. The platform concept and platform companies are sweeping across the world at an incredible pace, going deep into people's daily lives and penetrating into different industries and fields.

Today, 60 of the world's largest 100 companies use the platform business model as their major source of revenue; 5 of the top 10 companies on the Global Brand 500 list in 2013 were platform-based, including Google, Apple, Amazon, Microsoft and IBM; and among the first 40 of China's top 500 enterprises in 2014, platform companies such as Baidu, Tencent and NetEase were the most profitable (See Table 3.2).

Take Alibaba as an example. As shown in the supply-demand diagram (Fig. 3.1), consumers and stores, SMEs and lending banks, purchasers/suppliers and third-party logistics, post-trade payment and financial institutions, policyholders and insurance companies, travelers and travel agencies, used to appear in pairs. Today, Taobao, Ali Financial, Ali Logistics, Alipay, Zhong An Online Property Insurance (jointly controlled by Ali, Tencent and Ping An), Taobao Travel and others have become platforms for all kinds of service providers.

Internet-based platforms not only give rise to new economic concepts and business operation models (e.g., group-buying), but also drive the innovation of business models (e.g., the development of third-party payment). While removing the development bottleneck of the platform economy, third-party payment also achieved robust development itself—a batch of famous third-party payment companies emerged, including Alipay, 99Bill, Tenpay and UnionPay Online. Furthermore, companies' organizational modes have changed due to these innovations. As platform companies spring up, some traditional companies manage to expand into new areas of growth by building their own platform. For example, as

Table 3.2 Performance of platform companies among the world's 500 most influential brands/ top 500 Chinese companies

How many platform companies appear in the top 10 of the world's 500 most influential brands?		
Ranking	Company	Internet, platform company?
1	Google	√
2	Apple	√
3	Amazon	√
4	Microsoft	√
5	Coca Cola	
6	General Electric	
7	Samsung	
8	McDonald's	
9	IBM	√
10	Exxon Mobil	
Of the first 40 among the top 500 Chinese companies with the highest net profit margin, how do platform companies rank?		
Ranking	Company	Net profit rate (%)
4	NetEase	48.32
25	Baidu	32.93
33	Tencent	25.65

Source The world's 500 most influential brands 2013, fortune China top 500 list for Chinese companies 2014

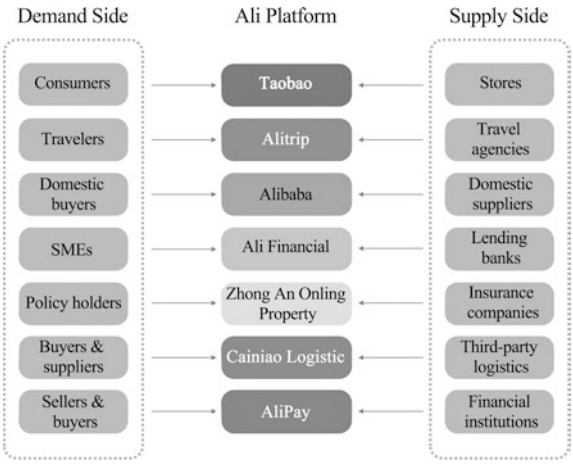

Fig. 3.1 Industrial landscape reshaped by Ali platform. *Source* Shanghai Institute of Digitalization and Internet Finance

a software-sale platform, the App Store has successfully turned Apple from a pure electronic product manufacturer into a comprehensive content service provider.

It has been a critical step in Apple's strategic transition and an important profit model. Moreover, new platforms can be derived from existing platforms, leading to new business opportunities. A good example is Fanli.com, a platform that integrates numerous online shopping platforms and positions itself as an authoritative platform above them (a platform of platforms).

3.2 A Keyword of Platforms: Connection

What differentiates platforms from one-sided markets is that a platform is not merely a part of the linear and one-way value chain, but also the value integrator and ecosystem leader; it does not directly sell products or services, but rather secures its revenue from commissions, advertising income or agency fees by facilitating bilateral or multilateral interactions. This distinguishing feature is based on a common characteristic of platforms: they connect bilateral (or multilateral) groups. Therefore, clarifying what a platform connects and how it connects is extremely important to understanding a platform-based company.

3.2.1 Platforms' Connection Goal: Becoming Multi-lateral and Diversified

A platform can connect two groups, three groups or more. "Recruiter" and "Job Hunter" on a job seeking website, "Single Male" and "Single Female" on a dating website, "Game Developer" and "Game Player" on a video game platform

and “Buyer” and “Seller” in an online shop are some of the common group types connected by platforms. Baidu and Google involve even more groups. Google, for example, not only operates as a search engine but also gathers groups of software developers, mobile phone manufacturers and cellphone end-users. Similarly, the Alitrip online platform connects travelers nationwide with more than 1000 traditional offline travel agencies, 10,000 hotels and dozens of airline companies (See Fig. 3.2).

The number of groups that a platform connects is not constant, but changes as the platform becomes larger or the strategy is modified. However, no matter how many groups are connected, two or three of them must be of primary importance and indispensable to the platform. Prof. Chen Weiru points out in his book *Platform Strategy* that such non-substitutability is evidenced by the following: without the demand of one side, the demand of the other side will also disappear and the platform will lose its meaning. Take Yihaodian as an example. It connects two groups, the buyers and the sellers: suppliers present their products on the online platform provided by Yihaodian, and consumers browse products, compare prices and purchase products through the platform. The whole chain involves

Sales volume of Alitrip on 11. 11

	Star Products	Sales Volume
1	4-day/3-night individual trip to Hong Kong	10, 712
2	Individual travel across China (departure from Beijing, Shanghai, Hangzhou)	4, 602
3	6-day/4-night individual trip to Chiang Mai	3, 704
4	InterContinental Hotel Group room booking	26, 000

Fig. 3.2 Multilateral groups connected by Alitrip. *Source China Daily*, November 17, 2013

Table 3.3 Selected types of platforms and examples

Type	Platform examples	Platform companies examples
Trading platform	• E-commerce platforms (B2B, B2C, C2C, O2O)	• JD.com, Taobao, Ctrip, Lvmama
	• Supermarkets and shopping malls	• Gome, Suning, Carrefour
	• Real estate brokerages, dating platform, publishers, etc.	• Centaline property
Media platform	• Web portals	• Sina, Sohu, NetEase
	• TV, Internet TV	• China Business News
	• Newspapers, magazines	• China Business News
Payment platform	• Third-party payment	• Alipay, Easipay, China PNR, IPS, 99bill
	• TV, Internet TV	• UnionPay
Software platform	• Operating systems	• Windows, Linux
	• Video games	• Shanda games, The9 game
	• Internet browsers	• Internet explorer

Source Shanghai Institute of Digitalization and Internet Finance

various links from manufacturing, consuming and logistics to payment. In the meantime, the two sides on the platform may also generate demand for a variety of services, such as consulting, marketing, finance and design. This will in turn attract more groups to the platform. But as far as Yihaodian is concerned, no matter how many groups get involved in the platform, it is still a two-sided market in essence.

The relationship between two or more groups connected by a platform varies greatly. They can be involved in an explicit buyer-seller relationship: the platform provides the space (physical or virtual) or technological means to facilitate deals between both parties, such as Taobao, supermarkets and other transaction platforms, UnionPay, 99Bill and other third-party payment platforms[4]; sometimes there is no explicit buyer-seller relationship, and the platform mainly functions to enhance the communication and matchmaking between groups, as with social networking platform baihe.com; another type of relationship involves a subsidy from a third party to two sides, including media platforms made up of content providers, users and advertisers as well as search platforms made up of websites, netizens and advertisers. In both cases, advertisers provide the subsidy for either content users or netizens (Table 3.3).

[4]Third-party payment refers to a kind of transaction in which a certain third party institution that has entered into agreement with banks in China and abroad claims a guaranteed credit standing and provides trusteeship services for funds used for transactions. When a buyer confirms an order, the payment for the goods should be first remitted to the third party's platform, which will give a consignment notice to the seller upon confirming that the payment has been received. When the buyer has accepted the goods and confirmed that the goods are satisfactory, the third party will remit the payment to the seller.

3.2.2 Connection Method: Interaction and Win-Wins

The one-sided market often features a one-way connection, while the two-sided market highlights interaction among multiple parties. Such interaction is also a source of value, and platform companies realize that value by facilitating the interaction. Therefore, the platform-based connection not only provides channels or intermediary services, but also offers a set of rules and systems to stimulate interaction and enhance the sense of belonging for platform participants, so as to improve the platform's stickiness and create a virtuous cycle.

The most important difference between a platform and one-sided market lies in the network effect a platform can exert, which also explains why the platform participants should strive for a win-win situation. In general, the network effect indicates that a change of one group's size will affect other groups involved. There are within-group network effects and cross-group network effects. The former implies that a change in one group's size will affect the efficacy to be obtained by other users in the same group. The latter implies that a change in one group's size will affect the efficacy to be obtained by the other groups. To this end, no matter how many groups are connected by the platform, the platform should be able to create benefits for and meet the needs of these groups, and build up a mutually beneficial network for shared growth, rather than play in a so-called "zero-sum game" (gains of the upstream are the losses of downstream).

For example, as a third-party payment platform, Alipay completes the carryover of funds by linking to the information system of commercial banks. Hence the more banks Alipay links to, the higher the value it can deliver to both dealers and customers, and the higher the appeal it has to users. Alipay has become China's most influential third-party payment platform as it supports online payment with more than 20 types of bank card. It is also worth noting that the value of a third-party payment platform is closely related to the amount of deals done via the platform. Hence, the more deals are fulfilled on the platform, the stronger and more apparent the network effect is. In other words, if the platform has facilitated the completion of a large number of deals, it will attract more users and rapidly increase its brand awareness. To this end, Alipay has launched a string of innovative initiatives.

Secured transactions: promoting innovation in the evolution of e-commerce in China. For customers, Alipay's secured transaction service is an innovation. The process is as follows: buyers remit the payment to Alipay first; Alipay subsequently notifies sellers that they may deliver the goods; buyers confirm the payment after receiving the goods; Alipay remits the payment to sellers. Alipay establishes itself as a trustworthy middleman via the secured services, thus addressing the lack of mutual trust between buyers and sellers. In the meantime, the third-payment platform can shield the bank card information of buyers, and avoid leaks of private information online. The third-party payment model meets the need for safety and trust of both merchants and consumers in e-commerce. The emergence and growth of the third-party payment model not only enhance the development of e-commerce, but also promote the establishment of a trustworthy, safe environment.

QuickPay: a product innovation that kills two birds with one stone. In December 2010, Alipay and the Bank of China jointly launched an innovative product—credit card QuickPay. With this product, users do not need to open an online bank account, but merely submit their bank card information either online or offline and complete the convenient QuickPay sign-in. Once users have linked their Alipay account to their bank card, they can enter in their Alipay account details directly, choose a bank card and key in the payment password to complete the payment without any additional procedures, seamlessly linking their bank card and online payment service. This is considered to be a giant advancement in the online payment field.

Wireless Payment: an innovation going with the historical trend. In November 2009, Alipay launched its mobile payment services, enabling users to transfer money, confirm receipt of goods, and pay utilities and mobile phone bills via their Alipay accounts. In this way, Alipay successfully expanded its presence from PC to mobile terminals.

Alipay has achieved high-speed growth by taking a series of steps to strengthen multi-lateral connections. According to data obtained from Alipay, it boasted over 800 million registered users in 2012, processed 188 million payments per day during its peak time in 2013 and received daily payments averaging 10.6 billion yuan in 2014. Both the number of online payments and their value surpassed those of the international payment tool PayPal. Alipay has thus become the largest online payment service provider in the world.

All in all, no matter whom the platform connects, how many parties are connected, or how they are connected, the platform connects both the supply and demand sides with the ultimate goal of decreasing transaction costs from information asymmetry. Therefore, a platform can develop a unique value proposition and profit model by addressing the pain points of multiple parties and satisfying their emerging needs.

3.3 Platform Advantages: The Ecosphere and Big Data

A platform can connect multiple parties and provide them with an interactive space, which decides the platform's inherent ability to connect with other business nodes. There are two methods of convergence: one is tangible convergence. Stakeholders assemble together through an established platform for "binding" development. Along with the growth and business expansion of the platform, online groups, offline shops, Internet and mobile phones may all fall within the business range of the platform and gradually form into a large and complicated ecosystem. The other is data convergence. Based on the development of Internet technology, a vast amount of dispersed user data (such as on business flow, information flow, logistics, labor flow and cash flow), can be gathered, recorded and analyzed via the platform. The following is a brief introduction to the two methods of convergence.

3.3.1 The Systematic Advantage of Platforms: The Ecosphere

The value of the platform ecosystem lies in the fact that it breaks traditional industrial barriers and regional limitations, smoothens cross-regional and cross-industry integration and collaboration, promotes communication and interaction between multiple stakeholders and sub-platforms to support concerted efforts to face market challenges, and taps the potential of multi-lateral markets to boost value, "just like overlapping whirlpools, continuously injecting value-added power into each other".[5] Furthermore, each sub-platform within the ecosystem may come from complementary, similar, vertical or even unrelated fields. As a result, the ecosystem can cover multiple areas and enjoy multiple profit sources, thus establishing a set of unique systematic strengths that are hard for competitors to copy or surpass. For example, with the advantages of shared membership resources and multiple profit resources, a platform is better able to enter into a new market rapidly and beat its rivals with highly-subsidized free offerings and an innate resource advantage.

Tencent, Baidu and Alibaba are representatives of comprehensive platform ecosystems. By capitalizing on its vast user base (the number of active QQ accounts alone exceeds 600 million) and terminal resources, Tencent has launched qq.com, game.qq.com, Qzone, Anywlan, SOSO, Paipai and Tenpay, among other offerings, and has thus built up an ecosystem composed of instant communications, online media, wireless/cable value-added services, interactive entertainment, Internet value-added services, e-commerce and advertisement. Baidu is not purely a search engine provider either. In terms of its search engine business, Baidu provides effective search engine, community search and related services; outside of its search services, Baidu has established its presence in areas such as e-commerce, online payment, online games, instant communications, input method, security business, mobile Internet, media business, website navigator and software, covering a very broad spectrum of services. Since 2011, Alibaba has been committed to building Taobao.com into a comprehensive platform integrating group-buying, logistics, marketing, warehousing and training.

Aside from these three platform giants, other platform enterprises are also penetrating other sectors via acquisitions and developing their own ecosystems and core competitive strengths. Marco Iansiti from Harvard University predicted, "The competition in the future will no longer be competition between individual companies but business ecosystems." Undoubtedly, platform enterprises will play a leading role in the future competition of business ecosystems.

[5]Weiru and Zhuoxuan (2013).

3.3.2 The Platform's Twin: Big Data

Due to their inherently interlinked and convergent natures, platforms are important carriers of big data. Big data, in turn, is also an increasingly important source of value for platform enterprises, and is regarded as a gold mine hidden behind user traffic. The value of big data can be seen from the below two aspects.

For one thing, through two-way data mining, platform enterprises can precisely create multi-layer value, greatly expanding their profitability. For another thing, a platform is dedicated to promoting interaction among different groups, so as to accelerate information flow and feedback. The acquisition of big data helps platform enterprises address user needs and market dynamics faster and more accurately. As a result, platform enterprises can respond more quickly and adjust their strategic orientation accordingly. These would be very difficult for traditional management models to accomplish. Nowadays, the Chinese government is gradually opening data sources and allowing corporate platforms to link to the systems of certain government agencies, e.g., handling customs, commodity inspection and taxation. Platforms are facing greater development opportunities in terms of big data mining and applications.

Using a platform to mine big data is not only a necessary task for new startups but also a secret weapon for traditional companies to realize business transformation. Alipay is a good example of fully utilizing the network advantage. By acquiring information through online registrations and transaction records, Alipay can grasp users' individual needs at all times and places and accurately predict future trends or changes in those needs. Another example is the Commercial Bank of China, one of the biggest banks in China, which built up an intelligent marketing information service system with a database of accumulated transaction records, thus achieving unified and accurate marketing management through big data mining. By employing this system to organize, plan, deploy and track marketing campaigns, the head office and sub-branches of the bank can carry out quantitative evaluation on these marketing campaigns. The bank's compound success rate in marketing was increased to 19.47 %, 2–4 times that of traditional marketing. As a result, marketing efficiency has greatly improved and the cumulative compound value created reached nearly 3 billion yuan.

3.4 Three Factors in the Success of Platforms

Compared with one-sided markets, platforms promote bilateral (or multilateral) group interaction to generate profits through revenue-sharing, commissions, advertisement fees, etc. In the initial stage, the investment cost to seize market share is huge while the marginal cost for Internet-based platform services is very low, even approaching zero. Therefore, the bigger the platform is and the more users it attracts, the lower the per user average cost and the higher the profit the platform can realize. In other words, the growth and revenue of a platform largely depend

on the expansion of the user base and the degree of user activity. Therefore attracting more users and enlarging market coverage are the foundation of a platform's success. Regarding those platforms that boast a high network effect and switching cost, the first mover is more likely to take all the gains. We have identified three striking characteristics of platforms (especially Platform 2.0): free/no cost, openness and maximization of user value.

3.4.1 No Cost

Chris Anderson pointed out in his book Free: *The Future of A Radical Price* (Chinese edition published by CITIC Publishing Group, September 2009, 1st edition) that in the 21st century, "no cost" or "free" is not a gimmick, a trick to shift money from one pocket to another. Instead it refers to the new and outstanding capability to bring the cost of goods and services to zero through technology advancements in the digital times. In the network economy, the price of CPUs decreases by half in every two years on average, and the prices of network bandwidth and computer memory decrease even faster. One function of the Internet is combining the three factors together to accelerate the downside trend in costs. The prices of online products and services keep dropping and the marginal costs of replicating digital products and services approach zero. All these make it feasible for platforms to deliver free offerings. Furthermore, the need for a platform to be "free of charge" becomes more apparent with the need to stimulate the network effect and seize greater market share.

It is a necessary for platforms to purposefully create an imbalance to create the first impetus and drive the network effect in pursuit of a long-term strategy while sacrificing short-term interests. Specifically, the first step is to provide free services to groups using the positive same-side network effect[6] so as to drive exponential growth in subscribers from these groups. This growth will then trigger a cross-side network effect, attracting subscribers from other groups. As a result, the platform will capture the market (in terms of market share, attention, reputation, etc.) and maximize the coverage.

But why is "free" the only way to attract people to join the platform? From a psychological perspective, people innately fear loss and experience mental inertia. Once you decide to charge a fee, no matter how low it may be, it will create a psychological transaction cost barrier.[7] Most people do not want to spend time and energy overcoming this barrier, and being free of charge eliminates it entirely

[6]The positive same-side network effect states that as the number of subscribers from the same group keeps increasing, the efficiency per subscriber increases accordingly, and consequently more subscribers from the same group will be attracted.

[7]A term put forward by Nick Szabo from University of Washington that basically describes the cost of thinking. In other words, laziness is a part of human nature. If there isn't a need to rack our brains, we won't. This is why we often prefer things and activities that don't require a lot of thought.

while getting people excited, acting as a source of irrational happiness, and driving more people to try the new platform. Offering it "free of charge" seems to abandon deserved profits, but this actually stimulates market demand and attracts more new users, which is helpful for a platform trying to quickly seize a market. In the digital era in particular, if you don't provide free services to customers, they will get them for free from someone else. Therefore, for the network-based Platform 2.0, "free of charge" is a necessary principle to win the competition and becomes its most important characteristic (See Table 3.4).

Table 3.4 Selected examples of free platforms

	Free platform	Description	Type of platform
1	Amazon.com: Free delivery	Since September 5, 2009, consumers have enjoyed free shipping if their purchase amount exceeds a certain minimum	Transaction platform
2	Taobao.com: Free C2C services	When Taobao.com was first launched, it announced its three-year free service program. Encouraged by this program, sellers from other platforms opened storefronts on Taobao.com, and a large group of netizens opened accounts on Taobao.com to sell or buy products while having fun	
3	China telecom: Free Yixin services	In 2013, NetEase and China Telecom jointly developed a free instant communication software, offering a wide variety of free emoticons, instant message and voice messages	Media platform
4	Netease.com: Free enterprise mailbox	NetEase developed its own free enterprise email service to satisfy the email needs of individuals, small organizations and small and medium enterprises	
5	Google.com: Free office software apps	All products and services are free for consumers, including Google Search, Gmail, Gtalk and online software apps	
6	China Merchants Bank: No annual fee for credit cards	Banks including China Merchants bank, Commercial Bank of China and Bank of Communications implemented a policy stipulating that credit cards can be exempt from annual fees as long as the cardholders use their cards a certain number of times each year	Payment platform
7	Third party internet payment enterprise: Free services for individuals	The third party internet payment enterprise charges annual fee for merchants (service fee and registration fee) but provides free services for individuals	
8	AutoNavi and BaiduNavi	In 2013, AutoNavi and BaiduNavi were announced as permanently free-of-charge services	Software Platform
9	Qihoo 360: Anti-virus software for free	Qihoo 360 provides various Internet security services and solutions for free, such as its "360 Browser" for Internet surfing, "360 Online Shopping Bodyguard" for online shopping and "360 Safe Box" for online games	
10	WeChat	Users can enjoy free voice, video chat, and posting services	Social platform

Source Shanghai Institute of Digitalization and Internet Finance

Qihoo 360, for example, is positioned as a platform enterprise focusing on Internet safety software and services. Qihoo 360 provides users with lots of Internet safety services and a full set of solutions, such as the "360 Browser" for Internet surfing, "360 Online Shopping Bodyguard" for online shopping and "360 Safe Box" for online games, all of which are free of charge. These free services have helped the company attract a massive number of users and improved user viscosity, leading to a penetration rate higher than 80 % and over 300 million active users per month. Based on its vast user base and Internet traffic, Qihoo provides a safe browser, and works to increase profitability by attracting other groups to this platform. For example, Qihoo embedded Google search into its browser to share profits with Google. On the homepage of the browser, Qihoo offers site navigation services that lead users to a series of trusted websites, and it also makes money from navigation rankings. Qihoo was founded in September 2005, and began trading on the New York Exchange in March 2011. Today it is the third largest Internet company, the second largest Internet browser provider and the biggest Internet/mobile safety company in China. Free products and services have been the key impetus for its rapid development.

3.4.2 Openness

The reason why a platform can be an ecosystem lies in its openness. It is a two-way openness that includes importing participants and exporting and sharing resources.

It is obvious that a platform is open to its users, as this openness is the foundation for the platform's growth and expansion. Of course, the openness is not absolute. Due especially to the existence of the negative network effect, the participation of some users may negatively affect the utility for other users. Therefore, a platform can realize conditional openness by introducing a user filtering mechanism. Through comparison you will find that different platforms have different strategies towards absolute openness and conditional openness, such as full openness without any barriers, high openness with loose restrictions and low openness with strict filtering. The choice of specific strategy is dependent upon the platform's positioning. For example, Apple's App store is a platform with low openness: it sets up high entry barriers to block out unqualified apps and ensure the high quality of either paid or free apps. In contrast, Google's Android system provides app developers with a highly open platform with low entry barrier. It tries to address various preferences of users with a large number of extremely diversified apps. But this system has defects such as fragmentation and uneven quality.

When the number of bilateral/multilateral users grows to a certain level, demand for supporting/extended services will appear. These services can be provided either by the platform enterprise itself, so as to find new sources of profit and increase user adhesiveness, or by other service providers. As mentioned before, JD.com provided logistics services by itself and later entered into

partnerships with financial services institutions to provide lending services to both suppliers and individuals. It is a good example of expanding the openness of a platform through two paths.

In addition, a platform opens its own resources to the platform participants. In the process of growth, some platforms not only accumulate resources from user traffic and user database, but also build up immense hardware resources such as computers and computer storage. By opening these resources, platforms can attract more users and institutions, expand on previous ecosystems or build up new platforms to formulate a complex platform system. For example, in the previous chapter, we discussed how Amazon opened up its computer resources, storage capacity and API,[8] and built a cloud computing platform based on the existing e-commerce platform. Another example is Qihoo, which developed an open app platform based on its 360 Browser that allows developers to upload plug-ins to the browser and thus share Qihoo's user traffic resources.

3.4.3 Maximization of User Value

The third key feature of a platform is maximizing user value, which requires a transformation of mindset from "customer" to "user". In a one-sided market, the concept of dealing with customers reflects a unilateral social exchange. This means customers pay for products while companies provide values to customers and meet their needs through products. Platform-based companies, on the other hand, build a platform for both sides and facilitate various transactional activities. As far as the platform is concerned, the biggest source of value lies in users instead of the exchange relationship between companies and users. Therefore, platforms pay more attention to mutual communication than to one-way transactions with users. In other words, a platform puts emphasis on the user experience rather than customer consumption. To be more specific, platforms keep innovating, to deliver a variety of services and develop effective interactive mechanisms to enhance users' sense of belonging and satisfaction, and increase users' switching cost as well.

Take the automobile industry as an example. Traditionally, the final assembly factory is the pivot surrounded by manufacturing, logistics and sales. Once a customer buys the car, the after-sale services will have little connection to the manufacturer. However, the Internet of Vehicles (IOV) puts car owners at the center, integrates manufacturing, sales, logistics and service, and sets up a big-data repository. The IOV terminals can access the data of car parts, identify potential

[8]API: i.e., application programming interface; a set of definitions, programs and protocols. APIs enable communication between different types of computer software. A major role of the API is to provide a set of common functions. APIs help programmers develop applications, helping them to avoid writing unnecessary code and thus reducing the programming workload.

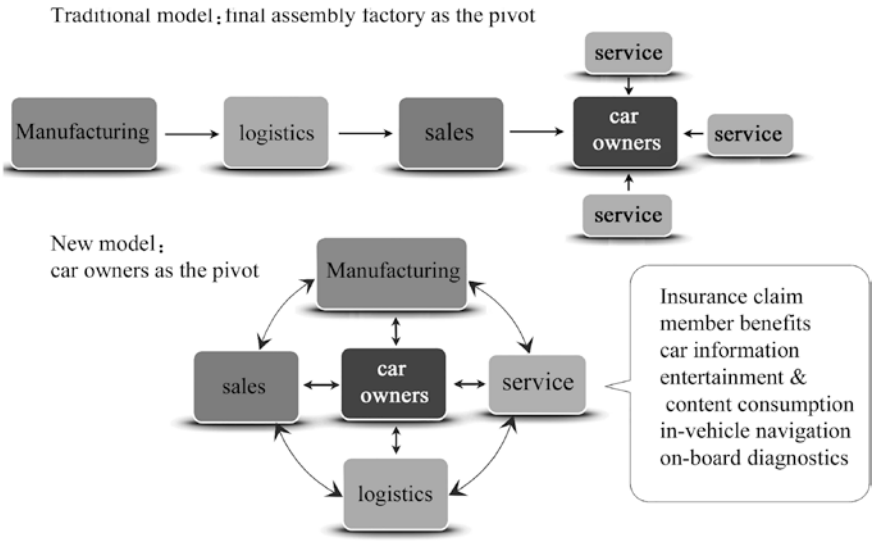

Fig. 3.3 IOV platform. *Source* Shanghai Institute of Digitalization and Internet Finance

failures in advance and come up with action plans. As a result, services such as maintenance, repairs, spare parts replacement, supply chain inquiry, and logistics scheduling can all be handled through reservations. IOV enables the formation of a closed circle around car owners, covering all services from manufacturing, logistics, and sales to after-sales services, thus enhancing the customer experience and saving time and other costs (Fig. 3.3).

Furthermore, cooperation between service providers and e-commerce also forges the connection between car owners and mobile Internet services, such as entertainment, local life and social networking. For example, e-navigation can provide tourists with multiple choices of travel routes. In-vehicle GPS influences the traffic dynamics near popular destinations and roads, and helps tourists modify their travel plans in real time. Entertainment and local lifestyle services provide the best options in accommodations. A diversified user experience can improve users' sense of belonging and satisfaction, while positive word of mouth will attract even more users.

3.5 How to Build a Successful Platform Enterprise

The three features of platforms (zero cost, openness and maximizing user value) are interdependent of one another. Openness is the essence of platforms. Being free of charge and maximizing user value increase users' loyalty through reducing costs and increasing revenue respectively. Only with the integration of these three

features can a platform company realize fast growth and expansion. Let's take a closer look at the platform company Sunivo and how it has successfully taken advantage of these three features.[9]

In the past, many SMEs outsourced their foreign trade supply chain due to a lack of foreign trade personnel. However, the processes involved in the foreign trade supply chain, including information release, business matching, import/export declaration, logistics and trading finance, are often highly segmented, and controlled by different agencies, which greatly increases costs and inefficiencies. Although some agencies provide one-stop services, most such services are delivered off-line. As a result, supply chain efficiency has not improved substantially. To this end, Sunivo canceled their contracts with such agencies and built up the Chemon platform on the basis of Internet technologies. It provides SMEs with efficient, transparent, low-cost, value-added and integrated foreign trade supply chain services. Without the participation of agencies, the whole process becomes simpler, more efficient and more cost-effective.

Free of Charge. On the Chemon platform, suppliers can open stores, publish product information and quote product prices. The platform promotes products in different markets globally based on specific product features. In the meantime, the platform informs the suppliers of overseas market demand via SMS, platform message and email. Buyers and suppliers can communicate with each other online through the platform. Sunivo charges no fees for all these services, and requires commission fees only once the deals are completed on the platform. The orders placed will then be forwarded to Sunivo's integrated foreign trade service platform, TradX, and pass through the subsequent procedural processes such as exportation, importation, and logistics. Since December 2013, Sunivo waived the charges on import/export agency services. By offering fundamental services for free, Sunivo has succeeded in attracting more and more SMEs to its platform. As of 2014, Chemon had attracted 6000 suppliers and 300,000 buyers and an annual transactions worth 1 billion Yuan.

Openness. Sunivo not only connects suppliers and buyers, but also establishes stable cooperative relationships with organizations such as banks, insurance companies, customs and commodity inspection agencies, thus building up strong resource-integration and coordination capabilities. Take logistics as an example. Sunivo directly links its platform to the systems of third-party logistics companies. In this way, quotes from the logistics companies can be displayed on the platform simultaneously for SMEs to choose from. In September 2013, Sunivo signed the *SMEs Integrated Finance Service Solutions Cooperation Memorandum* with China Development Bank, China Export and Credit Insurance Corporation, Shanghai

[9]See "Sunivo: Removing the Middleman", CEIBS Business Review, No. 143, July 2014.

Bank and Shanghai Re-guarantee Corporation to allow more financial institutions to enter the platform.

Maximizing User Value. Sunivo understands the complicated trading processes well (e.g., business matching, import/export agency, logistics and financial services) and integrates resources of suppliers, buyers and third-party service providers. In this way, it works to meet users' needs and maximize their value through free basic services and fee-based value-added services. Because B2B foreign trade supply chains are more complicated and have specific requirements on orders, logistics and capital, Sunivo uses a modularization model. This involves breaking down the supply chain into several modules, such as a transaction module, an agency module, a logistics module and a finance module. With such modules, Sunivo can provide more specialized and professional services to users. In addition, modularization allows more contact points with users. For example, SMEs often struggle to get a bank loan because of their limited size and financial strength, which directly affects SMEs' foreign trade activities. To solve this problem, in 2011, Sunivo started providing supply chain finance services to SMEs, such as export loan financing, letter of credit issuing, logistics settlement, advance payment for import tariff and taxes, petty loans, etc.

Big Data Application. Information flow is order flow. As orders are created, recorded and fulfilled on the Chemon platform, big data is generated, including information about buyers, suppliers, products, delivery time, prices, storage and shipping methods, trading terms and payment methods. Through precise data mining, Sunivo is able to provide users with follow-up value-added logistics and financial services and hence make a profit.

O2O Model. In addition to setting up the online service platform, Sunivo has established the "21 office" park offline to provide services such as company registration and transactions. The combination of online and offline services attracts more companies.

Through its comprehensive application of the three features above to occupy the market, gain users and establish competitive advantages, Sunivo offers valuable lessons for other platform companies, especially vertical professional platforms.

3.6 Conclusion

In the online era, platforms are penetrating every corner of the business world and our daily lives through connections across processes, industries and fields. Thanks to platforms, groups that seem totally unrelated are magically connected to each other, creating immense value. For example, Focus Media has gained high profits by connecting the public, office buildings and advertisement agencies. Industrial chains, which often seem static, are shortened and restructured by platforms, generating new business models and organizations. Internet-based literature platforms have changed the whole publishing model by reducing the importance of

agents, publishers, print factories, wholesalers and retailers, enabling direct interaction between authors and readers. Seemingly unrelated industries may suddenly become competitors or partners, and sometimes a new industry is created. For example, Apple's transformation from hardware manufacturer to platform provider has greatly impacted the mobile phone industry, telecommunications industry and content industry.

Greater diversification in industries utilizing a platform strategy, such as we see in mobile Internet, wearable devices, and places where people densely gather, make new platforms and business models possible. Connectivity is everywhere and platforms are everywhere. Regardless of what field or work you are engaged in, it is critical to understand how platforms are evolving and innovating in the world around us.

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Chapter 4
Mobile Internet—From PC-Based Internet to PC-Based Internet and Mobile Internet

The mobile wave is coming. If you're not ready to ride it, you'll be swept away by a tsunami of change that will fundamentally alter the world.

—The Mobile Wave: How Mobile Intelligence Will Change Everything

If the PC has changed our work style and ways of production, then the mobile Internet is reshaping our lifestyle. China will change dramatically due to the mobile Internet.

—Jack Ma, President of Alibaba

When you get lost in an unfamiliar place, Baidu Map on your mobile phone will guide you to your destination with its voice assistant; When you are in a bus station, subway, coffee shop, or airport lounge, you can browse the news, read a novel, tweet, play games or watch movies on your mobile phone or tablet; When you need a taxi, you can use Didi Taxi on your mobile phone to find a taxi nearby, and then you can pay for the fare with WeChat Payment or the WeChat "Red Envelope" you just got; When you and your friends want to eat out, you can take out your mobile phone and log into Dianping.com, open "search in the city", set a target area, price range, type of cuisine, etc., and within minutes you can find the best restaurant option; When you are on a business trip, you can read messages and photographs posted a moment ago by your friends, colleagues and family members through WeChat, and of course you also can post interesting things to share with them, or even chat directly by voice or video chat.

All these might be unimaginable a few years ago, but have become part of our daily life today. Mobile Internet—a global intelligence platform, a new mobile network and a virtual world, is quietly changing people's lifestyles and consumption patterns, significantly improving the user experience, and bringing about numerous imaginative applications and business innovations.

X. Zhu et al., *Business Trends in the Digital Era*, DOI 10.1007/978-981-10-1079-8_4

4.1 PC Internet Versus Mobile Internet

Mobile Internet, generally speaking, is a combination of mobile communication and the Internet. Mobile Internet in a narrow sense refers to the use of a variety of mobile terminals (mobile phones/PDAs,[1] laptops or other handheld devices) to access the Internet through mobile communication network (GSM, CDMA, 3G, 4G networks, etc.). Smartphones are currently the most widely used mobile terminals and the most familiar. If we form a vertical comparison between PC Internet and mobile Internet, we can conclude that the former represents the past and present, while the latter represents the present and future (Fig. 4.1).

4.1.1 Huge Differences

Mobile Internet is not an extension of or a supplement to PC- or desktop-based Internet; it is different altogether. PC Internet is different from mobile Internet in terms of access terminals, network, services available, method of service delivery, and degree of standardization (Table 4.1). Hence, mobile Internet users tend to have different characteristics in comparison with PC Internet users.

Portability for users. PC Internet can only be used in fixed locations like institutions, schools and offices that are mainly indoors, and the time when it can be used is relatively fixed. In contrast, due to the portability of its terminals, mobile Internet can be used whenever and wherever users want, even letting the users stay online constantly if they desire. In the era of mobile Internet, you can check Weibo and WeChat with your mobile phone while waiting for the bus, watch video clips on your iPad on the subway, search for a store information via mobile terminals when shopping online, browse Weibo and WeChat before falling asleep—smart mobile devices are everywhere around us, and they have become an integral part of our lives. A large part of the fragmented time in our daily lives can be fully utilized, and information can be spread rapidly, widely and extensively. This form of communication and information acquisition is far more convenient than it would be through the PC, bringing into full play the advantages of the Internet—"anytime, anywhere, in any way", and making innovation possible in the areas of instant messaging, content, communications and consumption.

Uniqueness of user identity. In the era of mobile Internet, a mobile phone number acts as an identity recognition tool, and the mobile phone itself is no longer just a communication device, but a means of social interaction. Compared with PCs, mobile phones are more closely linked to our identities, and users often disseminate

[1]The PDA, or personal digital assistant, enables people to work, study and have fun when they are on the move. PDAs can be divided by usage into industrial and consumer PDAs. Industrial PDAs are used in industrial applications, e.g., as barcode scanners, RFID readers, POS machines, etc.; consumer PDAs include smartphones, tablets and handheld game consoles.

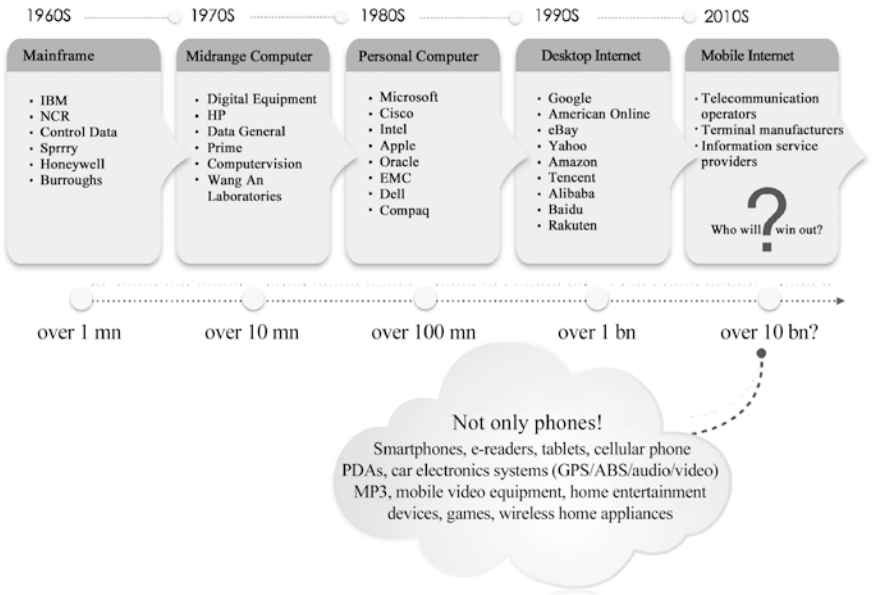

Fig. 4.1 The 5 waves of IT industry development. *Source* Shanghai Institute of Digitalization and Internet Finance

more information to colleagues, classmates, friends and others with their phones. Hence the information dissemination via mobile phone has a natural advantage in creditability. Compared with the traditional PC Internet, mobile Internet not only is used for point-to-point, end-to-end, and people-to-people information dissemination, but also is more suited to building an individualized mobile social network and, based on this, to conducting more accurate and effective marketing.

Traceability of user location. The portability of mobile phones makes them a natural tool for tracking geographical position. Cell phones are equipped with location functionality through a built-in GPS system or base station positioning. Because the phone is closely tied to its user, the user's location can be tracked. Applications such as Weibo and WeChat, as well as photos captured via the mobile phone, include information on the user's location. This information makes communication more accurate, and has also led to many location based services (LBS).

While enjoying the advantages of mobile Internet, we must also recognized the complicated security concerns it raises. The privacy demands of mobile device users are much greater than those of PC users. These high privacy requirements determine the characteristics of mobile Internet applications—not only in the verification of certified users, but also in securing information. Thus, it is different from the broader Internet, which is characterized by openness and transparency. User information on a PC can be collected in the context of the Internet, but mobile Internet users clearly don't want their information to be known or shared by others. However, in the online age, the PC is more of a tool for research and office work, and is less closely

Table 4.1 PC internet versus mobile internet

Indicators	PC internet	Mobile internet
Access terminals	Fixed terminals, e.g. desktops, laptops	Mobile phones, netbooks, tablets and other mobile terminal devices
Network	Traditional wired network Extensions of WLAN	Mobile communication network provided by operators telecom operators Wireless network such as Wi-Fi
Services available	Large, complex application services	Simple and easy to operate Services based on location, identity recognition, and access identification
Method of service delivery	Focus on services	Focus on users Users are more proactive and show greater autonomy in making choices
Degree of standardization	High degree of standardization in hardware, software, Internet protocol, etc.	Lack of standardization with regard to chip types, operating systems, browsers, and the role of operators

Source Shanghai Institute of Digitalization and Internet Finance

linked to people's daily lives than smartphones. People may carry about their smartphones everywhere they go while leaving the devices online all the time, leading to a high probability that private information like phone numbers, contact list, text messages, photos or videos stored in the phones will be leaked. Complicating the matter, smartphones' GPS-based location functionality can easily be used to track users' locations in real time. As e-payment apps are increasingly incorporated into smartphones, they are exposed to more risks such as stolen passwords for remote payment services and hidden risks in proximity payment. Protecting users' privacy and ensuring information security during smartphone use has become a serious challenge.

4.1.2 Catching up and Overtaking

The developments of recent years indicate a striking trend: mobile Internet is being widely adopted, growing faster than PC Internet, and moving toward an unimaginable scale.

4.1.2.1 Larger User Base

Since mobile devices are portable, easy to use, and affordable, mobile Internet is exploding in popularity globally. For example, in rural areas of China (see Figs. 4.2 and 4.3), mobile phones and mobile Internet are growing in penetration and scope. The rise of mobile Internet has greatly reduced the barriers to people enjoying a variety of services.

With the advancement of technology, the performance of smartphones has improved rapidly. In 2007, the performance of an iPhone CPU was equivalent to

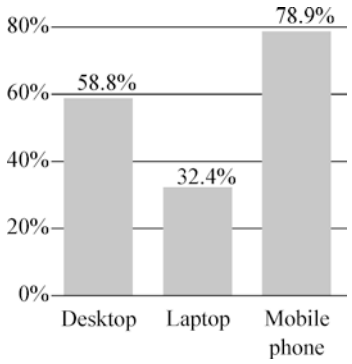

Fig. 4.2 The percentage of devices used to access the internet in China's rural areas, 2013

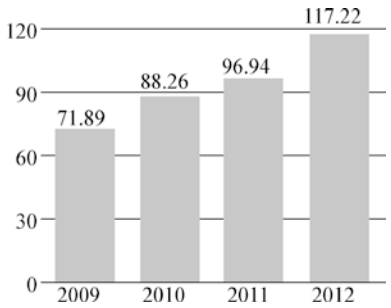

Fig. 4.3 Mobile internet users in China's rural areas, 2009–2012 (*unit* 10,000). *Source* China Internet Network Information Center (CNNIC)

that of an early Pentium II. Currently, smartphone performs computations a couple of times faster than a desktop produced a decade ago, but is only about one eighth the size of the latter's keyboard and is only about one tenth the price of a desktop. Quad-core CPUs, 64-bit processors and 1080p screens will become the standard features of high-end smartphones in 1 or 2 years. Even the performance of a 100 dollars smartphone is comparable to that of a PC produced 4–5 years ago.

It can be foreseen that in the near future everyone in China and even in the whole world will have a smartphone and every smartphone will be a gateway for the mobile Internet industry. From 2000 to 2013, the number of mobile phone users jumped from 500 million to 6.8 billion.[2] Smartphone users can be seen everywhere, from New York to London, Beijing, Rio de Janeiro, Mogadishu and Cape Town. Users in many developing countries have skipped the PC Internet stage and gone directly to mobile. By December 2013, the number of Internet users in China had reached 618 million, 500 million of which were mobile Internet users.[3] The mobile phone has replaced the PC as the most popular terminal to access the Internet. The era of mobile Internet has arrived in China, and 3G and 4G networks, featuring faster speed and lower charges, prolong the time that users spend on mobile

[2]See the corresponding research report of Informa.

[3]See the *Statistical Report on Internet Development in China* released by CNNIC in January 2014.

Internet and generate dramatic increases in Internet traffic (see Fig. 4.4). It is inevitable that more Internet users will shift to using mobile terminals.

4.1.2.2 More Mobile Apps and Usages

Try closing your eyes for a moment and ask yourself if the following are a familiar part of your daily life: mobile social networks, mobile games, mobile reading, mobile TV, mobile payment, mobile shopping, and mobile search, etc. (see Table 4.2). One market survey indicated that over 40 % of mobile Internet users in China downloaded apps every month.[4] Due to the particular attributes of portability, ID uniqueness and location traceability of mobile Internet users, the positioning and check-in services built on LBS have begun to grow in popularity. Precise services and marketing develop based on this trend. O2O business models established on LBS and mobile payment, and business applications such as remote monitoring, remote conference and business navigation that are built on a combination of 3G, social contact, video, Internet phone and mobile terminal network technologies are flourishing. More and more apps will be developed in the future, creating an ecosystem of mobile applications that would be difficult to achieve on PC.

Take mobile payment as an example. Since 2010, the mobile payment market has been growing, and since the beginning of 2012 it has seen explosive growth. By the end of 2013, the mobile payment market had surpassed 1.2 trillion yuan and more than 125 million users, representing a year-on-year growth of 700 %.[5] According to data released by Alipay, the number of users who sign up for Yu'E Bao on mobile phones every day is 2.5 times the number on PC. The number of inbound transfers on mobile phones is 1.5 times the number on PC, and Alipay wallet users increased by 500 % in 2013 alone. On November 11, 2013, the number of transactions through Alipay on mobile phones reached 45.18 million, 5 times the number a year earlier. The total value of transactions grew tenfold from last year, accounting for 24 % of the total amount of transactions. Compared to desktop payment, payment with mobile devices, especially mobile phones, is becoming increasingly popular and is taking a bigger proportion of the entire payment system (Table 4.3).

4.1.2.3 Constant Innovation in the Mobile Payment System

The previous mobile payment system was composed of mobile phone manufacturers, ISPs (China Mobile, China Unicom and China Telecom) and payment organizations (third-party electronic payment companies, domestic banks and China UnionPay). But the system chain has proven to be too long and its costs too high. When WeChat

[4]See *The Mobile Internet from the Perspective of Mobile Terminal*, InMobi China General Manager Yang Juan.

[5]See *Mobile Internet on the Way*, Wu Hequan, Chairman of the Internet Society of China, May 2014.

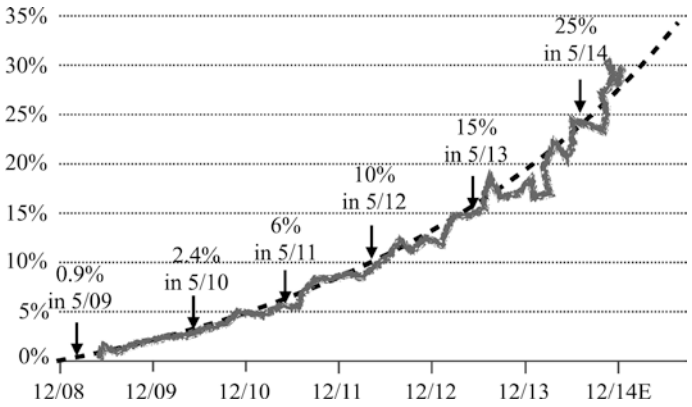

Fig. 4.4 Proportion of mobile traffic in total internet traffic. *Source* Statcounter Global Stats

5.0 was released, WeChat Payment and a number of domestic banks launched mobile payment, showing WeChat could function not only as a social platform, but also as a tool that greatly enhances the convenience of financing and trading services. Social platforms, WeChat's Moments and WeChat Payment together have overturned the traditional mobile payment industry. They not only lower the marginal cost of services but enable WeChat to cooperate with common users to fulfill a variety of needs in different situations and bring innovation to financial services (Figs. 4.5 and 4.6).

Nowadays, banks are expecting cross-industry cooperation with mobile Internet service providers and are accelerating their strategic planning in mobile payment, which has become the main battlefield of mobile finance. Banks such as China Merchants Bank, Industrial and Commercial Bank of China, Bank of China, Construction Bank of China, Bank of Communications and China Everbright Bank have launched mobile banking services. Ping An Bank launched an "Emergency Cash" service, enabling users to withdraw funds by a mobile phone without bank card and ATM (Table 4.4).

4.1.2.4 The Profit Model Matures

Nowadays, mobile Internet is part of mainstream life and commercial society. The monetizing capability of services such as mobile games, mobile advertisements, mobile e-commerce and mobile videos has been dramatically enhanced. As a thriving market segment, mobile games are attracting more and more users and occupying more and more of their time; users' willingness to pay is increasing and mobile games will see increased ROI (Return on Investment); mobile e-commerce has huge potential for growth as long as credit and payment issues can be properly addressed; with the development of large-screen smartphones, faster network speeds and lower fees, the potential of mobile advertisements will be brought into full play; mobile video can copy the business model of PC-based video advertisement; and

Table 4.2 Examples of mobile internet apps

Network tools	Security	Communication assistance	Video and audio media	E-commerce	Content	System tools	Reading and learning	Maps	Practical tools	Business and office
Internet browsers	Anti-virus software	Call assistance	Audio play	Online shopping	Information	Synchronized backup	E-books	Sign-up	Travel and food	Word processing
Instant messengers	Mobile phone protection	Short message tools	Video play	Payment	Software download	Chinese input	Reading tools	Nearby search	Alarm timer	Finance and stocks
Mobile blogs	Encryption	Communication record	Photography and video	Online price comparison	Games	System enhancement	Dictionary	GPS software	Financing	Financial calculation
Mailers	…	Name card management	Audio processing	…	Music	File management	Learning assistance	Maps on mobile phone	Transportation and tickets	…
Search engines	…	Multimedia message enhancement	Video processing	…	…	System management	…	…	Weather forecast	…
Weibo	…	…	Picture processing	…	…	Bluetooth and infrared	…	…	Postal code queries	…
Traffic statistics	…	…	Picture browsing	…	…	Font patches	…	…	Health management	…
Browser assistance	…	…	Screen protector	…	…	Desktop aid	…	…	Memo	…
Bookmark tools	…	…	…	…	…	…	…	…	Entertainment	…

Source Shanghai Institute of Digitalization and Internet Finance

Table 4.3 Comparison of Alipay and Yu'E Bao on PC and mobile terminal

Yu'E Bao daily registrations	Portal terminal: PC 2.5:1
The number of daily inbound transfers on Yu'E Bao	Portal terminal: PC 1.5:1
The number of transfers via Alipay wallet	Increased by 33.8 times
The number of bill payments via Alipay wallet	Increased by 13 times
The number of repayment of credit cards via Alipay wallet	Increased by 16.2 times

Source Shanghai Institute of Digitalization and Internet Finance

Fig. 4.5 China's mobile payment annual market expansion, 2010–2015. *Source* People's Bank of China, iResearch

Mobile functions are changing every day.Seize the optunity!

	Early Mobile Payment Companies	WeChat Payment 5.0
Companies involved in electronic payment	Mobile phone manufacturers + ISPs (China Mobile, Unicom, China Telecom) + Three alternatives: 1 Third-party electronic payment companies 2 Domestic banks 3 Chin UnionPay	WeChat+ WeChat Payment + Domestic bands
Traits	Value chain too long, costs too high	Simple, quick, low cost

Fig. 4.6 Mobile payment innovation. *Source* People's Bank of China, iResearch

the small-pay-required apps also show great vitality. The position of mobile Internet in Gartner's Hype Cycle (2011–2013) indicates immense development potential for mobile Internet in the future. It can be expected that mobile Internet will increase in popularity, be applied to more areas and develop a more sophisticated profit model.

Table 4.4 Milestones in listed banks' mobile payment endeavors, 2013

Banks	Partners	Cooperation events	Time
China Guangfa Bank		The first bank to launch a SD-mall model using SD cards as the payment medium	Jan. 2013
China Citic Bank		Users can submit, confirm and complete fund transfers by shaking mobile phones	Jan. 2013
China Merchants Bank	China Mobile	Cooperation based on NFC-SWP model in the financial payment applications for electronic cash, debit/credit cards, etc	Feb. 2013
China Citic Bank	MasterCard	Partnered with MasterCard to explore QR code and virtual payment in mainland China and overseas	Apr. 2013
Bank of China	China Telecom	Signed strategic cooperation contract on mobile payment with China Telecom	Jun. 2013
China Merchants Bank	China Unicom	Launched "China Unicom and CMB Mobile Phone Wallet" to create NFC (Near Field Communication Payment) service for small sums	Jun. 2013
China Merchants Bank		Launched the first "WeChat Bank"	Jul. 2013
China Citic Bank	Suning Yunshang	Launched its "Cyber Payment" accounts settling brand, of which QR code payment is the major product	Jul. 2013
China Citic Bank	China Unionpay	Completed joint testing of mobile payment service based on NFC communication protocol. The next step is the service's commercialization	Jul. 2013
China Everbright Bank	China Unicom	Partnered in areas of mobile finance such as mobile phone payment, mobile phone wallet, and mobile applications	Aug. 2013
China Guangfa Bank	China Unicom	Signed cooperation contract in mobile payment and launched mobile payment card based on SWP-SIM card technology	Aug. 2013
China Citic Bank	China Unicom	Signed cooperation contract in mobile payment and developed mobile payment based on NFC technology	Aug. 2013
Shanghai Pudong Development Bank	China Mobile	Launched the first mobile payment bank card based on NFC- and SIM-card enabled phones with independent intellectual property rights	Aug. 2013
Bank of China	China Mobile, China Unionpay	Launched and promoted NFC mobile payment products in Shanghai	Aug. 2013
Ping an Bank		Launched the electronic wallet "One Wallet", the main functions of which are fund transfer and chat	Jan. 2014

Source Great Wisdom News Agency

The world is flat, and mobile Internet is making the world even flatter. As built-in smart sensors mature and mobile terminals break the barriers of computing and storage capabilities, mobile Internet will be used even more widely than PC Internet, leading the trend of development and creating a new economic mythology.

4.2 Integration and Collision

Mobile Internet is itself an integrated product. The arrival of 3G and 4G networks have further boosted the development of mobile Internet, leading to innovations in technology and business models. Large-scale mergers, acquisitions and penetration have accelerated the industry integration.

4.2.1 The Integration of Mobile Terminals, PCs and E-consumer Terminals

In the last two years, we have entered a multi-screen world made up of PCs, mobile phones, tablet PCs, e-reader, smart TVs and vehicle-based systems. Nowadays, multi-screen interactions between mobile phones, PCs and TVs have become common. In the future, these three screens will be connected by the cloud and let users freely switch between screens and resume content consumption where they left off, thus ushering in a new era of Internet access enabling people to connect anytime and anywhere.

In the future, wearable products such as glasses and watches are likely to become pan-terminals. The concept of the "wearable terminal" links mobile Internet and smart terminals or devices. Many promising applications can be developed through embedding various types of sensors into a range of mobile equipment. A new stage in smart hardware, represented by the rise of wearable devices, is creating immense business opportunities and capital investment. On January 13, 2014, Google disclosed its 3.2 billion dollars purchase of Nest, a smart home appliance company. Just a couple of months later on March 26, Facebook announced its 2 billion dollars acquisition of Oculus VR, a vendor of immersive virtual reality technology; then, on May 28, Apple announced its 3 billion dollars acquisition of Beats Electronics, a headphone manufacturer. Chinese Internet companies, including Baidu, Tencent, 360, and Xiaomi, have also dived into the market, benefiting from the combination of "hardware + cloud data + applications".

4.2.2 The Integration of the Industrial Chain

With telecom operators as its core, the original industrial chain is a single chain covering information and communication technology. But the industrial chain

in the mobile Internet era tends to be more complex, involving multiple parties, such as terminal manufacturers, telecom operators, service providers, and system developers. Mobile terminal manufacturers, mobile operators and Internet companies all want a say in each link of the industrial chain. Mobile phone manufacturers have started entering the Internet market, consumer electronics manufacturers have started focusing on mobile terminals, traditional Internet companies have begun to get involved in mobile services, and mobile operators are beginning to build content platforms. For example, traditional Internet portals, such as Sina, NetEase and Sohu, are getting involved in mobile Internet, Apple's iPhone has proven itself around the world, and China Mobile is expected to unveil an app named "MobileMall" following the launch of its content platform "DO". In addition to Internet operations, Google has been concentrating on its mobile phone operating system, Android, and has defeated the former market leader Symbian in just one or two years. The company also acquired Motorola Mobility, and successfully launched the Google phone. Currently, Google is one of the largest Internet channels in the U.S., and it has applied to the U.S. government to offer Internet access in people's homes as an Internet operator (Table 4.5).

4.2.3 The Integration Between Industrial Chains

Research shows that the integration of the four major industries, namely, telecom, the Internet, media and entertainment, as well as the convergence and intersection of various industrial chains, will create a more complex ecological environment. Mobile terminals have become the primary content medium. Globally, mobile users spend an average of about 7 h on media every day (Chinese users spend 6.9 h each day, very close to the global average). However, China's mobile users, including smart phone users, spend more than 160 min on mobile terminals every day. In other words, China mobile Internet users spend about 40 % of their time on their mobile phone or tablet terminals. More and more users are spending long hours on their mobile terminals. Mobile terminals have become a type of mainstream content medium, and also the primary content medium.[6]

4.2.4 The Integration of Mobile Internet with Traditional Industries

Driven by cloud-computing, the Internet of things and other technologies, the integration of traditional industries with mobile Internet is showing new characteristics: on one hand, mobile Internet can be used as a means of business promotion

[6]See http://tech.hexun.com/2013-08-15/157111077.html.

Table 4.5 All parts of the mobile internet industry chain

Type	Examples	Focus	Emphasis
Telecom operators	Mobile, telecom, unicom	Building mobile Internet service platforms with advantages in network operations	Organizing and leadership role in the mobile Internet industrial chain
Terminal equipment and system developers	Apple, Google, Nokia, Samsung, DELL, HP, Motorola	Terminals as the gateway to the mobile Internet	Deep exploration of end user value
Internet enterprises	E-commerce companies, SNS, web portals	Transferring business strengths from the traditional Internet to mobile Internet	Control over mainstream Internet services and resources
Application service providers	Mobile browsers, mobile instant messaging tools, mobile application development enterprises	Providing innovative application services based on mobile Internet	Satisfying the diverse demands of mobile Internet users

Source Shanghai Institute of Digitalization and Internet Finance

for traditional industries, such as apps and enterprise promotion platforms for food, dining, entertainment, flights, automobile, finance and household appliances, so as to enhance the e-commerce sales ratio and create online brands; on the other hand, mobile Internet is reshaping business models for mobile terminals, as shown by the business transformations in sectors like medical treatment, education, tourism, transportation, and media.

Here we'll use medical treatment as an example. Mobile health-related applications can be divided into two categories: one is for hospitals, and the other is for the general public. There are four types of hospital-level mobile health applications, namely, mobile nurse application systems (for daily rounds, intravenous infusions, etc.), mobile doctor application systems (for mobile retrieval of electronic medical records, diagnosis, consultation, etc.), mobile management application systems (handling patient statistics, drug statistics, etc.) and mobile patient application systems (for mobile registration, laboratory test results, etc.). In particular, the use of electronic health records can improve information sharing among all parties during treatment, allowing doctors to carry out real-time remote monitoring of patients' health during treatment and to provide references for clinical practice. The other category includes general-public-level applications. The most promising are in personal and family health care, treatment of chronic diseases, patient care, etc. For example, mobile devices, using a variety of mobile communication networks, can collect personal health data regularly or on demand and send it to the medical center, allow real-time and long-term continuous monitoring of the patient's health conditions and give timely guidance and recommended treatments. This provides ubiquitous medical and health services for people and is furthering the transformation from a passive treatment model of going to the hospital when you're sick to a new model that stresses early warning and proactive treatment. According to incomplete statistics, there are over 2000 healthcare apps in China, basically covering the whole treatment cycle for patients. These applications have great potential in providing a healthier lifestyle, in improving patients' persistence in self-care and interactive nursing after leaving the hospital, and consequently in reducing the readmission rate.

Of course, while mobile Internet promotes industry integration, generates a new round of business hot-spots and expands industry income sources, it also continually collides with the traditional business ecology and models and is faced with government regulations that are slow to change.

Take the Big Three mobile operators—China Mobile, China Telecom and China Unicom—as examples. Mobile Internet has had a large impact on them: enterprises such as BAT (Baidu, Alibaba and Tencent), Amap, and Baidu Map plan to shift their focuses from PC to mobile terminals; meanwhile, China Mobile, China Telecom and China Unicom suddenly realized that all their hard work previously has just paved the way for a third party—WeChat. WeChat's business poses a huge threat to the SMS and wireline voice businesses of the Big Three.

Furthermore, the conflict between emerging taxi-hailing apps represented by Didi Taxi (where the highest fare gets service) and traditional taxi services (concerned with fairness and public service), and that between mobile payment and financial regulations, are all inevitable challenges in the development of mobile Internet.

Figuring out how to seize the opportunity for integration and handle unexpected conflicts are problems that all participants face in the mobile Internet era.

4.3 The New Journey from PC Internet to Mobile Internet

Taking into consideration the market's huge potential, many companies are facing a practical and critical challenge in shifting from PC Internet to mobile Internet and starting a new path suited to the unique characteristics of the mobile world. To this end, a mobile Internet strategy should never be a simple extension of PC Internet strategy.

4.3.1 Tencent: Back to Zero and Starting Anew

At Tencent's 15th anniversary party, Ma Huateng announced several new starts or shifts—from PC to mobile Internet, from virtual to real, from closure to openness, from domestic to overseas markets, from a big company to a small team… all centering on the shift from PC Internet to mobile Internet.

Ma Huateng believed that Tencent had an excellent opportunity as mobile technology had created a market ten times bigger than that of traditional PC technology. Though WeChat has offered Tencent a ticket to the world of mobile Internet, there is no guarantee of success. Without vigorous efforts to embrace change, the company can fall behind at any time. Among all Tencent product categories, mobile products today account for a high percentage, even exceeding PC products in some areas. With WeChat and mobile QQ as its trump cards, Tencent has constructed a mobile ecosystem covering multiple areas, including search, payment, map, social applications, video, games and e-commerce.

In the field of search services, Tencent runs Sogou and QQ browser; In the field of payment, Tencent launched WeChat payment; Tencent Map is the company's map platform; In the field of mobile social networks, Tencent WeChat has become a dominant platform; In terms of video business, Tencent has been operating a dedicated video website (v.qq.com); In terms of online games, Tencent has integrated the resources of several mobile platforms including WeChat, mobile QQ Social, Mobile QQ Game Hall, mobile Qzone and an app store (Myapp.com); in B2C business, Tencent has partnered with JD to provide full scale support for traffic and payment solutions. This includes opening up WeChat to all merchandise offered via JD. Meanwhile, mobile QQ lets users access JD's "shopping" tool with their QQ Wallet. JD distributed Red Envelopes via WeChat and QQ during its "6.18" shopping party; In the O2O field, a "red ocean" market where the competition is the most fierce, Tencent has invested in Dianping, Didi Taxi, opened WeChat storefronts and rolled out "pilot" partnerships with companies in different sectors, such as VIP.com, Haidi Lao Hotpot, 7 days Inn, Ubox, Southern Airline, Wangfujing Department Store and New World Department Store. As a result, a series of mobile

life service models with social functions have emerged and broken down the boundaries between online and offline channels. For example, Tencent has built up connections with Dianping to tap the latter's rich merchant resources and experience in providing local life services. In addition, it capitalizes on the socializing function of WeChat and the mobile payment capability of WeChat Payment to provide its users with one-stop local life services ranging from content acquisition, log-in, inquiry, and customer services to fast payment and sharing.

4.3.2 Microsoft: Two Firsts

In the mobile Internet era, failing to advance means falling behind. During the PC period, Windows prevailed and Microsoft dominated the market, holding over 50 % of the Internet browser and application operating system markets. However, even a giant like this was caught off guard by the rapid development of mobile Internet. From Windows CE (Windows Embedded Compact)[7] to Windows Phone 7, and then to Windows 8, Microsoft kept disappointing its loyal users with its failure to upgrade its mobile operating system properly. The number of Microsoft's mobile users consequently is growing rather slowly and is far lower than those of its competitors, namely Apple and Google. In June 2012, Microsoft launched its self-owned hardware product—Surface. Though the market response was not as good as expected, it indicated Microsoft's efforts and determination to adjust its operation strategy to catch up with its competitors.

In 2014, the newly appointed CEO Satya Nadella clearly pointed to a "mobile-first and cloud-first" strategy for the future development of Microsoft. He emphasized that "what we do with our products and services has to account for this fundamental vision… Mobile first means that we should study the mobile scenarios from every perspective to develop new technology and businesses". On April 2, 2014, Microsoft officially announced it would preinstall Windows for free on all devices smaller than 9 in, so as to cover a maximum number of devices, build its presence in the largest ecosystem, and gain a larger share in the mobile Internet market (which is much bigger than PC market). As stated by its CEO Satya Nadella, if Microsoft can devote itself to implementing and concretizing this strategy, the company will undergo a fundamental transformation.

4.3.3 Fighting for Control of the Traffic Gateway

A traffic gateway refers to the beginning of a route people most frequently choose when they want to surf the Internet. The gateway determines consumers' needs,

[7]Windows CE is an operating system in the Windows family specially designed for hand-held PCs and embedded devices.

Internet surfing habits and behavior model. As the gateway translates into demand, controlling the gateway means capturing users. This is why the giants fight to control it.

Ever since the beginning of the mobile Internet era, the battle for the gateway has raged without pause. It is a battle without gunfire, but one that will determine the future of all players. After all, from PC to mobile, the evolving fight for traffic gateways has shuffled the positions of all players. Overall, though traffic gateways in the mobile area are quite dispersed, structurally we see a clear sign of the Matthew effect—the accumulated advantage phenomenon—in this context, as the strong get stronger. This is very similar to the "winner takes all" effect in platform operation. Both traffic and user time are converging towards the strongest players of each field, and all mobile Internet players are to win.

It should be noted that the most important gateway in the PC era might not be the same in the mobile Internet era. For example, the significance of what used to be the most important traffic gateway—the web browser—has greatly declined. In fact, mobile apps that are closely connected to users' habits and boast strong user loyalty, such as search, map, social networking and utility apps, etc. have become important traffic gateways to mobile Internet.

On August 28, 2013, Baidu Map announced that Baidu Navigation would be permanently free of charge. Four hours later, AutoNavi announced free navigation and map apps. The fight over free services is actually over traffic gateways. At present Baidu has developed 14 mobile products[8] for 4 types of gateways (search, application distribution, map and video) with a total of over 100 million users.

Didi and Kuaidi engaged in a fierce and memorable competition in 2014, collectively burning over 2 billion yuan. Why were Tencent and Ali so generous in funding the Didi-Kuaidi competition? Their generosity stemmed not just from strategic efforts to cultivate customers' mobile payment habits, but also from a desire to control the traffic gateway. Data from Didi showed that by the end of March 2014, it had accumulated more than 100 million subscribers with over 5.2183 million daily orders covering over 178 first-tier and second-tier cities including Beijing, Shanghai, Guangzhou and Shenzhen. The total number of drivers who used Didi exceeded 900,000. Hence, it took just over one year for Didi and Kuaidi to overturn the traditional taxi industry and become the two biggest "taxi companies" in China.

A blank canvas has the potential to become the most beautiful painting. Though the optimal profit model in mobile Internet is still unknown, that uncertainty has given more room for market imagination. And this has greatly stimulated the desire of all the big industry players to acquire the gateways. As they have no idea where the road leads to, their desire to control all gateways only grows.

[8]Products include Baidu Mobile Terminal, Baidu Mobile Browser, Baidu Cloud, 91 Desktop, Baidu Map, 91 Assistant, Android Market, Baidu Motu, Baidu Mobile Shurufa, iqiyi, PPS, Baidu Video, Android Master, Baidu Mobile Guard, and Baidu Mobile Assistant.

4.3.4 Mergers and Acquisitions that Define Territories

From 2013 to 2014, there was a surge in mergers and acquisitions. In China, Internet companies headed by BAT invested heavily in M&A activities focusing on increased control of the huge mobile Internet market that derived from the proliferation of smart phones.

Alibaba invested 5 billion dollars to acquire over 12 companies including AutoNavi, Youku Tudou, Qyer.com, Kuaidi Taxi, UC and ChinaVision Media Group in various industries such as logistics, media, O2O, web browsers and financial platforms.

Ali's acquisition of Amap and UC explorer were significant strategic moves. Amap is the No. 2 mobile map app in China, next only to Baidu Map. Better map services could help attract customers who search for stores with mobile phones. UC explorer occupies the biggest share in its market. With the acquisition of UC, Ali obtained 264 million user accounts that overlapped little with its existing users, thus generating big growth. Mobile browsers can cater to users' usage habits, and mobile phones can be linked to Alipay and Taobao to ensure a better consumer experience. Before these acquisitions, mobile Internet was considered a weak point for Ali Group. But after Ali enacted a series of strategic moves, its trade volume on various platforms reached 248 billion dollars, the highest in the world, 19.7 % of which is generated by mobile channels.

Baidu invested over 2.4 billion dollars to acquire at least 5 companies, including 91 Wireless, PPS and Nuomi.com. Baidu has established 4 gateways, in mobile search, application distribution, map and video, attracting over 100 million mobile users with 14 mobile products. Among these, mobile video programs like PPS have the biggest user base. It is an ideal gateway for attracting mobile user traffic. Baidu acquired PPS for 370 million dollars. Currently, Iqiyi's mobile traffic makes up more than 60 % of total traffic, and 30 % of the company's advertising revenue comes from mobile video. 91 Wireless was another key acquisition, and it has greatly strengthened Baidu's position as a mobile Internet gateway. Traffic from both Baidu search and various application products under Baidu are channeled to 91 Wireless for an overall integrated entrance based on search and application store.

Tencent owns WeChat, its trump card in the mobile field. Thanks primarily to WeChat, Tencent continuously explores new gateways through investment and acquisition activities to expand its mobile ecosystem. From 2013 to 2014, the company invested at least 3 billion dollars in more than 10 companies, including Sogou, Ijinshan, Dianping, JD, Didi Taxi, 58 and Navinfo, covering the areas of search, O2O, e-commerce, LBS and social networks. Among these, Dianping, Sogou and JD are leaders of their respective sectors.

Giant players are building their Internet ecosystems through investment and acquisition while small and medium sized enterprises need to strive for a foothold in the greater ecosystem. In today's environment, "being acquired" also means success.

4.4 The New Mobile Internet Thinking

In shifting from PC to mobile Internet, a company must grasp the key points of competition, understand the whole ecosystem, and adopt a mobile Internet mindset. If the business lacks the mobile Internet gene or a transformation mindset, it will be very hard for it to succeed even with a strong financial base.

The e-commerce 1.0 era based on PC Internet created a few outstanding e-commerce platforms, such as Amazon and Alibaba. They are the most shining Internet companies of today, and many vertical e-commerce operators, traditional companies and retailers have shown strong interest in cooperating with Tmall, JD and Amazon. Some are even heavily investing in building up their own online shops, hoping to catch the second wave of the retail revolution. But unfortunately, the tides are falling.

These traditional companies didn't enjoy victory in the first revolution; instead they suddenly realized that consumers throughout the whole world were connecting real time through mobile Internet. This is the world of "small companies", one where extreme price wars and traffic wars are very common. Meanwhile, it becomes more and more expensive for big companies to acquire a single customer. The traffic conversion rate declines; the bloated supply chain and logistics systems fail to cope with the Internet's fragmentation of orders and high frequency of transactions. Eventually, the companies become warehouses for overstocked and out-of-season commodities and drift further and further from their major customers. For many entrepreneurs, the era of e-commerce they desired never comes. Instead, countless companies face bigger and bigger challenges or outright failures.

Looking back at the past 20 years, many well managed companies in the PC Internet era lost their dominant market position though they actively sought new models, actively invested in innovations, and listened to the hearts of their customers. This is because that they failed to cultivate an Internet mindset quickly enough. Today, the PC Internet mindset pointing to "big companies that do everything in-house and offer one-stop shopping experience" has become harmful. Users in the mobile Internet era have changed a great deal; consequently, traditional PC Internet thinking should be altered to cope with these changes.

The first and most significant feature of mobile Internet is fragmentation. Fragmented content is transmitted in fragmented time. Every piece of fragmented information contains the fragmented needs of consumers, whose thoughts are also becoming more fragmented. This requires mobile Internet product and service providers to accumulate commercial strength in the seemingly fragmented world and find out ways to attract consumers in the fragmented time and have the consumers enjoy the fragmented content provided. But how should businesses use these small windows of time to connect to consumers and win them over with the goods and services presented to them? And how can businesses make their content more valuable and their services more personalized to better reach consumers in their fragmented time? It is a fiercely competitive environment, and consumers might

only remember the No. 1 player in the industry. Even the No. 2 may end up as cannon fodder, let alone No. 3 or 4., forcing all players to sink or swim as they fight for the first place.

Secondly, the popularity of mobile devices enables users to be online all the time. This requires companies to design their products from a totally different perspective. If you start your own business and happily develop a very good app but fail to think about how it will interact with other devices, platforms and the cloud, you are bound to struggle. In the mobile Internet era, "frequent" Internet access isn't good enough—users want to be online, all the time.

Finally, consumers will exercise greater initiative and control in the mobile Internet era. The purchasing model of consumers has shifted from "attention—interest—anxiety—memory—purchase" to "attention—interest—search—purchase—share—referral". Consumers are most likely to trust the recommendations and evaluations of their friends, and the user's unique identity on the Internet strengthens the reliability of referrals and comments made online. The result is that when consumers praise your brand on their social networks, your business can be rewarded with explosive growth. What's more, consumers in the mobile Internet era are no longer simple "consumers", but prosumers as well as supporters and communicators of brands. They may participate in all the stages of product or content design, innovation, production and marketing. Therefore, a new challenge in the mobile Internet era is how to get consumers more involved, integrate them into the value chain and transform them from consumers to loyal and passionate ambassadors for your brand and your company.

4.5 Conclusion

All around the globe, the vast reach of mobile Internet and the smooth, instant communication of information have increased market transparency, enhanced market effectiveness and improved the welfare of society overall. Thanks to low priced terminals, underdeveloped regions can skip the PC Internet era, and instead embrace the mobile Internet era and the benefits of mobile Internet technology without big infrastructure investments.

Hence, no matter where we are in the world, mobile Internet is changing how we live, play and work. It is changing the financial, healthcare, publishing and entertainment sectors, as well as how we interact with others. We can see the changes everywhere we go, and every participant must prepare for the integrations and collisions that an emerging trend may bring. No business can achieve victory without effort, but developing a mobile Internet mindset will ensure that success is always within reach.

Chapter 5
Software Defined Anything—From Software-Defined Hardware to Software Defined Anything

Software is eating the world.
—Marc Andreessen, co-founder of Netscape

Software is able to define the world. It should be the heart and soul of the world, and become an important engine and an essential part of information consumption.
—Chen Wei, Director of Software Service Industry Division, Ministry of Industry and Information Technology

Marc Andreessen, a well-known engineer, investor and columnist based in Silicon Valley, is the inventor of the first graphical web browser, Mosaic, co-founder of Netscape and member of the board of directors at Facebook, eBay and Hewlett-Packard. In 2011, an article Andreessen authored for *The Wall Street Journal, Why Software Is Eating the World,* received considerable attention. In the article, Andreessen wrote about the growing impact of software: the key point of the article is that software is becoming even more pervasive; it is eating the world. He also made a list of the best-performing companies in many industries that we are familiar with, for instance:

- Amazon, the world's largest bookseller;
- Netflix, the largest video service by number of subscribers;
- Apple's iTunes, one of today's dominant music companies;
- Zynga, one of today's fastest growing entertainment companies;
- Pixar, the best new movie production company;
- Skype, today's fastest growing telecom company;
- Google, today's largest direct marketing platform;
- LinkedIn, today's fastest growing recruiting company.

According to Andreessen, all the companies listed above are software companies. However, Andreessen probably would never have thought that software would not only have eaten the world but also be defining anything and everything just a few

X. Zhu et al., *Business Trends in the Digital Era*, DOI 10.1007/978-981-10-1079-8_5

years following the publication of *The Wall Street Journal* article. In September 2013, thousands of IT experts gathered at the Gartner Symposium/Itxpo 2013 in Orlando, Florida, where Gartner identified "software-defined anything" as one of the "Top 10 Strategic Technology Trends" for the first time and defined it as a technology with the potential for significant impact on enterprises in the next three years. In an era where young entrepreneurs are keen on disruptive innovation, "software-defined anything" is not merely a concept but a growing trend towards disrupting traditional way of thinking (Table 5.1).

5.1 Software-Defined Hardware

Software was originally designed as a supplement to hardware: improving hardware performance and continually increasing computing speeds necessitate the development of supporting software. However, with the relationship between software and hardware reversed, software is now defining hardware.

The underlying cause of this marked change is the declining difficulty of manufacturing hardware. In the past, developing a hardware product required establishing a strong team for technological support, long-term engagement in R&D, the making of dedicated molds, quality control, and establishing a distribution network. What's more, upgrading products necessitated repeating all these steps, confining hardware production to large manufacturers. But today it's a different ball game as hardware production has become increasingly simple. 3D printing technology and powerful software tools have enhanced start-ups' capability to develop a prototype of a machine, thus accelerating the process of product innovation.

Therefore, the best way to win in this environment is not by offering quality hardware, but by creating a software experience that connects to multiple aspects of a user's life. This is the core of product differentiation. According to Adam MacBeth, who played a role in the development and design of well-known hardware products including the iPod, Jawbone's wristbands and Fifty Three's Pencil, people think that they can build a game-changer with some really great industrial design and packaging, but that's not the case anymore. Incredible industrial design is necessary, but what really matters is an equally beautiful software system that coordinates with hardware.

Incredible hardware is able to function as a platform that offers various experiences and services. When equipped with an operating system, hardware products acquire a magic power. Physical functions can be simplified as much as possible, while the functions of applications can be extended without limit. As a result, both the functions and capabilities of hardware are improved. Software can help attain many seemingly impossible goals. The most interesting devices take elements of the physical world and expose them to software. To succeed, hardware needs software that makes it sing.

Fifty Three's Pencil is considered one of the most beautiful and revolutionary pieces of hardware in recent years. The entire experience was crafted to naturally fit with how people work. You'll notice it doesn't even have a power switch. It

Table 5.1 Gartner's top 10 strategic technology trends (2009–2014)

No.	2009	2010	2011	2012	2013	2014
1	Virtualization	Cloud computing	Cloud computing	Media tablets and beyond	Mobile device battles	Mobile device diversity and management
2	Cloud computing	Advanced analytics	Mobile applications and media tablets	Mobile-centric applications and interfaces	Mobile applications and HTML5	Mobile apps and applications
3	Servers–beyond blades	Client computing	Social communications and collaboration	Contextual and social user experience	Personal cloud	The internet of everything
4	Web-oriented architectures	Green IT	Video	The internet of things	The internet of things	Hybrid cloud and IT as service broker
5	Enterprise mashups	Reshaping the data center	Next-generation analytics	App stores and marketplaces	Hybrid IT and cloud computing	Cloud/client architecture
6	Specialized systems	Social computing	Social analytics	Next-generation analytics	Strategic big data	The era of personal cloud
7	Social software and social networking	Security—activity monitoring	Context-aware computing	Big data	Actionable analytics	Software-defined anything
8	Unified communications	Flash memory	Storage class memory	In-memory computing	In-memory computing	Web-Scale IT
9	Business intelligence	Virtualization for availability	Ubiquitous computing	Extreme low-energy servers	Integrated ecosystems	Smart machines
10	Green IT	Mobile applications	Fabric-based infrastructure and computers	Cloud computing	Enterprise app stores	3D Printing

Source Gartner

turns on and connects when you press the tip of the Pencil to the corner of your iPad. All these advantages, to a great extent, can be attributed to the smart software that connects equipment with applications.

The smart phone is also a good example. Smart phones loaded with various types of software turn into mobile computers that can be used for office work, computation, making payments, navigation and playing videos and music. Before 2008, mobile phone buyers used to focus their attention to hardware specifications

like pixel count, battery life and screen resolution. With the launch of Apple's iPhone and App Store and Google's open source operating system, Android, consumers turned their attention to software and its functions. Software and operating systems have transformed mobile phones from simple communication terminals into portable smart terminals with broad applications. But this shift is not limited to smart phones: many other traditional products including TVs, refrigerators, watches, glasses and even cars are being defined by software.

5.1.1 A Means of Transport or a Computer with Four Wheels?

In today's cars, software runs the engine, controls safety features, entertains passengers, guides drivers to destinations and connects the vehicle to mobile, satellite and GPS networks. In the future, an automobile system will be similar to a PC-based framework in which software plays a more significant role. Many hardware functions like navigation, long-distance information processing and communication will be incorporated into applications and processed by a couple of central electronic control units.

The trend towards hybrid and electric vehicles will only accelerate the software shift. The creation of software-powered driverless cars is already under way at Google and the major car companies. Electric cars are basically computer controlled already. For instance, the IT- and Internet-oriented auto maker Tesla has achieved the effective integration of software, cloud computing and data. Users can control multimedia, communications, cabin functions and vehicle functions through smart phone apps and the Model S operating system. The vehicles can even be controlled at long distances and receive over-the-air updates for the operating system. If you buy a Tesla Model S today, the behavior of the car six months from now could be radically different because software can continually reshape the capabilities of the hardware ahead of customer demand.

In the future, any physical devices including vehicles will be controlled by software.

5.1.2 GE's Bet on Software

From aviation to health care, GE's customers are now collecting unprecedented amounts of data, due to a growing number of intelligent, sensor-equipped machines—what General Electric (GE) calls the "industrial Internet". These data enable customers to better manage their machines, using less fuel and optimizing maintenance and operations—if they have the right apps to quickly crunch the data and spew out actionable insights. That's where GE comes in.

In 2012, GE opened a facility dedicated to software development in San Ramon, California—not far from the heart of Silicon Valley. The Bay Area office now employs about 425 people, all working on "next-generation service offerings".

In April 2013, GE announced a 105 million dollars investment in a new platform-as-a-service provider called Pivotal, a spinoff of EMC and VMware (VMW). Why? GE's future relies partly on its ability to keep churning out software and services to support the increasingly smart machines it sells. With Pivotal, GE hopes it will have a better way to quickly build and deploy big data business applications and deliver data analytics and cloud architecture for its customers in the future.

To put it another way, GE is making a big push in software development by taking a lesson from the consumer side of the internet—Googles, Facebook and the Amazons, applying software into new service offerings and making smarter machines to create more value for its customers.

5.1.3 Android Wear: A Software Platform for Wearable Devices

In March 2014, Google announced in its blog that it launched an Android-based software platform for wearable devices—Android Wear. This move is in line with the growing trend towards software-defined hardware.

With Google glasses, Google watches or wearable device in any other shape, Android Wear is able to perform the following 4 functions with the support of a wide variety of Android applications: (1) Providing useful information when you need it most, for instance, the latest posts and updates from your favorite social apps, chats from your preferred messaging apps, shopping notifications, news and shared photos; (2) Saying "Ok Google" to get stuff done, like calling a taxi, sending a text, making a restaurant reservation or setting an alarm; (3) The ability to better monitor your health and fitness, tracking and recording fitness information while providing real-time feedback; (4) Android Wear lets you access and control other devices. Just say "Ok Google" to fire up a music playlist on your phone, or cast your favorite movie to your TV.

However, "software-defined hardware" doesn't necessarily mean that hardware is of little importance. Instead it reflects the fact that the productivity of hardware is fixed while there is no limitation on the variety or extent of consumer demand. This demand can't be met without software, requiring that hardware in turn must be defined by it.

5.2 Software Is Pervading Industries

Software has caused widespread disruption in various industries. More and more industries have been transformed by software—from manufacturing to the service sector, from traditional industries to emerging ones. The global trend towards the dominance of software has been seen in a wide array of industries.

In the manufacturing sector, software is playing an increasingly important role. Software systems are widely applied in many fields such as traffic control, travel by car, industrial process control, the control of key infrastructure (power grids, irrigation networks, communication systems), robots and defense systems.

With regard to housing and infrastructure, it is reported that Vannevar Technology, a subsidiary of Google, has been developing planning tools for specialized architects and engineers, as well as advanced analytics and simulation tools. In the future, it will be possible for people to undertake all types of projects themselves, ranging from repairing manhole covers to building bridges, as long as money can be found.

The transportation sector is also undergoing transformation. In some developed countries where the growth of car parks has started to slow down, on-demand taxi-hailing applications like Uber and Lyft are building momentum. Central data processing and effective scheduling enable users of these apps to get a taxi within 10 min after making a reservation despite the limited number of taxies available. These gains in efficiency made possible by better algorithms will only grow with the apps—traditional forms of scheduling can't keep up.

Many other industries, such as photography, automobile, retailing, transportation, petrochemicals, agriculture, financial services, national defense and future education and healthcare industries are being deeply influenced by software applications (See Table 5.2). Even industries that are software-based today are increasingly threatened with irrelevance by new software offerings like Salesforce and Android.

As Andreessen quipped in 2011, "Companies in every industry need to assume that a software revolution is coming."

5.2.1 How Software Is Revolutionizing the Fast-Food Industry: "McDonald's on Your Smart Phone"

In the US, a new generation of fast-food chains such as Spoonrocket and Sprig are taking over the industry with innovative business models. These restaurants are able to deliver food to consumers within 15 min after they place orders through their mobile phones. However, consumers have to make choices among limited menu options with guaranteed quality. In these companies, food is prepared by their central kitchens and delivered through their own logistics systems. Some of these businesses have raised a huge amount of funding during the past 6 months, securing an A round financing of 10 million dollars or more, and plan to expand to other cities in the US.

In contrast to traditional fast-food chains, these delivery-only restaurants are reinventing fast food by making full use of mobile Internet, aiming to become "McDonald's on your smart phone". The new business model enables fast-food restaurants to establish a market presence in a city shortly after they build a central kitchen and logistics team as they don't have to invest in brick-and-mortar stores. New-generation fast-food restaurants place great demands on their logistics system as high speed is a major factor in their success. They are able to deliver the

Table 5.2 The impact of software applications on various industries

Industries	Software application
Retailing	Software powers logistics and distribution capabilities (Wal-Mart)
Automobile	Software runs the engines, controls safety features, provides passenger entertainment, guides drivers to destinations and connects each car to mobile, satellite and GPS networks
Express delivery	A software network has trucks, planes and distribution hubs connected to it (FedEx)
Airlines	The success or failure of airlines today and in the future hinges on their ability to price tickets and optimize routes and yields correctly—with software
Petrochemicals	Oil and gas companies were early innovators in supercomputing and data visualization and analysis, which are crucial to today's oil and gas exploration efforts
Agriculture	Satellite analysis of soils combined with per-acre seed selection software algorithms
Financial services	Practically every financial transaction, from buying a cup of coffee to trading a trillion dollars of credit default derivatives, is done in software. And many of the leading innovators in financial services are software companies, such as Square and PayPal
National defense	The modern soldier is embedded in a web of software that provides intelligence, communications, logistics and weapons guidance. Software-powered drones launch airstrikes without putting human pilots at risk. Intelligence agencies do large-scale data mining with software to uncover and track potential terrorist plots

Source Why Software Is Eating the World, Marc Andreessen

food in 15 min partly because they could work out the best route according to the order information after they load the food into the delivery vans. With the support of data analysis, the system can even plan more efficient routes based on predictions of where new orders will come from, making it possible for consumers to get their food 5 min after placing an order. Software enables these fast-food start-ups to rival established fast-food chains like McDonald's by optimizing each step of the business operation ranging from food preparation and processing to delivery. Though they look to hire skilled chefs to ensure the quality of their offerings, the priority is improving the efficiency of their operation systems with software.

5.2.2 How Software Is Reshaping the Construction Industry: The All-Powerful BIM System

The Shanghai Tower is a mega-tall skyscraper under construction in Lujiazui, Pudong, Shanghai. The building stands approximately 632 m high and has 128 stories (including 5 podium floors and 5 basement floors), with a total floor area of 576,000 m^2. Following its topping out in 2013, the Shanghai Tower became the tallest building in Shanghai and has become a city landmark.

After completion, the Shanghai Tower breaks a list of world records, namely records for the world's largest tower structure, largest concrete bottom slab, highest hanging garden, fastest elevators, highest landscaped pool, highest wind-driven generators and tallest green building. In addition, it will become the world's first mega-tall skyscraper equipped with a cloud computing center. Between the inner layer and the outer layer of the glass façade, nine indoor zones provide public space for visitors, offering unique and panoramic views of the city. Even among these achievements, Shanghai Tower's most impressive accomplishment may be the constructors' application of a BIM (Building Information Modeling) system.

Consisting of 15 categories of software and applications (See Table 5.3 below), the BIM system depicts the virtual construction of a facility prior to its actual physical construction. The free flow of information in various stages of construction forms the core of the system.[1] During the construction of Shanghai Tower, BIM has played various roles in different stages, integrating a mass of information concerning such factors as designing, construction, equipment and materials. BIM has also been used to construct a 3D model, which demonstrates not only how the completed building will look but also the layout of walls, windows and even pipelines. The application of the BIM system makes it possible for the project to be completed with the support of 47 construction workers, approximately a 1/30∼1/20 of the labor required by comparable construction projects at home and abroad. Though perhaps hard to believe, the fact still stands. No wonder people are impressed by the power of the BIM system and even more by the wisdom of Shanghai Tower's management team.

Moreover, the BIM system enables Shanghai Tower construction project to effectively eliminate corruption. With the support of software-based management, any steps in the construction process including design, raw material procurement, components manufacturing, reinforced concrete placement, infrastructure building, equipment installation, interior decoration, project delivery and property management are kept under the control of BIM system.

Take the logistics system as an example. A great deal of detailed information—concerning when the components and raw materials were purchased, when payment was made, where the components and raw materials were unloaded, who the person in charge was, when the payment was credited to the supplier's account, when the payment was disbursed—is recorded by the system, and all of the information can still be retrieved 10 years later. Great transparency can significantly reduce the incidence of corruption.

5.2.3 Software-Based Farm Management: Cloud, Big Data and Farmaron

Farmaron is a piece of specialized livestock management software customized for the US where a mature livestock production system has been established. It can

[1]Chen Jiliang, Zhang Dongsheng, *Application of BIM Technologies in the Construction of Shanghai Tower, Architecture Technique,* 2011 Z1.

Table 5.3 A list of bim software and applications

1	BIM authoring software	Autodesk revit
		Bentley
		ArchiCAD
		Dassault
2	BIM scheme design software	Onuma planning system
		Affinity
3	Geometric modeling software for BIM interfaces	Sketchup
		Rhino
		Formz
4	BIM sustainable (Green) analysis software	Ecotect
		IES
		Green building studio
		PKPM
5	BIM electromechanical analysis software	Design master
		IES virtual environment
		Trane trace
6	BIM structural analysis software	ETABS
		STAAD
		Robot
7	BIM model checking software	Solibri model checker
		Revit model review
8	BIM visual software	3DS Max
		Artlantis
		Accurender
		Lightscape
9	BIM design development software	Tekla
10	BIM model integrated collision checking software	Autodesk navisworks
		Bentley navigator
		Solibri model checker
11	BIM cost management software	RIB
		Vico
		innovaya
12	BIM operation management software	ArchiBUS
13	BIM publication review software	Autodesk design review
		Adobe PDF, adobe 3D PDF
14	BIM data management platform	Autodesk vault
		Bentley project wise
		Dassault enovia
15	BIM applications for mobile terminals	Autodesk BIM 360 glue
		Graphisoft BIMx
		Bentley navigato
		Glodon GMS

Source The BIM team of Shanghai Tower construction project

upload livestock-related information to the cloud and predict the milk production cycles of cows and when calves will be born based on statistical analysis of big data.

At its foundation, Farmaron is a piece of farm management software that lets users record a range of basic information on livestock, such as the number of livestock on hand and the date of birth of each animal. It also enables users to have detailed knowledge of animals' growth cycles, determine the optimal time to provide different types of feed, and predict when cows will produce milk or give birth. Therefore, users of Farmaron know what kind of feed should be provided to animals in each stable and when to move animals that are in heat or pregnant to special stables.

In addition, Farmaron lets users test and optimize feed formulation and methods by monitoring milk productivity of cows and nutrient composition of the milk with an iPad.

5.2.4 How Software is Pervading the Finance Industry: Wolfram's Retirement Planning Calculator

Wolfram Retirement Planner's Professional Assistant aims to help users effectively plan their rate of return on pension benefits by offering a visual presentation of their pension planning. The app has a number of key functions, letting users:

(1) choose from different portfolio styles (e.g., aggressive, balanced or conservative);
(2) calculate return on investment in the investment portfolio and receive advice on future investment planning;
(3) identify potential needs for various financial services and carry out an in-depth analysis of household income and expenses, investment, debt and physical assets;
(4) develop a proper pension management plan by offering a visual display of asset allocation practicality, liabilities, return on investment and daily expense;
(5) look up interest rates, local exchange rates, individual income tax rates and information about costs of living for utility prices, rent or property costs, etc.

The app is able to formulate an insurance plan or a pension plan 5 s after a user has input a few variables: current wage rate, annual increase in wage, length of service, current age and retirement age. With this app, insurance companies can greatly improve their operating efficiency and attract more potential customers, explaining the results to users and adapting the plans according to their preferences.

Other financial institutions like banks, accounting firms and security companies could also improve their process management, quality of service and operating efficiency with the support of software.

For example, HSBC has developed a "financial X-ray" system that examines the financial records of companies applying for loans and integrates their loan verification experience with loan verification software. By making it easier to capture images of internal body structures and identify problems, X-ray machines can help

doctors provide better treatment. Likewise, financial X-ray systems help improve the quality and profitability of loans. By using data about the operations and financial position of companies applying for loans, the system can carry out a rapid and detailed analysis of the companies' operational and financial performance. It can also identify potential risks by taking into account factors that loan verification specialists may not have considered, thus helping them to decide whether to provide a loan or not and how much can be lent safely.

As one of the big four global accounting firms, Deloitte has developed an X-ray system to check the accuracy of enterprises' tax information in four steps, thereby reducing tax-related risks for its corporate customers. Sunyard System Engineering Co. Ltd. aims to build a comprehensive working platform for internal auditing at commercial banks with its computer-assisted system, "SunAudit". Characterized by a simple, user-friendly interface, SunAudit can improve the transparency and smoothness of bank's audit process management, as well as the efficiency and image of the internal audit. As a result, internal auditors can conduct their work more efficiently.

There are numerous examples of successful software applications in a wide range of industries. In an era where applications are given priority, there is a general trend towards software-defined anything. Software is transforming every industry and it can't be stopped.

5.3 Software-Defined Anything

Software is reshaping every industry. It redefined hardware and is now redefining everything else. Following the emergence of the concept of "Software-defined Networking (SDN)" in 2012 and the popularization of "Software-defined Storage (SDS)" and "Software-defined Data Centers (SDDC)" in 2013, software wields enormous influence over a wide range of areas including hardware manufacturing, IT infrastructure and industrial applications, giving rise to the concept of "Software-defined Anything"(SDX).

Though people are divided over how to define the concept of "software-defined", there is a general agreement that it means separating applications, service and management from hardware to create an intelligent and automatic service environment. IBM has taken the "software-defined network" concept to another level by introducing the "Software-defined Environment (SDE)", while Gartner went even further by identifying software-defined anything as one of the major disruptive technologies.

No matter what concept people use (SDN, SDS or SDDC) or how suppliers define it, the emphasis is on improving service with software and prioritizing software. Independence from hardware and reduced complexity in the network environment are the main objectives of this concept.

For individual users, software-defined anything implys a more open and flexible market, it heralds a new era in which markets are defined by the consumer,

whose demands will be satisfied through software. Users will spend increasingly more time on software. A survey of US consumers' mobile phone usage shows time spent on apps continues to increase: users already spend average 86 % of their time on using apps versus only 14 % on using mobile browsers.[2]

When it comes to corporate users, software-defined anything means enterprises will move from the 1.0 era, in which digital management and IT are regarded as assets, to the 2.0 era, which emphasizes product digitization and data. In the 1.0 era, software was mainly used as a means to optimize human resources, capital and material management in enterprises. In other words, software was initially used to handle complex calculations, providing assistance and support to the statistical work of government agencies or improving the work efficiency of information-intensive areas including finance and engineering design. In the future, software will be applied into corporate material management and office automation to realize automated office work-flow and information-based production management. To realize that, enterprises must buy various types of software (see Table 5.4) and IT equipment such as PCs, switches, routers, servers and storage facilities, and build a computer room or local area network. In the 2.0 era, where everything is defined by software, enterprises can not only automate the production and service process, but also make use of many types of software by means of cloud services—without the need to invest in new infrastructure and train new employees.

5.3.1 The Internet: The Physical Basis for Software-Defined Anything

The Internet is becoming part of the basic infrastructure of the human world and the physical basis for software-defined anything. Over 2 billion people now use broadband, up from perhaps 50 million a decade ago. Within the next 10 years, we expect at least 5 billion people worldwide will own smartphones, giving every user instant access to the full power of the Internet at every moment of every day.[3] In September 2013, Cisco Systems predicted in its blog that 75 billion devices would be connected to the Internet of Things by 2020. The world population is expected to reach 8 billion by 2020, meaning an average of 9.4 IoT devices for each person. In the future, the Internet will function as part of the basic infrastructure of our world just as utilities do, bringing digitization everywhere and serving as the physical basis for software's reach.

Meanwhile, as the threshold for starting a business in the software sector has dropped sharply, launching a software company with global scale is also becoming easier. The rapid evolution of software development technologies, and of programming

[2] *Computer Industry Investment Strategy for the 1st Half of 2014: why we are firmly optimistic about software-defined anything,* Ping An Securities.

[3] "Why Software Is Eating the World", *The Wall Street Journal*, Marc Andreessen.

Table 5.4 Examples of business management software

Full name and abbreviation of software	Chinese name
ERP, enterprise resource planning	企业资源计划
CRM, customer relationship management	客户关系管理
MES, manufacturing execution systems	制造执行管理系统
HRM, human resources management	人力资源管理系统
SCM, supply chain management	供应链管理系统
OLM, product lifecycle management	产品生命周期管理
APS, advanced planning systems	高级计划系统

Source Shanghai Institute of Digitization and Internet Finance

tools and Internet-based services in particular, means people can launch global, software-powered start-ups without the need to invest in new infrastructure and train new employees. With lower start-up costs and a vastly expanded market for online services, the result is a global economy that for the first time will be fully digitally wired.

Tips Software Is Eating Software Development

Chris Dixon is a renowned Silicon Valley tech entrepreneur, investor and cofounder of Hunch, which was acquired by eBay for 80 million dollars. As an investor in many prominent technology startups, like Foursquare, Kickstarter, Pinterest, Dropbox and Skype, he is currently a partner with the big-name Silicon Valley venture capital firm Andreessen Horowitz. Dixon made a new observation in a recent blog post: Software is now eating software development.

Software is eating software development, and software development teams are getting smaller and smaller in the process. WhatsApp was able to disrupt the global SMS industry with only a few dozen engineers. Small teams can have a big impact because software development (and deployment) has improved dramatically over the past decade. Some improvements include:

- Infrastructure. Deploying a commercial website 10 years ago required significant upfront capital. Now you can spin up virtual servers in minutes. Upfront costs are close to zero and ongoing costs are orders of magnitude lower than before.
- Services. Startups created simple APIs that abstract away complex back ends. Examples: Stripe (payments), Twilio (communications), Firebase (databases), Sift Science (fraud).
- Open Source. Open source dominates every level of the software stack, including operating systems (Linux), databases (MySql), web servers (Apache), and programming languages (Python, Ruby). These are not only free but generally also far higher quality than their commercial counterparts.

- Programming languages. Developers have steadily marched upwards from Assembly to C to Java to, today, scripting languages like Ruby and Python. Moore's Law gave us excess computing resources. We spent it making developers more effective.
- Special-purpose tools for non-programmers. These tools let non-programmers create software in certain pre-defined categories, thereby lowering costs and reducing the demand for developers. Examples including Shopify (e-commerce), WordPress (blogging), and Weebly (small business websites).
- General-purpose tools for non-programmers. In the pre-Internet era, tools like Hypercard and Visual Basic allowed hundreds of millions of semi-technical people to become software developers. By allowing more people to program, these tools act as a force multiplier for the software industry.

In all likelihood, the demand for software development will continue to dramatically outpace the supply. If so, "software eats software development" will be an exciting area going forward, with lots of valuable startups created in the process.

Source: http://36kr.com/p/211193.html

5.3.2 *Software-Defined Anything Accelerates the Development of Cloud Computing, the Internet of Things and Big Data*

Software is at the core of many technologies that have emerged in recent years, such as cloud computing, big data and the Internet of Things. With regard to these three, software-defined anything refers to specialized hardware being replaced by specialized software and resources being converted into IT services. Traditional IT infrastructure and IT applications like computing, storage and security can be supplied on demand automatically, thus ensuring high flexibility and efficiency. In the era of "software-defined anything", the development of cloud computing, the Internet of Things and big data will accelerate greatly.[4]

Accelerating the maturation of cloud computing. Software provides everything needed to adapt the data center to new situations and new applications, and to manage everything from storage to switches and to security. Any changes in hardware are irrelevant to applications. Software systems empower real-time resource allocation and expansion and offer solutions to performance and scalability issues with IT infrastructure, thus providing resources and the operating platform needed for cloud computing. Some software systems are able to manage both private and

[4]*Computer Industry: Great times, SDX will reshape the world- investment strategy for 2014,* Ping An Securities.

public clouds, allowing users to apply private cloud applications in the public cloud and driving cloud computing to maturity.

Facilitating the rise of the Internet of Things. The development of the Internet of Things in recent years leaves much to be desired. Having held high expectations for the Internet of Things since its infancy, many industry experts believes that the Internet of Things (IoT) is emerging as the third wave of development in the global IT industry, following the emergence of the computer and the Internet. According to these experts, IoT will become the next major driver of high-speed development worldwide and create another trillion-dollar market following the rise of the communication network market, thus offering considerable potential for exploration. However, after years of development, we have yet to feel a profound impact on our work and personal lives. Instead, we find the concept is declining in popularity. Baidu Index indicates that the Internet of Things, despite a promising start, is attracting less media attention than big data, a concept that was introduced 3 years after IoT (see Fig. 5.1).

SDX technology is driving the continuous development of infrastructure and dramatic improvements in computing capability, which are further accelerating the development of the Internet of Things. While being technologically successful, IoT has not seen much use partly because of high costs and the absence of an industrial environment for large scale applications. SDX can dramatically reduce the cost of building, transforming and reconstructing networks by taking the brains out of network hardware and moving them into software, thereby providing support for ultra-large-scale web-based services. In addition, SDX can significantly enhance IoT's resource support and computing capability (and consequently its development). Though unable to provide solutions for all the problems with IoT, SDX may create a great opportunity for the development of IoT as lowering the costs of one step will benefit the whole process.

Encouraging the development of big data. An absence of infrastructure and effective data mining tools and approaches weakens the ability of companies to mine critical information from big data, and indirectly it negatively affects business insight, even if they have stored a vast amount of data. But now, many types of software, particularly those that are open source software (OSS, meaning their source code is freely available for anyone to inspect), contain big data processing tools. These make big data processing easier and enable organizations of all types and sizes to find the best tools for their business requirements and make good decisions with the data.

In addition, the development of cloud computing, big data and the Internet of Things will in turn support the growth of the software industry by encouraging the creation of new software and systematic solution suppliers. Any of these technologies involves data processing tasks, which are mainly undertaken by software companies like software development firms, industrial solutions providers, system integrators and operating service providers. The wide application of these technologies requires that software companies offer solutions that are adapted to each sector, driving even greater development in the software industry.

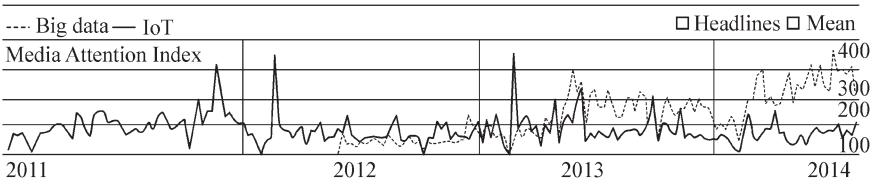

Fig. 5.1 A comparison of media attention index for IoT and big data. *Source* Baidu Index

5.4 The Path to Success in the "Software-Defined Anything" Era

As the technological capabilities related to SDX matures, software and IT service sectors are undergoing high-speed development and evolution, having a profound impact on global economic and social development, and people's work and life as well. How could people achieve success in the new era of "software-defined anything"?

5.4.1 The Verticalization of Software Companies

The verticalization of software companies refers to the acquisition of hardware companies by software companies. The integration of hardware, software, and services in one complete package through verticalization creates a better user experience, and products that are difficult to be copied. By building this sort of sticky lock-in into its products, software companies can ensure more consistent revenues and also raise the costs of switching for customers.

One of the lesser-discussed reasons why software companies desire more control over products of hardware companies is simply that the sorts of engineering problems encountered by companies today are becoming more complex. Consider the case of home automation. There have been many attempts in this space over the years. But solutions always faced the same problems—how to make all the sensors and control switches into one comprehensive system with easy setup and well-designed software. It seems obvious that a verticalized company with a complete and well-developed product line on both hardware and software is ideally qualified for developing this sort of product.

This interesting pattern has been the increasing engagement of software companies in this area, with Google being the prime example. It is generally known that Google's key products are all software: Google Web Search, Gmail, Android, and Google Docs, while its revenues come predominantly from advertisements. It is the epitome of the Internet software business. Yet the company shelled out 3.2 billion dollars for thermostat-maker Nest Labs. In June 2014, the company bought two hardware businesses—home-monitoring camera startup Dropcam and

satellite imaging company Skybox Imaging—for about 500 million dollars each. Internally, Google appears just as focused on building up its competency in hardware. The "moonshots" coming out from its GoogleX laboratory include such hardware products as Google Glass, Loon balloons, and self-driving cars.

Google is hardly the exception among top software companies. Microsoft's 7.2 billion dollars acquisition of Nokia in 2013 is one of the company's largest acquisitions in history. Facebook's second largest acquisition to date was for virtual-reality startup Oculus VR in 2014 with 2 billion dollars. Amazon continues its long investment in hardware and recently launched the Amazon Fire phone.[5]

However, there are certain problems in deeply integrating hardware and software that are simply tougher to solve if there are multiple companies involved. There can also be conflicts over incentives in such collaborations between companies as well, since a hardware manufacturer may prefer a smaller market share but higher margins while a software company wants greater user adoption to generate traffic. An important note: if 80 % of your resources are invested in software development—leaving less for industrial and hardware design—you need to make sure those and other smaller functions have a seat at the table. They are the ones who can put a hard stop on ideas because of limits on energy, cost, size and materials. This is critical to achieving the verticalization of software companies.

5.4.2 The "Virtualization" of Hardware Products

For hardware companies hoping to achieve transformation through "virtualization", creating a product that has user-friendly software, an elegant design and a great feeling means they have the ingredients to become the next Apple or Tesla. Therefore, enterprises should give close attention to the following issues.

5.4.2.1 Focus on Demand and Find Real Problems to Solve

Emotion is part of choosing a product. What makes you want to buy a product? Generally speaking, people want products that make things easier, help them achieve better health or a better quality of life, or lower their costs. However, offering these benefits is far from enough.

You have to consider many questions. Why should users choose your product? What value does it offer them? What problems does it solve and how? We will discuss these issues in detail in Chap. 7.

When you satisfy the demands of users and reduce their burdens, especially when you make them feel that your products are of great value for the money and create an unexpected and engaging experience, people will immediately turning

[5] *With Software Eating Hardware, Silicon Valley Enters "Hard" Times,* http://m.huxiu.com/article/36781.html.

to your products and even help you advertise them. In the era of the Internet, we can't underestimate the importance of word of mouth.

5.4.2.2 Enhancing Interdisciplinary Collaboration

To create a memorable experience with a device, you need close collaboration throughout a cluster of disciplines: user experience, audio design, industrial design, manufacturing, engineering, marketing and so on. Good organizational structure and clear communication are paramount. You can't afford to focus your energy in the wrong places. Adam MacBeth, whose work has helped shape many well-known hardware products, has a number of best practices for building "magical" devices[6]:

First, separate engineering and manufacturing functions. They need to work together to make sure that the ideal product can in fact be made with the resources available. But otherwise, these two functions have very different skill sets and rhythms. When manufacturing is ramping up on one product, engineering should already be moving on to the next. Don't have them working off of the same timeline.

Second, have the software team lead hardware engineers in driving a product's functional development. Software is the most responsible aspect for creating the behavior exposed to the user. Once the desired experience is defined, the project lead should work with people from various disciplines to understand what's possible, but at the end of the day, the software team is responsible for pulling it all together, and for making sure the product is kept fresh and up to date with firmware updates, new applications, and supporting web services. Putting the manufacturing team in charge of engineering—including software and electrical engineering, will end up with a brittle, commodity product.

Last, ensure close communication and collaboration between the software team and the hardware team. The hardware engineering team might assume something about software response time. The software team might assume something about how the device will feel in someone's hand. Poor communication and decision-making based on assumptions of one party lead to dangerous situations where hardware is created that physically can't enable the software to work. All of this can be avoided if both sides communicate their assumptions about the desired end goal, and make sure everyone understands the terminology being used. Therefore, close communication and collaboration between the software team and the hardware team help ensure that software engineers effectively lead the product development team.

5.4.3 Have You Found the Right People?

For both software companies adopting a "hardware" strategy through acquisition of hardware companies and hardware companies intending to achieve

[6] *Software is Eating Hardware—Lessons for Building Magical Devices,* www.firstround.com.

transformation through "virtualization", recruiting the right people for the right jobs is an important task.

A survey on smartphone development reveals the significance of human resources in business competition. Nokia developed the concept of the smartphone 10 years before the debut of the iPhone. Nokia also unveiled touch control technology 3 years before Apple and an application store 1 year before Apple's App Store but still was defeated in the smartphone market. Comparing the 2009 financial statements of the two companies reveals that Nokia's poor performance in smartphones was not due to inadequate investment in research and development but probably due to a talent gap.[7]

Therefore, recruiting talent, especially employees with interdisciplinary expertise (systems-oriented software engineers who truly understand concepts like power management, radio signals and network communication), is crucial to the success of companies that want to fully integrate software and hardware. The challenge, however, is recruiting this type of talent.

Startup founders are advised to hire generalists. It's easier for those people to have perspective on how entire systems work together. People who are generalists with deep computer science backgrounds can be tasked with any kind of software problem.

However, many talented IT professionals lack the education and skills required to participate in the great new companies coming out of the software revolution. Many surveys of businesses show that the talent gap is widespread not only in Europe and America but also in China and globally. And the problem is much more serious than it may seem.

5.4.4 Where Will the Investment Opportunities Be in the Future?

The trend towards software-defined anything is part of the new era of digitization. With regard to the economic value of SDX, Martin Creaner, President of TM Forum, has claimed that anything that can be digitized will be digitized. Users expect any service that can be delivered digitally to become digital. Any service we can imagine will be digitized by software, and everyone will be part of this change.

We are in the middle of a dramatic and broad technological and economic shift in which more and more major businesses and industries are being run on software and delivering products as online services. For some 30 years, software has been the one iron (and golden) rule of building a startup. These sorts of business models have been unmatched as vehicles for founders and venture capitalists since companies can rapidly iterate their products and scale up quickly when the right

[7] *Computer Industry: Great times, SDX will reshape the world-investment strategy for 2014,* Ping An Securities.

product-market fit has been found. But most importantly: software can be more profitable than almost any other industry, with margins for some companies reaching well beyond 50 % of revenue.

According to PwC *Global Technology IPO Review* Q2 2014 published in August 2014, global technology IPO activity surged in the second quarter with 43 IPOs raising 12.3 billion dollars in proceeds, a year-over-year increase of 153 and 327 % respectively. Internet software and services led activity with 21 deals and 5.2 billion dollars raised. This massive amount of financing in the capital market is inseparable from investors' appetite for technology stocks. Technology IPOs saw one-day returns near 16 % on average in Q2 and one-day returns of 18 % on average in the first two quarters in 2014, surpassing the overall growth of 2014 market indexes and motivating more technology companies to enter the public markets.

Let's turn our attention to the Silicon Valley, where software's inevitable dominance is taken for granted. Software companies like Microsoft, Google and Facebook are among the world's most iconic and valuable, and new startups like Airbnb and Uber aim to transform traditional industries like those for hotels and taxis. But what about the Chinese market? Given the fact that Chinese companies' expenditure on software and IT services is significantly below the global average while the proportion of expenditure on software and IT services is continuously increasing globally, software is still a key area for further development in China's IT industry.

In the digital age, software-defined everything will subvert traditional processes while software-powered companies with disruptive innovation capabilities will take the lead in the market. However, in order to win, software-powered companies should develop at least three key strengths, i.e., strong core resource capabilities, an innovative profit model and efficient service appeal.

Strong core resource capabilities are the source of enterprises' long-term competitive edge, and they are hard for competitors to copy. For instance, the key to Google's success lies in such core resource capabilities as cutting-edge search technology and management of the world's largest information bank. An innovative profit model determines the vitality of innovative companies as it can provide an important means of converting core resources into revenue for enterprises. For example, Google has adopted a typical advertisement-based model in which advertisements are the primary source of its sales revenue. But the importance of effective service should not be ignored. Only through offering quality and efficient service can companies expand into new markets and continuously increase their customer base.

Finally, new companies need to prove their worth. They need to build strong cultures, delight their customers, establish their competitive advantages and justify their rising valuations. No one should expect building a new high-growth, software-powered company in an established industry to be easy. But once they succeed, they will have won a larger market than they ever had before.

That is the reason for Marc Andreessen's comment at the end of his article *Why Software Is Eating the World*: "That's the big opportunity. I know where I'm putting my money."

5.5 Conclusion

Software is constantly restructuring every part of the world and will accelerate the process by which we are redefining our world. When we consider the changes in our everyday lives over the past few years—from how we read books, to how we navigate the roads, to how we record our lives—we can see how software is continuing to transform everything around us.

With more ways to access online networks and the expanded reach of smart devices, software's effects on global development have reached a new stage. Integrating the world of atoms and the world of bytes will create a new, digital world—one that is more easily understood by human beings.

Software will continue to redefine the world, promoting the growth of civilization and society in the process. It will be the most productive force in the digital age, and its greatest effects are still to come.

Chapter 6
Outsourcing and Crowdsourcing—From Building All-Round Capabilities to Outsourcing and Crowdsourcing

In 10 to 15 years, organizations may be outsourcing all work that is "supportive" rather than revenue-producing.
—Peter Drucker

Thus, the Third Industrial Revolution is best seen as the combination of digital manufacturing and personal manufacturing: the industrialization of the Maker Movement.
—Chris Anderson

Crowdsourcing is not just a business possibility; it is the business model of the future.
—Jeff Howe

Wreckage searching can be crowdsourced? In March 2014, four days after Malaysian Airlines flight MH370 had gone missing, DigitalGlobe, an American satellite mapping company, set up Tomnod, a crowd-sourcing initiative, encouraging internet users to scan and tag images of more than 1200 mi^2 of ocean to locate the missing plane. Each online volunteer was given some satellite images and directions to tag any suspicious hints, floating objects or airplane wreckage. An algorithm would tally all of the tags, note any areas of the ocean that consistently attracted attention and then pass over the findings to governments involved in the rescue efforts. Unexpectedly 25,000 users signed up within a single day, crashing the website.

Mapping can be crowdsourced? In 2012, 34 million people "Wazed", drove their cars more than 9 billion km using the smartphone app Waze and sharing 90 million user experience reports. In 2012, 65,000 user editors made a total of 500 million map edits and updated Waze's map to reflect 1.7 million changes on the ground. Waze has discovered that community members are fixing issues at record speeds: In December, new data revealed that map editors resolve nearly 70 % of system-detected map problems within a 30-day period and nearly all user-reported map problems are resolved within a week. Waze attracted venture investment from

X. Zhu et al., *Business Trends in the Digital Era*, DOI 10.1007/978-981-10-1079-8_6

KPCB and Horizons Ventures amounting to 30 million dollars in 2011, and the company was sold to Google for 1.1 billion dollars in 2013.

Software testing can be crowdsourced? Applause (formerly uTest) is an American venture-funded software and application testing company, headquartered in Framingham, Massachusetts. A group of more than 140,000 crowdtesters and debuggers, help remove all the possible bugs in the software applications. In 2013, Applause made a total income of 24 million dollars, and its clients included Google, Microsoft and News UK. It was predicted that its income by the end of 2014 would reach 35 million dollars. A streaming media service with over a million users worldwide needed to run a stress test on its app using more than 100 types of devices. In no time, Applause gathered 500 IT Geeks from 78 countries, including London, Madrid, Munich, Sao Paolo, Philadelphia, and Bangalore who tried the app on desktops, smartphones, game consoles and smart TVs to test its performance and user experience.

Knowledge can be crowdsourced? Wikipedia is a revolutionary yet mature example of not-for-profit Internet content crowdsourcing. By April 7, 2014, Wikipedia had over 4 million entries in English, and other standalone Wikis in 282 languages totalled up to 21 million entries, 32 million users and 1.2 billion edits. Wikipedia is ranked among the ten most popular websites on the Internet, and it is the only one run by a non-profit organization. Unlike profit-making websites, Wikipedia has a very low operation budget, though it gets as many as 19 billion page views every month.

Human intelligence can be crowdsourced? Mechanical Turk is a crowdsourcing Internet marketplace that enables individuals and businesses (known as Requesters) to coordinate the use of human intelligence to perform tasks that computers are currently unable to do. It is one of the sites within Amazon Web Services. Mechanical Turk is based on Amazon's extraordinary user base, payment system and central control system. Requesters can post tasks known as HITs (Human Intelligence Tasks), such as choosing the best among several graphics for a business or filling out a simple survey. Workers (called Providers in Mechanical Turk's Terms of Service, or, more colloquially, Turkers) can then browse among existing tasks and complete them for some money the Requester pays from their Amazon account.

R&D projects can be crowdsourced? InnoCentive is one of the first crowdsourcing websites sponsered by Eli Lilly and Company in 2001. Now it has become an important R&D online platform in the areas of chemistry and biology. With over 90,000 engineers, InnoCentive's customers include commercial, government and non-profit organizations, from AstraZeneca, Procter & Gamble, Dow AgroSciences, Eli Lilly and Thomson Reuters to the Air Force Research Lab, NASA, the Department of Defense and the Lumina Foundation. Procter & Gamble is one of its earliest customers. Through InnoCentive, P&G has increased its percentage of crowdsourced innovation from 15 to 50 %, and in the meanwhile its R&D capacity has grown by 60 %. Now it has 9000 internal engineers, as well as access to 1.5 million external researchers or crowd-researchers.

Capital raising can be crowdsourced? Beijing-based Demohour is now the best crowdfunding site in China, a Chinese counterpart of Kickstarter. Project creators can post their dream projects on the website in videos, picture or textual

descriptions, and choose a deadline and a minimum funding goal. For those who love the projects, they can commit donating certain amount of money. If the goal is not met by the deadline, no funds are collected. Demohour gets a commission of 10 % after the funding is completed.

In *The World Is Flat*: Thomas L. Friedman asserts that the world is a level playing field in terms of commerce and a place where all competitors enjoy equal opportunity. He defines ten "flatteners" that he sees as leveling the global playing field, including outsourcing. Friedman argues that outsourcing has allowed companies to split service and manufacturing activities into components that can be subcontracted and performed in the most efficient, cost-effective way. Now a new form of outsourcing has emerged that is even more efficient and cost effective: crowdsourcing. Since its emergence, crowdsourcing has attracted global attention and has quickly spread worldwide. It has fueled a great number of changes, including changes to innovation models and organizational structures, and it has deeply affected business operations.

6.1 Outsourcing and Crowdsourcing: Similar but Different

6.1.1 Links Between Outsourcing and Crowdsourcing

Outsourcing is the business practice of contracting out processes to another party to reduce costs and increase efficiency. Via outsourcing, a company is able to focus on the core process or area in which it has a relative advantage, and it is also able to better adapt to the external environment (see Fig. 6.1). In short, the idea behind outsourcing is "focus on what you do best and let others do the rest". For instance, the blockbuster film *Avatar* (2009) was really a global production: a script from America, constructed models from China, audio recordings from New Zealand, and music from France.

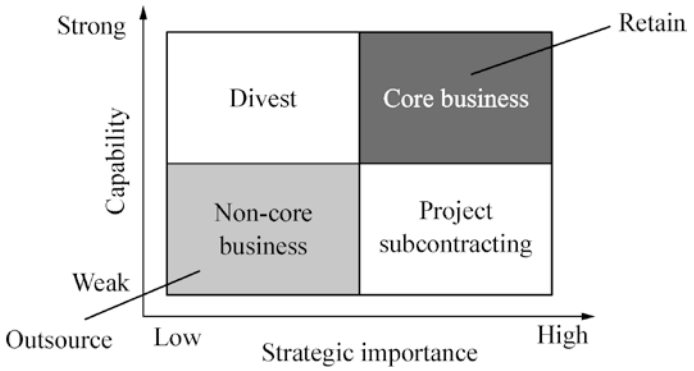

Fig. 6.1 Outsourcing decision matrix. *Source* Shanghai Institute of Digitalization and Internet Finance

Crowdsourcing is a new term compared with outsourcing. The term "crowdsourcing" is believed to have been coined by Jeff How, editor in chief of *WIRED*, who first raised the idea in an article from the June 2006 issue: In his words, "crowdsourcing", as a new business model, helps companies obtain needed services by soliciting contributions from a large group of people, and especially from an online community, rather than from traditional employees or suppliers. Very soon, Eric von Hippel, professor at MIT Sloan School of Management offered the theoretical proof supporting crowdsourcing. He revealed through a survey that for the growth of a modern business, technological innovation accounts for 40 %, resource availability 20 %, the increase of capital 15 %, economy of scale 13 % and worker improvement 12 %. This conclusion is contrary to the traditional belief that economy of scale and capital input are key to making profits. As the survey shows, the combined percentage of economy of scale and capital input is merely 28 %, while innovation and worker improvement contribute 52 % to business growth. This is where the world is going, and from the research we can better understand the circumstances in the rise of crowdsourcing.

On a basic level, both crowdsourcing and outsourcing are the result of intense market competition. Outsourcing means a company can choose to give up certain tasks and just do what they do best; crowdsourcing encourages consumers and users to take charge and pursue their goals. Outsourcing and crowdsourcing have much in common, and both are revolutionary compared with the old doctrine of building everything within the organization.

The foundation of both outsourcing and crowdsourcing is IT development. As knowledge can be codified, standardized and digitalized, traditional services and goods can also be split into smaller portions and stored or packaged digitally. The splittable services and goods can be low value data (such as data typed into the computer) or high value data (such as architectural designs, precise financial information and analysis, X-ray, movies, software builds and commercial clips). On the Internet, users can connect with each other at any time from anywhere in the world, and the spread of information is much cheaper and faster than ever before. This makes outsourcing and crowdsourcing possible across any boundary of time and space.

A shared trait of outsourcing and crowdsourcing is the decentralization of innovation. Companies depend more on external innovation and external resources. It is no doubt a wise practice to use external resources and solutions when they are limited or not available within the organization. By outsourcing some jobs and processes, a company can focus on its core capabilities and eliminate the unnecessary costs of non-core capabilities. Similarly, crowdsourcing is the best way of using external capabilities by sourcing solutions and services from an undefined crowd.

6.1.2 Outsourcing ≠ Crowdsourcing

One would be mistaken, however, in equating crowdsourcing and outsourcing or viewing crowdsourcing as a form of outsourcing (Table 6.1).

Table 6.1 Differences between outsourcing and crowdsourcing

	Crowdsourcing	Outsourcing
Time of rise	The early 21st century	1980s
Environment	Internet	Internet and beyond
Relationship type	Partnership	Contract
Choice of suppliers	Public network	Professional organizations or individuals
Number of suppliers	Unlimited	Contractors only
Payment	Payment on satisfactory results	Regular payment

Source Shanghai Institute of Digitalization and Internet Finance

The first difference is that crowdsourcing does not share the contractual relationship of outsourcing. The basic idea of crowdsourcing is "creating shared value together with users", as product design is led more by users than producers.

Second, outsourcing involves specialization, which is the outcome of economies of scale. A company would contract out business processes or services to external suppliers that are better equipped to handle them. Crowdsourcing is just the opposite. It is based on a belief in users and innovation by all, and focuses on public networks of individuals who are most often amateurs. By bringing together massive crowds of Internet users, a crowdsourcing company expects to pool the wisdom of the public network to find solutions to its more difficult problems and enhance its core competitiveness. In short, outsourcing aims at cost reduction, but crowdsourcing is more about innovation.

Another difference is that outsourcing is more often a one-to-one relationship, while crowdsourcing is a one-to-many relationship. Most outsourcing companies enter into a specific one-on-one relationship with an external contractor, although some find two or more suppliers for the same process or service. On the other hand, crowdsourcing involves hundreds or even thousands of suppliers. For instance, UC Berkeley has an open-source distributed computing projects, making it possible for researchers to tap into the enormous (collective) processing power of underutilized individual personal computers around the world.

So there are connections and differences between crowdsourcing and outsourcing, and a company can adopt either crowdsourcing or outsourcing separately, or opt for both outsourcing and crowdsourcing and try to create synergy between the two. In recent years, the outsourcing market has grown phenomenally and has developed a mature business model, while crowdsourcing is just emerging and still has enormous potential.

6.2 Modern Service Outsourcing Driven by IT Innovations

Service outsourcing can generally be divided into information technology outsourcing (ITO), business process outsourcing (BPO) and knowledge process outsourcing (KPO). The key areas of service outsourcing fueled by IT innovations

include the financial back office and financial outsourcing market, cloud computing and the Internet of Things-related outsourcing market.

Financial back office and financial outsourcing market. Financial institutions are one of the largest segments of service outsourcing. As banks and other financial institutions around the globe need to process a huge number of financial transactions quickly and accurately, outsourcing has become an inevitable choice. This has made financial service outsourcing into an enormous business.

Financial institutions have front offices and back offices. Banks outsource mostly back office services such information system, data processing and credit card services. They are sourced in three ways: (1) total outsourcing: e.g., China Development Bank outsources its entire IT system to HP; (2) partial outsourcing: e.g., Everbright Bank and Lenovo form a partnership for IT system development; and (3) insourcing: e.g., Bank of communications has a data center that develops its own IT system. Banking back office outsourcing includes offshoring and onshoring.

Cloud computing-related outsourcing market. As stated above, examples of cloud computing services outsourcing include IaaS (Infrastructure as a service), PaaS (Platform as a service), and SaaS (Software as a service). In a sense, cloud computing can be viewed as a representative model of Outsourcing 2.0. For instance, IBM opened up its cloud computing platform in Dublin, Ireland and offered its software and IT services to conduct collaborative app development; Capgemini and Amazon extended their service outsourcing contract to cloud computing; and Wipro Technologies has planned to provide digital asset management, data storage, data backup and disaster recovery on the cloud. According to Apalak Ghosh, a software and IT services analyst, the value of cloud computing services could reach 70 billion dollars in 2015. There are of course huge opportunities in this market.

The Internet of Things-related outsourcing market. The Internet of Things (IoT) has a massive potential for the outsourcing market. At the Global Mobile Internet Conference (GMIC) 2015, Qualcomm CTO Matt Grob forecasted that by 2020, 70 billion IoT devices would be interconnected in the world, meaning IoT would become another multi-billion-dollar industry. Now IoT has found applications in a number of areas of social and industrial development, such as in Smart Cities, Smart Healthcare and Smart Traffic. Shanghai International Shipping Center is going to use Smart Planet technology and IoT to substitute notification with detection when slips arrive at the ports. Shanghai Port Authority has already completed the substitution (Fig. 6.2).

In the long term, the Internet of Things will grow around "Things as a service (TaaS)", in which RFID and Machines will be services offerings: RFID as a service (RaaS) and Machine as a service (MaaS). For example, Google PowerMeter, a service launched in 2009 and designed to record the user's electricity usage in near real-time, allows manufacturers to produce compatible smart meters that can track and analyze the usage of electricity in every household and send the results to the user's computer. Your light bulb can tell how much electricity it is using. It is not hard to imagine how "Things as a service" will evolve into a huge outsourcing market.

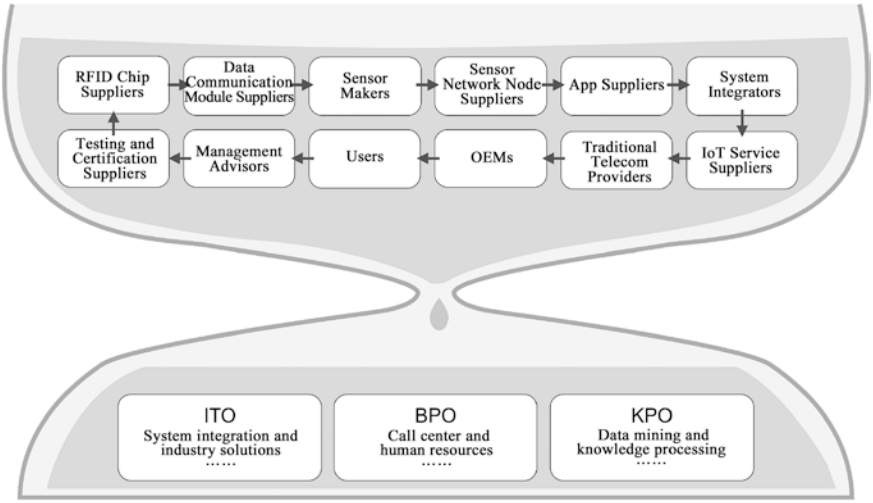

Fig. 6.2 IoT industry supply chain. *Source* Shanghai Institute of Digitalization and Internet Finance

New technologies are emerging at an astonishing speed and pose a challenge to the traditional concepts of corporate management. Although they have appeared only recently, cloud computing and the Internet of Things make it easy to imagine revolutionary changes in management methods, especially as they transform economic, cultural and social activities into services. The future may follow this sequence: Infrastructure as a service (IaaS), Platform as a service (PaaS), and Software as a service (SaaS) based on cloud computing; RFID as a service (RaaS), Device as a service (DaaS) and Machine as a service (MaaS) based on the Internet of Things; and finally everything as a service, or X as a service (XaaS) (see Fig. 6.3). There is every reason to believe that such innovations will generate an enormous market for service outsourcing.

6.3 Outsourcing: Why and How?

6.3.1 The Good News and the Bad News

On the back of the iPhone it says: "Designed by Apple in California. Assembled in China."

Apple has outsourced basically all its manufacturing to overseas suppliers including Foxconn and Quanta Computer. Likewise, Xiaomi, the Chinese mobile phone maker, has outsourced almost every process, from manufacturing to logistics, warehousing, and even after sales services, while it focuses on R&D and mindtouch with users. And HTC, another mobile phone maker who

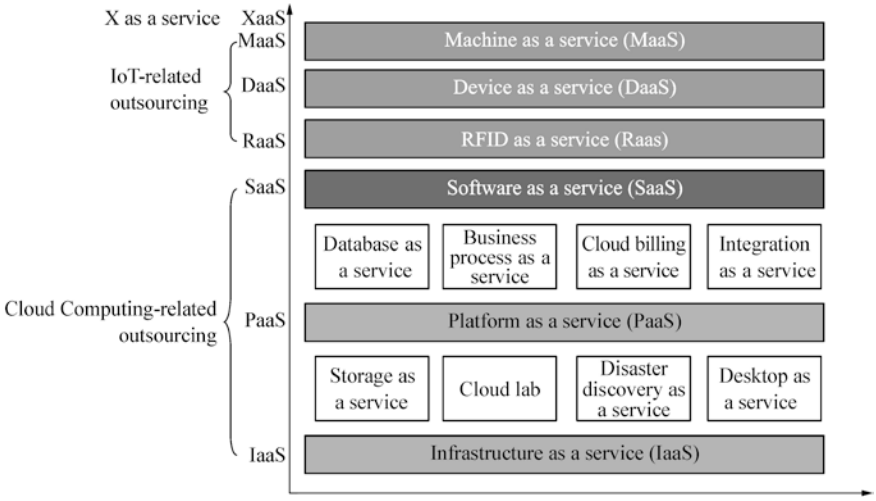

Fig. 6.3 Breakdown of XaaS. *Source* Shanghai Institute of Digitalization and Internet Finance

insisted on making every handset in its own factory, began to outsource the production of some of its smartphones in 2014 in order to cut costs and attract consumers from emerging markets. In short, smartphone outsourcing has become an industry fad.

Now let's look at the other side of the coin.

Take Boeing for example. The Boeing 787 aircraft is troubled with quite a few issues, like brake problems, fuel leaks, cracked windshields, and electrical fires, that have aroused global anxiety and debate. According to L'Agence France-Presse (AFP), the Boeing 787 depends too much on external suppliers. Almost everything from traditional electronic components to synthetic materials has been outsourced. Component suppliers are involved on many levels, and theoretically they must follow perfectly identical designs to achieve compatibility between the parts and components. But the reality is a lot messier. There were parts that didn't fit together with others. Some suppliers subcontracted work to their suppliers and then shrugged at problems with assembly. When one part wasn't available, the next one that depended on it couldn't be attached and the global supply chain all but seized up. Boeing had to spend 1 billion dollars in 2009 to buy out one of the most-delayed suppliers and bring the work back in-house.

By comparing both sides of outsourcing, we'd better understand what outsourcing is and how it can be achieved before concerning whether or not outsourcing is needed.

6.3.2 Outsourcing Strategies

Harry Moser, an MIT-trained engineer and founder of the Reshoring Initiative, once argued that a proper evaluation of the methods of offshoring could help businesses decide whether it is the right course of action for them and how it should be done.[1]

6.3.2.1 Use the Right Metrics to Evaluate Outsourcing Strategies

In analyzing outsourcing, firms must get beyond rudimentary cost calculations focused on short-term profit, such as the cost of labor or the ex-factory cost, and incorporate the total costs and risks of extended international supply chains. An analytical tool called the "Total Cost of Ownership Estimator" can help companies calculate the full risks and costs of offshore and onshore outsourcing. The Estimator poses a series of questions. What's the price of the part from each outsourcing site? How far away is each site? How often are you going to travel to see the supplier? How much intellectual property risk is there? How long do you think the manufacturing cycle will take? The Estimator uses the answers to calculate 25 different costs that, once added up, indicate the "Total Cost of Ownership".

When managers manage with a spreadsheet rather than real-world knowledge about what is actually going on in the factory and what its possibilities are, they overlook the hidden costs of skill erosion, loss of quality and constraints on innovation. They also miss the potential added costs that could be generated by designing and manufacturing things differently, as well as the costs and risks of an international supply chain that is increasingly out of step with shorter, faster product cycles. Such costs and risks require careful considerations when offshoring decisions are made and companies manage their offshoring contracts.

6.3.2.2 Don't Outsource Mission-Critical Components

Harry Moser made a comparison between the outsourcing performances of Apple and Boeing. He explained, "An iPhone isn't nearly as complicated. The downside risk isn't as great. Apple has succeeded with outsourcing almost everything to Foxconn, mainly because they first completely manufacture the new product in the US. They make sure it's right, while Foxconn is working in parallel with them, developing their tooling and other items. So Apple has a finished product and they say to Foxconn: make it just like this! What Apple has done works amazingly well, because they have the capability to do the perfect prototype here, before it gets offshored to Foxconn. Most companies don't have that. If Boeing

[1] http://www.forbeschina.com/review/201301/0022838.shtml.

had taken full responsibility for the engineering and then had jobbed the parts out and assembled them, their problems would have been a lot less severe."

This is an important lesson for outsourcing decision makers. They can outsource manufacturing, logistics, R&D, and customer service, but they can never outsource the overall responsibility. In short, don't outsource the critical tasks that affect final manufacturing and service quality.

6.3.2.3 Pursue the Ultimate Goal of Creating Values for Customers

The true purpose of every firm is to create values for customers. Global manufacturing is at the cusp of a massive transformation as the new economics of energy and labor plays out and a set of new technologies—robotics, artificial intelligence, 3D printing, and nanotechnology—are advancing rapidly. Together these developments will spark a radical transformation of manufacturing around the world over the next decade. The winners in the rapidly changing world of manufacturing will be those firms that have developed the agility needed to generate rapid and continued customer-based innovation. It is far from enough to change the location of manufacturing through outsourcing. What companies really need is a systematic transformation.

6.4 Crowdsourcing: A New Model of Innovation by All

6.4.1 The Value of Crowdsourcing

In January 2007, Geely, a Chinese auto maker, pledged a 3.6 million yuan award for innovative logo designs submitted by Geely fans worldwide. The champion alone could take away 2 million yuan. The goal was to find a logo beautifully-designed with international appeal.

In 2014, Adidas offered an app, mi ZX Flux, to let fans create their own shoe designs. The most original designs will be bought by Adidas and the shoes will be sold on eBay.

Volkswagen-Das Auto recently also launched a campaign inviting Beetle drivers and other interested people to brainstorm taglines for the car.

Gartner's 2012 Hype Cycle for Emerging Technologies made an attention-grabbing prediction, namely that crowdsourcing as a management innovation, was approaching a peak and was expected to appear in a massive number of applications globally within 5–10 years. In fact, there are already innumerable cases of crowdsourcing in which some companies have generated vast amounts of content, some have raised impressive funding, and some others have cut costs sharply through crowdsourcing. In short, crowdsourcing is playing a vital role in meeting the core demands of corporate development, including reducing costs (outsourcing of human resources), increasing their core competitiveness (innovation center), and leading market trends (consumer design).

The rise of crowdsourcing is based on the Internet. Some companies revealed their products' source code online and saw unexpected improvements from the crowd, whose wisdom has helped propel and shape business development. Thanks to the ubiquity of the Internet, crowdsourcing can tap into the collective wisdom and capabilities of enthusiasts and create mutual benefit through user and open collaborative innovation. In this new approach, users are active creators rather than passive value recipients. The idea is that everyone is an artist, a scientist, an architect or a designer, and that a business is a promoter of collaboration and shared value, rather than a builder of regular products. Crowdsourcing has unleashed the unlimited potential of the crowd and enabled everyone to pursue excellence in multiple professions.

Disrupting the traditional model. As a bottom-up business model, crowdsourcing disrupts the traditional top-down business and organization hierarchy. In the traditional model, a company needs to hire a number of well-paid professional designers, and it is still very possible that their designs will not meet customer needs. This translates into high total cost and risk for the company. The bottom-up model, on the other hand, stimulates and pools the innovative power of each consumer. Drawing from varied educational and culture backgrounds, consumers provide diverse and sometimes unexpected ideas. Imagine crowdsourcing TV commercials. L'oreal normally spent 32,000 dollars making a TV commercial, which involved dozens of expensive tasks. But then L'oreal began crowdsourcing the job, using viewer-created content from Current TV to pool new and fresh advertising ideas. As a result, L'oreal only spend as little as 1000 dollars making one commercial.

Flattening the organization structure. Crowdsourcing is to some degree flattening the organizational pyramid, because a company now does not need as many employees as before, and the remaining employees are distributed in fewer layers of the organization. Meanwhile, crowdsourcing is also diversifying the channels of innovation. The crowd working for one company doesn't have to include people on the company payroll working in a certain location. They may come from anywhere around the globe. As long as they have interest in the projects and accept the offered conditions, they can play a part.

Breaking the wall of professionalism. Crowdsourcing doesn't rely on professionals; instead it depends on diversity and the power of individual amateurs. This is because the power of individuals, even if they are amateurs, is great, and folk wisdom, as a Chinese saying goes, is greater than any mastermind. IBM has an annual Innovation Jam, an event of collaborative innovation that lasts several days. Starting from 2005, IBM has originated "Jam" on its intranet platform. "Jam" is an annual collaborative innovation even that lasts several days. IBM also has a WikiCentral, an intranet Wiki, that is open to all employees. Any entry on WikiCentral can attract new contributions and improvements from developers and other colleagues worldwide. Thus both IBM Jam and WikiCentral are tools to break down the bureaucratic walls that can hinder innovation, and accelerators of business growth driven by crowd wisdom.

Promoting overall competition. There is no doubt that the market exists and evolves through competition, which happens naturally between companies, big

or small. Normally, small and even mid-sized companies face a greater threat. Fortunately, crowdsourcing is changing the competitive landscape, and now smaller companies can compete on more equal footing. Over the Internet, a small company can easily turn into a "global organization" with employees coming from virtually all continents. They may be strangers, but they serve the same company. In the past, the human resources department was responsible for just the limited number of employees on the payroll, but now they have to face the huge crowd of scientists, engineers and creators who are located in other parts of the world. Human resources managers now must understand information technologies and marketing, and grasp how to prepare crowdsourcing project manuals. The days where they could comfortably sit behind the desk talking just to inhouse employees are gone.

6.4.2 How to Benefit from Crowdsourcing

The key to benefiting from crowdsourcing is the smooth and quick transfer of innovative knowledge from users to companies.

Believe in and utilize the enormous collective wisdom of consumers. China has the largest population in the world, which translates into the largest consumer market and which is therefore a treasure trove for businesses. Domestic companies, which enjoy direct and quicker access to this mine of wisdom, would be guilty of wastefulness if they did not fully take advantage. According to China Internet Network Information Center (CNNIC), as of December 2013, there were 618 million Internet users in China, 177 million of which were rural users—that is only 28.6 % of the rural population. The overall penetration rate was 45.8 %. This shows that there are huge resources on the Internet already, yet there is still amazing potential to be developed. Nobody can afford to ignore these current and latent resources.

Care for the needs of Internet users. MIT Sloan School of Management professor Eric von Hippel argued in 2005 that "product-development processes traditionally used by manufacturers start with market researchers who study customers in their target markets to learn about unsatisfied needs. But this process is extremely wasteful". He insisted that user-centered innovation is steadily increasing in importance as computing and communication technologies improve, and that they will prove much more valuable than mainstream manufacturer-based innovation. Users may innovate if something is not available on the market and are willing to pay for its development. Market-segmentation studies suggests that users' needs for products are highly heterogeneous in many fields. This accelerates the demand and capability of users for innovation, and product design, which was once dominated by producers, is more and more created by users.

No one knows the real needs of users better than users themselves, and users are more active and creative in design than company-based professionals. Therefore, the core concept of crowdsourcing is collaborative innovation with

users to create shared value. Companies that ignore the power and real needs of users will be ignored by the market.

Utilize crowdsourcing platforms on the Internet. Now there are quite a few crowdsourcing platforms on the Internet, such as CONBY, InnoCentive, adkungfu.com and zhubajie.com. On these websites, companies can find the right problem solvers. At the same time, they can cut costs, drive up efficiency, promote innovation and increase company visibility. The costs they pay are much lower than employee salaries and even the cost of outsourcing. At the same time, users can earn income from their hobby if their design or concept is used. It is a win-win situation. As stated above, Procter & Gamble crowdsources solutions on InnoCentive, and it is also a client of YourEncore and NineSigma. Likewise, Chinese companies can get in touch with users on such online platforms and call for solutions to business problems.

Transform traditional ideas about innovation. More and more evidence is showing that the line between amateurs and professionals has begun to blur. Lego, a designer and maker of plastic construction toys, helps users participate in various areas of design, from robotic control systems to construction brick sets. Similarly, the furniture maker IKEA has IKEA Home Planner, with which consumers may participate design contests. The winner gets a 2500 Euro award and the winning design is manufactured and marketed. McDonald's and MasterCard have similar initiatives.

Crowdsourcing has extended the scope of user participation. Research and development was once the job of the R&D department composed of professional designers, then it became a company-wide task, then it became a producer-supplier partnership, and now it involves all end users. This transfer of responsibility reveals how crowdsourcing has changed the traditional concept of innovation. Companies can not deny this transformation; instead they must actively respond to and use it.

Of course, there are some downsides to crowdsourcing. For instance, crowdsourcing does not guarantee the quality of the winning design; the globalization of the workforce can cause communication problems; the winner may have stolen the idea; and the integrity of crowdsourcers can be hard to verify. There are risks, of course, but no doubt crowdsourcing will be a powerful tool that helps most small and mid-sized Chinese companies save costs, increase competitiveness, and master market trends. Therefore we should not give up crowdsourcing just due to its downsides. We must better regulate and improve it. IPR protection is important, but user identification that banks and other organizations use is also very helpful in creating a favorable and reliable environment for crowdsourcing in China.

How to utilize public wisdom and create economic benefits is now a hot management issue. It is also a complicated issue, as crowdsourcing involves a number of management factors, including collaboration, decision making, orientation and incentives. Great management expertise is therefore required to tap collective wisdom. In such a scenario, managers face more demanding requirements: Only if they can first learn how to leverage management systems, and master basic management processes, can they better manage all the possible noises from the

crowd. If you are just a lover of open thinking but have no conception of modern corporate management, you are very likely to turn collective wisdom into collective stupidity, according to Julian Birkinshaw, Professor and Chair of Strategy and Entrepreneurship at the London Business School.

Case Study The Trilogy of Crowdsourcing Innovation on adkungfu.com

Adkungfu.com is a leading advertisement crowdsourcing website of China, and, as its tagline indicates, a platform for online brainstorming. The website has gathered more than 30,000 young brainstormers and over a hundred chief creative officers from 4A advertisement companies as judges, and has generated a great number of impressive new ad concepts.

Milana is a furniture brand belonging to a leading Chinese maker of traditional furniture. Targeting young Chinese customers, Milana combines modern Chinese elements and the fashion of Milan in creating beautiful and stylish wooden doors.

Milana already had extensive experiences and strong technical capabilities, and what it needed most of all was to deliver its brand message to its target customers. As a traditional brand, it frequently used advertisement agencies to fulfil its marketing objectives. But in recent years, the mobile Internet has grown vigorously, while traditional communication channels have been marginalized. Milana tried to strike a chord with young consumers, but failed for many times. So it turned to adkungfu.com for help coming up with a new marketing strategy. Adkungfu.com taught Milana a "Trilogy of Marketing" techniques: first understanding customer psychology; then setting goals; and finally calling for contributions.

The first "act" required examining customers' psychology and understanding their real concerns. This is no surprise. People care very much about what their friends are doing and what they have on their minds, and this helps to explain why there are so many WeChat groups.

The registered designers on adkungfu.com are very young, mostly born after 1980. They were exactly the segment Milana was appealing to, and they understood the target customers' mindset much better than the company's marketers. Within a week, Milana received about a hundred contributions and finally mapped out customer preferences and needs.

Based on this understanding, the second act involved determining marketing goals and requirements: e.g., digital and print advertisements, PR events or branding videos.

This did not begin with making plans. Crowdsourcing platforms and designers were first used to consider what style, stories and channels work the best for young people.

There are many powerful companies with mature marketing teams that have become irrelevant to young consumers. Why?

Trends move quickly in the Internet age, and even well-designed campaigns may become outdated even before they are launched.

The key isn't just about getting the advertisement up to date, but also finding a story that anticipates where market trends are going.

In the third act, the company called for designs.

What Milana really needed was original visual design, eye-catching PR campaign, and creative video script. Traditional advertisement agencies believe they can do very well. Normally, they call some designers together and prepare the messaging and designs for the company behind closed doors. The problem is that their messages and designs are very likely to miss the mark if there is even one misjudgment or wrong assumption. This is true even for the best agencies. This was not a problem with adkungfu.com. After the first two acts, Milana had a clear picture of the customer mindset and a focused, prescient creative direction. On this basis, Milana was able to confirm what needed to be done before crowdsourcing the designs and other items.

Various forms of crowdsourcing are available on adkungfu.com. For tasks that require broader input, such as acts 1 and 2 above, any registered creator can contribute his or her concepts and designs, often leading to a very large number of submissions. This is open-ended crowdsourcing. For Milana, which demanded higher creativity, adkungfu.com used a different format: "internal comparison", a close-ended form of crowdsourcing that is open to experienced inhouse designers only. Ultimately, whether for open or closed sourcing, adkungfu.com offers a platform for real-time communication, and with the "internal comparison" model, Milana could participate in design generation. In this way, the final design could reach 4A-agency standards at less than half the cost.

6.5 The Maker Movement: The Next Step After Crowdsourcing

Human civilization has gone through several critical transformations in terms of production methods. It started with hunting and gathering, which gave way to farming and family workshops. This was the first transformation. Then the division of labor began with craftsmen who made tools and handicrafts. As productivity grew, family manufacturing appeared with dozens of people working as a workshop. The second transformation came when manufacturing was taken over by skilled labor. Products were made piecemeal or in small batches as productivity or technology grew further. Then mass production on the assembly line took over piecemeal or small batch production. This was the third transformation: costs dropped and efficiency rose. The fourth transformation was trade processing,

which can be called manufacturing outsourcing. The most recent transformations, namely outsourcing, crowdsourcing, and the maker movement, are all based on digitalization and the Internet. The maker movement, in particular, represents a big change to production modes in the environment of big data, cloud computing, platforms and mobile communication. It is not a simple repetition or restart.

On January 19, 2014, Lenovo Innovators Competition in Beijing drew more than 50,000 participants, who contributed more than 100,000 designs. The competition's website registered over 8 million visits. This became China's most influential innovation event, and it turned "Makers" into a buzzword and later a household concept.

Makers, in this special context, refer to people who try to turn their ideas into reality without seeking profit. Makers firmly believe that their ideas and innovations will ultimately change the world. The Maker Movement started in the USA, and is changing the face of industry. Dale Dougherty, President/CEO of Maker Media, who started *Make* magazine and the Maker Faire, was among the first to tap into the growing Maker Movement. He believes that all objects, from clothes to technological parts, can be created or transformed by Makers. As 3D printers and open-source hardware appear in households, makers get the access to the tools they need to build their product prototypes easily. This is bringing regular people closer to open-source hardware and spurring maker culture.

In the past, a product would go through a certain series of steps before it went to market: market research, needs verification, product design and mass production. Then in the early age of the Internet, custom production increased in popularity: consumers could find someone to produce and deliver what they want. Now, makers are opting for the C2B model, which goes from demand generation to demand analysis, product fabrication and sales. Makers are responsible for their own goals only: turning their ideas into reality. In this process, they need to be financed, to integrate resources, to find professional support, to build up virtual organizations and to fabricate the product. However these challenges are not as difficult as before. There may be no organization or team, but the system works because everything works toward the same goal. It is no longer a dream to own what you want. Material supply and product fabrication are made easier by the accessibility of 3D printing, the materials market, modular components, open-source design and other emerging technologies. It is now technologically possible for anyone and everyone to create and manufacture things.

The Maker Movement represents a spirit of free creation, individualization and community collaboration. The Maker revolution, or the third industrial revolution, is best seen as the combination of digital manufacturing and personal manufacturing. It is about digitalizing the physical world, and innovation is devolving from labs and scientists to users in communities. Now innovation is open, collaborative, and participative.

Traditionally, major innovations have come from companies. Individuals might have generated new ideas, but companies were needed to turn such ideas into commercially viable and socially accepted products. Companies may lose some of their importance because of the Maker Movement, which doesn't need them for

innovation, creation and commerce. Individual creation, production and labor will not belong to any particular commercial organization. The employment relationship between individuals and companies will turn into partnerships and the distribution of income will take the form of profit sharing rather than salary payment.

In the end of *Long Tail*, Chris Anderson makes a thrilling prediction: "A 3D printer is a domestic factory, capable of manufacturing almost anything in lot sizes of one. Someday, they may be as common as laser printers and not much more expensive. As 3D printing technology extends beyond brittle plastic to a range of materials, from metals to synthetic fabrics, we may be able to self-manufacture spare parts, toys, perhaps even entire machines that we've downloaded from some virtual retailer. We already have that power for digital goods: You can simply download a software, a song or a book onto your computer today. But someday that may also extend to physical goods. Today you print your own photographs at home; tomorrow you may print the frame, too … and every photo frame will be unique. We've already got rid of the capacity constraints of shelf space and channels, along with their one-size-fits-all demands. Soon we may lose the capacity constraints of mass production as well. The explosion of variety we've seen in our culture thanks to digital efficiencies will extend to every other part of our lives." This is no longer imagination, but a reality that is getting nearer and nearer.

6.6 Conclusion

As Cory Doctorow puts it in his science fiction Makers, "The days of companies with names like 'General Electric' and 'General Motors' are over. The money on the table is like krill: a billion little entrepreneurial opportunities that can be discovered and exploited by smart, creative people." Imagine what this will mean for China when the collective wisdom of the 1.3 billion people is tapped and when all of us are makers!

The wisdom of the cyberworld is just as valuable for the physical world. And there is much to look forward to in the revolution of production and business models. But history won't stop with outsourcing, crowdsourcing, the Maker Movement or any other single production model or technology. The wheels of transformation will keep turning.

Chapter 7
Prosumer Economy—From Supply Chain to Prosumer Economy

More and more service companies turn their supply chain into a demand chain, and therefore fully win consumer trust.
—How Companies Win: Profiting from Demand-Driven Business Models No Matter What Business You're In

They know that real demand comes from connecting the dots between the human factors and a quirky, ever-shifting combination of other elements. It comes from understanding how all these factors interact in complex, unpredictable, and counterintuitive ways. And while every demand story is unique, they all start in the same place: a person, a problem, and an idea.
—Demand: Creating What People Love Before They Know They Want It

People say they love it, but they don't buy it. Why?

In the initial stage of Netflix, its founder deeply believed that his website can provide a new way of renting movies, more convenient, less expensive and with fewer troubles. He also believed that his customers loved online services offered by Netflix, and a large number of potential customers heard of his company. However, the problem was that the subscription rates in other US cities were much lower than that in the San Francisco Bay area. What, then, was different about the Bay area? An intensive survey was launched to examine the attitudes of both Netflix customers and noncustomers in cities around the United States. There was one, and only one, consistent difference in the survey responsed from Netflix customers in the Bay area—and it was big enough to explain the difference in subscription rates all by itself. Virtually every Netflix subscriber in the Bay area raved about how fast they got their movies. Comparatively no one in the rest of the country felt that way. The reason for the difference was now so obvious. The distribution center from which all the DVDs were mailed was in the Bay area! So Netflix opened more distribution centers in different cities, and wherever a new distribution center was opened, subscription rates swiftly doubled.

X. Zhu et al., *Business Trends in the Digital Era*, DOI 10.1007/978-981-10-1079-8_7

At the end of this story, the author of Demand, Adrian J. Slywotzky says,

> It was a bit ironic. Netflix relied on two remarkable technological breakthroughs—the Internet and the DVD laser disc as well as the incredible software created by a team of brilliant programmers. The company was a quintessential artifact of the high-tech industry. Yet now its leaders had discovered—to their shock and, perhaps, their chagrin—that the secret weapon behind the company's success was a low-tech delivery system founded more than two centuries earlier by Benjamin Franklin and consistently run by government workers: the U.S. Postal Service.

Then why do customers who love your products still go away?

Most classical music marketers have always assumed that convincing potential new subscribers to give the symphony a try is the key to growing demand. The assumption is that, once people venture into the local symphony hall to hear a concert, the sheer beauty of the music will draw them back. There's only one problem with this theory: it just isn't so. Every year thousands of potential new listeners are persuaded to attend their first classical concert. The concert hall is beautiful, the performances stunning, the music ravishing. Yet most of those one-time visitors never return. The apparent failure of orchestras to convince one-time attendees to become longtime supporters poses quite a puzzle. In 2007, nine symphony orchestras joined forces, hiring a team of researchers to analyze symphonies' marketing challenges. The study confirmed that customer turnover was a major issue for the nine orchestras in the consortium. Among first-time concertgoers, the "trialists" as opposed to the "core audience", the churn rate was an almost unimaginable 91 %. Why?

Using online surveys and other testing techniques for examining customer behavior, the researchers further found results that were fascinating and often counterintuitive. It turned out that factors like the relative prestige and quality of the local orchestra were not terribly important in attracting return visits by trialists. Neither was the beauty of the concert hall, the opportunity to hear contemporary music, nor the selection of refreshments. And what did make a difference? At the top of the list was parking. The simple ability to travel to and from the concert hall with a minimum of fuss was the single most powerful "driver of revisitation", as the researchers put it. It was the key demand trigger for trialists. But parking was something few orchestra companies had ever focused on.

The common revelation of these two stories is that a company must focus on what their customers want, or shift their attention from the supply end to the demand end.

So let's get into the new world driven by demand.

7.1 The New Scenario of Demand in the Digital Age

In 2002, Rick Kash asserted in his new book, *The New Law of Demand and Supply: The Revolutionary New Demand Strategy for Faster Growth and Higher Profits*, that the law of supply and demand would dramatically change in the global economy:

- In the age of globalization, economic cycles are shorter than those in any other time in history;
- Almost every industry is obsessed with oversupply;
- The pricing power which producers enjoyed will vanish;
- Consumers can shop and compare prices more easily than ever, putting an end to the age of information scarcity; and
- Products have shorter life cycles.

Now most of his forecasts have become reality. A new arena is taking shape where the noticeable factors are information and new technology swapping capability and efficiency and speed of market entry. Competition is getting fierce globally, and every company, big or small, is under great pressure to offer more and better products and services at lower costs and higher speed. So this world has become amazingly efficient and oversupplied, and consumers are faced with too many choices of products and channels.

At the same time, due to changes in demographics and life style, this world is largely entering into an era of compression. While some regions still enjoy high growth, the birth rate in most industrialized countries is declining, and the size of families is declining too, which means fewer consumers and smaller demand.

Due to the combination of general oversupply and declining demand (more products and services for fewer buyers), consumers have won unprecedented power over companies. As Rick Kash put it in 2012, we have entered into a society dominated by demand in the long term. The new deciding force of the global economy is demand, which is shifting and changeable.

If you ask economists whether today's economy is still a product economy, nine out of ten would say, "No. The service economy has already come." Some people who look further would even say, "We are entering into an experience economy." Then, in such a new era, has enough effort been given to products?

7.1.1 Reflections on the Traditional Supply Chain

The traditional supply chain starts with product manufacturing. Then products are sold to wholesalers who sold them to retailers, and consumers buy them from retailers. On the stretched chain from suppliers to consumers, there have been a variety of strategic options: Just-In-Time (JIT) delivery, Zero Inventory, Flexible Manufacturing, and Third-party Services; technological solutions including Computer-Aided Design (CAD), Computer-Aided Manufacturing (CAM), Digital Automation, Information Technologies and Artificial Intelligence; and a range of management systems, including ERP (Enterprise Resource Planning), CRM (Customer Relationship Management) and PR (Public Relations), that form the framework of the corporate information system. In theory, things are perfect as these tools and systems are interconnected and give producers enough supply capacity and flexibility.

There are problems indeed. In the traditional supply chain, there is a close cooperation between links, but the operation model is linear. It goes from suppliers to manufacturers to distributors to retailers and finally to consumers at the end of the chain. The key problem is that consumers are passive while the movement of goods on the supply chain is first and foremost decided by manufacturers who are far away from the consumer market. It is most often the case that the choice of products is not based on specific market needs or consumer preferences; instead it is based on technological competence, resources and marketing capability of the manufacturer. The trouble is often that manufacturers cannot adjust to the diversified and shifting consumer demands.

Imagine the changes the traditional supply chain has to cope with: reduced product life cycle, customized product demand, finer segmentation and intensified competition. Isn't it right to compete based on products? Yes, it is right, but this argument poses a restraint on market vision. Producers are likely to miss the real needs of consumers and may be unable to deliver products that consumers really need and want to buy. As the CEO of a large consumer goods manufacturer lamented, "For the past few years we have been focused on engineering our entire supply chain. As a result, we now get the wrong products to the wrong customers at the wrong stores faster and cheaper than anyone else." Lower costs, faster cycle time and higher quality supply aren't enough.

7.1.2 The Rise of the Demand Chain

The dominant force in the supply chain is also changing. At first, manufacturers were the most powerful link members. They decided the products to be manufactured, and consumers took what they made. If car makers wanted to produce a million black cars, they didn't need to care whether their customers preferred other colors.

The 1950s and 1960s represent an age of large retailers in some countries and regions. Retailers like Toys RUs, Circuit City and Home Depot gained a lot more power on the supply chain, because they provided a powerful link between manufacturers and wholesalers on one end and the elusive consumer on the other. The emergence of Walmart in the 1990s rewrote the rules of production and sales throughout the supply chain.

Then the predominance of Walmart and thousands of its suppliers and partners were challenged. The center of power shifted again. The position of consumers rose and consumer demand began to play a leading role in the supply chain, which was reshaped and transformed into the demand chain. This latter term has quite a few definitions.

For instance, in *How Companies Win: Profiting from Demand-Driven Business Models No Matter What Business You're In*, Rick Kash gives the following description: "A demand chain is a collaborative network composed of manufacturers, retailers, and media companies that enable each participant to better

understand—and more completely and precisely fulfill—customer demand." This definition emphasizes the collaboration of manufacturer, retailers, media companies and their interactions with customers.

Zhang Xiang, a research fellow of AMT institute, defines the demand chain from the perspective of customer service management: "A demand chain is a network composed of service consultation, service design, service delivery and service tracking to achieve the goals of creating, developing and satisfying customer demands." The main point in this view is that the demand chain starts and ends with service demand, while a supply chain starts with the supply of materials and ends with the delivery of end products.

According to another view, the demand chain focuses on the process of consumer expectation reaching the market. This process involves manufacturers, distributors and retailers, but the exact composition is decided by consumer behavior and consumer analysis.

These definitions care about different aspects of the demand chain, but they attach great value to consumer demand. So demand chain would be the synonym for the demand-driven trend.

7.1.3 The Changing Rules of the Game

As a push model, traditional supply chain focuses on product supply, emphasizing on inventory turnover, sale-to-output ratio, cost, delivery, etc., with a aim of lower cost, fewer inventory, shorter cycle time, higher quality supply and faster delivery.

Unlike the traditional supply chain, a demand chain is based on customer demand, and emphasizes customized service, communication with customers and satisfying customer needs. First and foremost, a demand chain aims to satisfy customer demand actively. The process will not be driven by manufacturers any longer, but by end users or customers. Companies will try to provide highly customized services to satisfy the needs of end users, reduce inventory cost and increase their market share and their profit share.

This does not mean that the traditional supply chain ignores consumer needs. In the supply chain, retailers are closest to consumers and are responsible for providing customer feedback, such as on consumer needs and customer satisfaction. On this basis manufacturers modify their products (such as updating their packaging), develop new partnerships and refill their inventories.

Rather than adopt the traditional focus on products, the demand chain gives more consideration to customer demand, which now includes the demand for services ranging from convenient and appropriate product placement in the store to aftersales follow-up. In the demand chain, all the links interact and collaborate with each other, meaning that a product may not originate from the manufacturer and that gathering customer insights is not the sole responsibility of retailers. Each link in the demand chain collects and shares information, and a product can be developed by any member of the community at any point of the chain.

In the past, retailers fought for market share or dominance, as did wholesalers and manufacturers. Every participant played very tough in the competition. In the demand-driven age, however, the rules of the game are all changed. Many industry leaders have realized that a winning strategy is no longer based on the activities of any single organization but rather partnerships and alliances. Changes in demand cannot be satisfied without collaboration along the chain of goods and services.

Of course, we don't dismiss the traditional supply chain entirely when we talk about the demand chain. The idea is that the traditional supply chain is unable to attain a competitive edge through faster development, lower cost and higher quality only. The supply chain must be linked with the demand chain. In other words, the right products and services should be created and delivered to the right customers at the right locations and the right time, based on customer information generated by the demand chain. The supply chain should closely follow and quickly respond to the demand chain, not vice versa.

7.2 Prioritizing User Demand

In the demand economy, low cost and high quality supply are still very important for winning and keeping market leadership, but these do not guarantee the final success. To gain a higher profit share and stay ahead of its competitors, a company must fully understand customer needs and then develop the right products (including the right packaging, the right price, and the right product information).

There are exciting business cases. They reveal that it takes more than a dream and courage to create a business legend. It also requires a careful study of hidden customer demand. The explosive success of any product or service is achieved by putting neglected demand at the forefront.

7.2.1 Qunar.com: No Model, but Demand

Qunar is China's leading mobile and online travel platform and it became the first Internet website to offer Chinese travellers vertical search for the cheapest flight tickets. Qunar also established the biggest hotel rating platform in the world after noticing that two thirds of users were viewing comments when they booked hotels. In October 2013, Qunar launched its "Local Service" for travellers who prefer customized trips and travel advisers, positioning itself as more economical than travel agencies and less risky than a DIY tour. This Local Service offers both a sense of assurance and a real local experience.

This illustrates the assertion of Chenchao (CC) Zhuang, co-founder and chief executive officer, that Qunar.com has no rigid "model", focusing on demand instead. This has been the key to its success so far. By September 2013, over 300,000 pictures on the website give its users a real view of hotels; by September

Table 7.1 Qunar's demand-led services

User demand	Qunar's services
How to find the cheapest airplane ticket among countless online sellers?	First vertical flight ticket search platform in the Chinese tourism sector
Two thirds of users need to know what a hotel is actually like when they make a reservation	Largest hotel rating platform in the world; 1870 accommodations testers contributing 12,305 reviews; Over 300,000 hotel pictures helping 11,544,324 users find satisfactory hotels
Travel agencies are too expensive and DIY tours are too risky. How can users get a true "local experience"?	"Local Service" by Qunar; Hiring locals as tour assistant; Tailored trips

Source Shanghai Institute of Digitalization and Internet Finance

2014, more than 3196 hotel critics and accommodations testers had shared their professional hotel reviews on the website. On November 1, 2013, Qunar was listed on the NASDAQ and valued at 3 billion dollars (Table 7.1).

7.2.2 P&G: The Consumer is the Boss[1]

In 2000, when A.G. Lafley became the CEO of Procter & Gamble, he saw a company that had lost its way. The stock had plunged almost 50 % after a warning in March 2000 that the company would miss its earnings estimates. Lafley looked for simple ways to reenergize P&G's innovation energy. He came to the conclusion that the company needed to fundamentally reorient itself. P&G was world renowned for driving decisions based on deep customer understanding, but on reflection, Lafley realized that the company's focus had drifted.

Lafley is gifted at communicating complicated ideas in simple language. He developed a simple mantra to relocate P&G: The consumer is the boss. An employee might hear him say: "Fellow P&G-ers, I'd like you to meet your new boss. You may think that I, as your CEO, am boss. That's not right. You might think that the board of directors to which I report is boss. That's not right. You might think our shareholders are the bosses. That's not right. You might think your line manager is boss. That's not right. We have one and only one boss that matters. The consumer. The consumer is the boss."

Lafley urged P&G to understand their boss as never before, and to hear what the consumer was saying and, much more importantly, tease out what the consumer wanted but couldn't articulate.

To do this, Lafley worked to create a culture where everyone in P&G—from the chairman down—would spend time living with its consumers, shopping with

[1] http://www.fastcodesign.com/1669070/3-ways-to-predict-what-consumers-want-before-they-know-it.

them, or working alongside them. He has described invaluable insights he personally obtained in his career by spending time in the market: for example, while Lafley worked on Tide laundry detergent, P&G would regularly administer surveys to assess the quality of its product and packaging. Consumers reported that they loved Tide's packaging (at the time, Tide was packaged in cardboard boxes). Yet, when Lafley was interacting with a consumer, he noticed that she almost always used a screwdriver or scissors to open the Tide box. Lafley realized that the woman didn't want to risk breaking her nails opening the cardboard box. She said she loved the packaging because she didn't know of any alternatives, but in reality, she had to find a "creative" way to open the box because of its design limitations.

Many P&G products trace their inspiration to these kinds of observations. For example, a woman's frustration at spilling coffee grounds on the floor helped inspire P&G's Swiffer quick cleaning line, which today produces more than 1 billion dollars in annual revenue.

7.2.3 Amazon: Standing in the Shoes of Customers[2]

The customer-centric way is always a defining element of Amazon's culture. One advantage of a customer-driven focus is that it fosters a certain proactivity. Amazon believes it should be internally driven to improve services for users, adding benefits and features before it has to. It lowers prices and increases value for customers before it has to, and develops systems to "proactively" detect user experience and act on it.

Amazon always steps into its customers' shoes. For example, most customers are too busy themselves to monitor fluctuations in the price of an item after they pre-order it, and Amazon's policy could have been to require the customer to contact the service and ask for the refund if he is unhappy. Being proactive and sending a reminder to customers can be more expensive, but it also surprises them, delights them and earns their trust. "I just received notice of a 5 dollars refund to my credit card for pre-order price protection…What a great way to do business! Thank you very much for your fair and honest dealings," a customer said.

Amazon builds automated systems that look for occasions when it has provided a customer experience that isn't up to company standards, and those systems then proactively refund customers. The editor of *Business Insider*, and an Amazon customer himself, recently received an automated email from Amazon that said, "We noticed that you experienced poor video playback while watching the following rental on Amazon Video On Demand: *Casablanca*. We're sorry for the inconvenience and have issued you a refund for the following amount: 2.99 dollars. We hope to see you again soon." Surprised by the proactive refund, he ended up

[2] *Jeff Bezos' Letter to Shareholders on Proactivity, User Needs, and Long-term Investment*, Jeff Bezos, http://www.businessinsider.com/amazons-letter-to-shareholders-2013-4.

writing about the experience: “Amazon noticed that I experienced poor video playback…And they decided to give me a refund because of that? Wow…Talk about putting customers first.”

Amazon also has authors as customers. Amazon Publishing recently announced it would start paying authors royalties monthly, beginning sixty days after publishing. The industry standard is twice a year, and that has been the standard for a long time. Yet when Amazon interviewed authors, it found that infrequent payment was a major source of dissatisfaction. Though Amazon isn’t forced to pay authors more than once every six months, it is doing so anyway.

In a letter to shareholders, Amazon CEO Jeff Bezos wrote: “When we’re at our best, we don’t wait for external pressures. We are internally driven to improve our services, adding benefits and features, before we have to. As I write this, our recent stock performance has been positive, but we constantly remind ourselves of an important point—‘In the short run, the market is a voting machine but in the long run, it is a weighing machine.’ We don’t celebrate a 10 % increase in the stock price like we celebrate excellent customer experience.”

Standing in the shoes of customers and putting customer needs first have been proven to be the cornerstones of lasting success.

7.3 Consumer Demand: Seeing Past the Tip of the Iceberg

The importance of demand cannot be overemphasized. The key, however, is whether you can detect demand that is still taking shape and that customers are not yet aware of, and then try to satisfy the demand. Can you discover the demands of tomorrow, of next year, or of five years in the future while your competitors struggle to meet the demand of today?

The problem is that the greatest customer demands are not always obvious. Industrialist Henry Ford once said, “If I had asked people what they wanted, they would have said a faster horse.” We have all heard Henry Ford’s famous quote, which has become the battle cry of many a visionary entrepreneurs who swear against asking customers what they want. Steve Jobs had a reputation for, amongst other things, his stance against customer input. “It’s really hard to design products by focus groups. A lot of times, people don’t know what they want until you show it to them.”

Freud likened the mind to an iceberg: consciousness makes up just the visible part of the iceberg above water, while the subconscious forms the bulk of the iceberg under the water’s surface. In the business case, the subconscious is the real determining factor for any buying decision. The conscious portion is what customers see and believe that it motivates them, but more often than not, the underlying impetus remains hidden. Therefore it requires a great deal of effort and careful observation to detect the larger part of the iceberg under water.

It is of course far from adequate to explicitly ask customers to pinpoint or quantify their demands. Most customer insights have come instead from direct contacts

and deep communication with customers, such as observing the behavior of customers on the street and having in-depth conversations with members of the target audience. While these approaches may appear informal or simplistic, the observations they generate can be more revealing than what the customers say themselves.

7.3.1 Observing in the Real Environment

Customer behavior is most reliable in the real environment. For instance, one of the most signature technologies of Reebok is the Reebok Pump, which debuted in 1989 and which saw more than 100 professional athletes wearing the footwear by 1992, including Shaquille O'Neal. The idea of pumping air in the heel of the shoes was considered a joke, but basketball players changed their minds after playing in these air-filled shoes—they loved the design, and that's why it succeeded.

This is perhaps not the best example, but the point is that we should observe our customers, including the potential customers, in the real environment. While difficult, examining their behaviors (and how they change when purchasing) can go a long way toward product improvement and the discovery of new opportunities.

Consider shopping for jeans. Research shows that women find it the second-most intimidating shopping experience, behind shopping for swimwear. In 2009, as part of an ambitious innovation program, VF Corporation, which makes Wranglers and Lee Jeans, began to spend more time engaging with customers to better understand their specific points of frustration.

One trip to a local department store proved particularly illuminating. Executives watched as prospective female customers shopped for a new pair of jeans. They wandered around the endless clothing racks in the store, picking up pair after pair of jeans. Two things stood out to the VF team: first, the sheer volume of jeans the woman brought into the dressing room. Second, the fact that the woman had picked up multiple sizes of every style she was trying on.

The executives assumed that they must have recently experienced a weight change, so they were unsure of the size. But in fact it turned out that their experience taught them that the sizes that appeared on the labels of jeans are not only relevant to looseness, but also body fitness. Their workaround involved bringing in volumes of pairs of jeans in order to find one good fit.

These observations helped the company focus its innovation efforts on the jeans-buying process. VF changed the labeling on its jeans, developed innovative display mechanisms in retail stores, and launched an online campaign for which noted style icon Stacey London helped women find jeans that best suited their body type. In early 2011, VF reported that these and related innovation efforts had created 100 million dollars in incremental revenue in its jeanswear division.[3]

[3]http://www.fastcodesign.com/1669070/3-ways-to-predict-what-consumers-want-before-they-know-it.

7.3.2 Experience as a Customer

For a customer, the product or service experience is more important than the product or service itself. One must have an underlying emotional connection with the product or service and believe that it will save him or her time or energy. If one does, it's much more likely that he or she will be happy to open one's wallet. An effective way to create a positive customer experience is by using and experiencing your products as a customer.

Being established in 2008, Airbnb (AirBed and Breakfast) allows individuals to rent out their sofa, room, apartment and houses through Internet. Home owners set their rental prices, while Airbnb collects rental fees from home users and retains some amount of the rental fees as its commission.

Chesky and Airbnb's other co-founder, Joe Gebbia, became roommates in 2008 when they both moved to San Francisco. Both were unemployed and in need for money. At the time there was an Industrial Design conference coming up that would be held by the Industrial Design Society of America, and many hotels were overbooked. The pair believed they could make some money by renting their place out. They bought three airbeds and marketed the idea by creating a website called "Air Bed and Breakfast." This was the foundation of Airbnb.

In 2010, Brian Chesky stayed in spaces he found on Airbnb for almost a year, changing locations every five nights or so. It turned out to be an amazing year, letting him experience different living and social environments. He once stayed with one of the top air guitarists in San Francisco, and another time with a Ski-Ball pro ranked number two in the US. He stayed at the home of an architect who had designed the house himself and made it into a beautifully furnished, modern and eco-friendly space.

Brian Chesky believed this experience gave him a real understanding of what customers needed, which has helped him figure out how to improve the user experience. He emphasizes "understanding nuances and learning how to empathize with our users. Also, improving the UX of the site. As an industrial designer, you just have to consume it, you have to live it," he said. "People are requesting two things from us. People are requesting that they can book or rent out different types of spaces, and they're requesting that they can rent them out for a larger window of time. They'd love to rent out their bike, their parking space, their car. They want to be able to rent out a hot air balloon, a pool, things you could never imagine."[4]

7.3.3 Precise Demand Prediction via Big Data

While we must try to understand customer demand, we of course can't understand and respond to all customer needs, and we don't have to. It is impossible to design

[4]*Dialogue with Brian Chesky: Needs drive Innovation*, http://99u.com/articles/6920/Airbnbcom-Necessity-Begets-Creativity.

a product that satisfies all customer demands; a smart designer and creator will focus on a certain segment and target the members of that group, predict their specific needs and address those needs precisely.

In the past, customer information was collected through surveys or quota sampling, and then analyzed and categorized. The age of big data, or data analytics, has made it possible to monitor and track customer behavior and to amass customer information online. It has therefore become easier and cheaper to predict customer demand more precisely.

For example, the following is a famous story about how big data helps to predict customer demand precisely.

At the beginning of 2012, a man walked into a Target outside Minneapolis and he was angry, asking the Target store manager, why the store continued sending her daughter coupons for baby clothes and cribs. The angry father said, "She's still in high school. Are you trying to encourage her to get pregnant?"

The manager apologized and then called a few days later to apologize again. On the phone, though, the father was somewhat abashed. "I had a talk with my daughter" he said, "It turns out there's been some activities in my house I haven't been completely aware of. She's due in August. I owe you an apology."

This story carried by *New York Times* was titled "The Incredible Story of How Target Exposed A Teen Girl's Pregnancy", and it amazed US readers about the power of data analytics.

But how was Target able to make the incredible prediction? The answer is that it has a very well managed data tracking system, supported by a strong statistical team led by Andrew Pole, who identified over 20 products that, viewed together, indicate a woman buyer is likely pregnant. The value of this information was that Target could send coupons to the pregnant woman and encouraged her to make more purchases. Whenever possible, Target assigns shoppers a unique code—known internally as the Guest ID number—that tracks everything they buy. "If you use a credit card or a coupon, or fill out a survey, or mail in a refund, or call the customer help line, or open an e-mail we've sent you or visit our Website, we'll record it and link it to your Guest ID" Pole said, "We want to know everything we can." What also linked to your Guest ID is demographic information such as your age, whether you are married and have kids, which part of town you live in, how long it takes you to drive to the store, your estimated salary, whether you've moved recently, what credit cards you carry in your wallet and what websites you visit, etc. Target can buy data about your ethnicity, job history, the magazines you read, any bankruptcies or divorces, when you bought your houses, where you went to college, what books you prefer reading.

Another good example is Carolinas HealthCare System (CHCS). CHCS operates the largest group of medical centers in North Carolina and South Carolina, including more than 900 care centers (e.g., hospitals, nursing homes, doctors' offices and surgical centers). CHCS is placing its data, which include purchases a patient has made using a credit card or store loyalty card, into predictive models that give a risk score to patients.

Within the next two years, the score to be regularly passed to doctors and nurses who can reach out to high-risk patients to suggest interventions before patients fall ill. A patient may soon get a call from his doctors if he hasn't used his gym membership card for a long time, or has developed a habit of drinking too much or begun shopping at plus-sized clothes.[5]

In this digital age, companies need to cope with ubiquitous networks in a new way. Businesses should be able to understand the user's perception of their services and products on a real time basis via blogs and BBS (bulletin board systems), and therefore predict the user's demands. It should be noted, however, that data analytics are not equal to customer insight, which should be focused more on personal observation. Figures and demographic labels cannot replace face-to-face contact.

Of course, no matter what tool or method is used to discover and predict customer demand, one thing is clear: customer demand is unlimited, but your resources are not. So your task is not to find out the demands of all target customers and pick the "right demand". On the contrary, you should identify your selling point and align it with the right segment, and then focus on this specific segment to gain a larger share of profits. In addition, you should look beyond current demand to non-customers, who pose new demands and represent new opportunities. The next chapter—which focuses on Long Tail, the notion of looking at the tail itself as a new market of consumers—will present the best strategies to capture these new demands and new opportunities.

7.4 How to Create the Demand Chain

For many years, traditional supply chain management has given a substantial competitive edge to many companies. The demand chain extends the supply chain while communicating the real needs of customers to the market; meanwhile the demand chain breaks through the logistical restrictions of the supply chain, uniting all members of the chain together to deliver solutions that satisfy customer demands. In general, the creation of the demand chain involves the following steps[6]:

- Identifying and analyzing unsatisfied customer demands;
- Finding partners to perform the necessary roles in the demand chain;
- Transferring each role to the most effective and efficient partner on the chain;
- Sharing information about customers and users, available technologies, and opportunities and challenges concerning logistics with partners on the chain;

[5]*Big Data Has to be Raised Up: Hospital can Predict Potential Medical Needs Through Data Mining Patients' Credit Card Records*, Wang Xintian, http://www.36kr.com/p/213480.html.

[6]"A Transformation from Supply Chain to Demand Chain", *Information and Computer*, Wang Yan, Issue 11, 2000.

- Developing products and services that meet customer needs; and
- Developing and applying the best logistical methods to deliver the products and services as customers expect.

7.4.1 End Users, not just Direct Users

Valuing demand and discovering demand are the prerequisite for creating the demand chain. Many people believe that a company needs to focus on its direct customers only, because it does not sell its goods to end users. This is a mistake. For any company in any part of the value chain, addressing the problems of direct customers is tied to addressing those of customers further downstream. That means the company must consider the needs of the whole value chain, in which demand originates from end users. If end users buy less from retailers, retailers will order less from their supplier (the producer) or enter into fewer transportation contracts. Any demand predictions must include end-customer trends.

7.4.2 Long-Term Partnerships

As a collaborative network, the demand chain should first gather a number of partners so that all the necessary links on the chain are functional and all duties are performed. To gather such a group, there must be one or more pioneering partners willing to take on unconventional roles to attract more participants. The demand chain will create more value for customers than the supply chain so long as there are enough long-term partners committed to supporting the demand chain. It increases further in value when it operates properly, by bringing more potential benefits to all participants.

The Hershey Company, one of the largest candy manufacturers, was losing market share to its competitors, so it decided to shift to a demand-driven approach. Hershey put its market and consumer insights together with retailers' insights on shopping malls, shoppers and triggers for making purchases, and designed for the retailers a comprehensive operating system to drive sales and profitability of Hershey and its retailers. This operating system involves:

- Identifying the unique demand mix for each retailer;
- Putting retailers into categories and designing unique brands for each category;
- Designing the best brand mix, inventory unit and packaging type for each retailer category; and
- Designing sales, distribution and marketing programs to generate the best results for the retailer communities.

According to conventional wisdom, Hershey's, as a supplier, didn't need to take on these challenges. But it did, and retailers responded immediately to get involved. Retailers are clearly aware that the era when "everyone is a competitor" has passed; partnership is the best choice for creating the highest profit and efficiency. As Hershey's former President and CEO J.P. Bilbrey put it, "When all participants are going in one direction, product pipeline is not that important any more, because we've found our intellectual pipeline."

7.4.3 Sharing Demand Information

A key to the success of the demand chain is information sharing among all participants, whether the information comes from a point-of-sale survey or from new methodology or internal research. Data must be shared. This means every link of the chain, including design, manufacturing, distribution, transportation, and retail, is responsible for exchanging forecasts, inventory and consumer trends, and feedback on product design, promotions, packaging and distribution strategy—responsible, in short, for monitoring customer demand and sharing market and consumer data—even though they may not be directly involved in researching and forecasting trends.

Take the example of retailers and manufacturers. In the past, retailers possessed vast amounts of data about customer demographics and purchasing behavior, while manufacturers collected data focusing on why the consumer bought their goods. Each group had only half of the picture, but they rarely worked together to see the whole picture. When it functions properly, the demand chain brings the insights of all participants together for their mutual benefit. All analysis, databases, and statistics on customer demographics and purchasing behaviors are integrated in a practical and profit-generating model.

For instance, Walmart offers its Retail Link system to all suppliers, allowing suppliers to analyze and optimize their Walmart portfolio. Suning Appliance Company Limited (Suning), one of the largest privately owned retailers in China, has also opened up its powerful ERP database, by which upstream appliance manufacturers can examine the flow of their own goods in Suning's stores and therefore manage their inventory, logistics and aftersales services.

The actions above have generated long-term partnerships on the demand chain, as well as satisfactory profits. On the demand chain, customer information and information about goods and services flow freely back and forth among all participants, offering insight into the preferences of customers, their lifestyles, their demands and expectations, and the movement of products along the supply chain. Therefore, every participant is able to improve product design and packaging, develop better products, launch more targeted promotions, better satisfy customer needs and hence create more benefits for the whole value chain.

7.4.4 Learning to Leverage Crowdsourcing

In the Internet era, a company is equipped with more tools and channels to build the demand chain, and one of the most valuable means is crowdsourcing. Crowdsourcing transforms the relationship between producers and users from product-trading to collaboration. Users participate in the whole process, from product or service design to manufacturing, packaging, delivery and the final experience, and their participation will generate powerful feedback for producers, who are therefore able to better meet the needs of users.

The Chinese outbound travel service provider Qyer is a good example of tapping into crowdsourcing demand. The website, qyer.com, offers a special type of travel guide called the Qyer Guide. Traditionally, a travel guide would be compiled by a travel writer, who bases the content on his or her own perspective and experience and writes it as an authoritative and one-directional text (for example, Lonely Planet guides). The Qyer Guides take a different approach. They are made up of concise, practical and fresh contributions from users, and reveal the experiences of Chinese tourists in cities all around the world. Any traveler can be both a reader and a writer of Qyer Guides, and the guides themselves have attracted praise after launch, logging 400,000 downloads in less than a week. They are offered free of charge, but the key to their popularity isn't the (lack of) price. They are popular because they start from the real demands of tourists and created by the people who know those demands best: the tourists themselves.

7.5 Lean Startups and the Demand Chain

The term "lean startup" comes from the best seller *The Lean Startup*. Its underlying idea is that product design is no longer in the hands of product managers or designers, but of users. Compared with the concept of demand chain, it mainly addresses how a startup builds its demand chain, the key to which are validating customer demand and adapting and adjusting before it's too late.

For startups, especially those in emerging sectors, questionnaires won't help reveal demand, because most of them are based on existing technologies and current market trends. They are helpful for mature sectors (for example, the shampoo market), but mean nothing for startups focused on innovation or disruptive innovation. The current market has no idea of what these startups are developing and trying to deliver.

Before the iPod reached the market, most people didn't see the point of storing a month's worth of music in an MP3 player. Any market survey at the time would have told you that users needed only enough music for a day. If Steve Jobs followed this survey, he would never have built up Apple as we see it today. But how can a startup engaged in disruptive innovation validate customer demand and adapt?

7.5.1 Two Cases

The most familiar case in China is Xiaomi, the Chinese smartphone maker. In the past, mobile phone makers would produce a beta handset and test it among target users. Afterward the company would modify the properties that didn't match customer needs, at a rather high cost of course. Xiaomi, however, started with software and came up with its simple MIUI system, which can be installed on the Android smartphones of other companies. With these test handsets, Xiaomi called for user feedback and each week updated the system accordingly. Using this quick cycle of feedback and updates, Xiaomi improved the user experience and gained user loyalty. Based on certain conversion rate, when the number of MIUI users hit 300,000–400,000, it was possible for Xiaomi to sell out 150,000 units of phones and recover its investment. After it decided that its user base and user demand were mature, Xiaomi started manufacturing the hardware. Xiaomi reported 3 million sets sold during the first year, even though its goal was just 300,000. As Xiaomi didn't have to modify the hardware when it tested the software system, adaptation proceeded very fast at a very low cost. Most importantly, Xiaomi accumulated a great number of loyal fans.

Another case is Lizhi FM, a music app. At the start, Lizhi FM didn't invest too much time or financial resources. The company thought of making a smartphone app, but radio was not popular in China. Would there be any demand at all for mobile radio? To figure it out, the startup team spent three days turning out the beta app, and registered a WeChat public account. On WeChat, they found more than 4000 Chinese broadcasters and contacted 500 of them. Lizhi FM ultimately gave links to 300 of the broadcasters on its WeChat public account. At first, the interface was very rough. There was not even a customized menu. Users would have to post a message with the number 1 to the WeChat public account to request a radio program. The WeChat public account gathered more than 30,000 users in the first month, and the number increased to 50,000 in the second month. Though this was exciting, because it proved demand existed, the growth was a bit too slow.

Then they made an important change, adopting a Label Cloud (which syncs items tagged by the user to the cloud) with the hope of further stimulating user interest. The results were fantastic. The number of users soon exceeded 500,000, and grew to 1 million a month later. There were over 200,000 active listeners and more than 1 million requests per day. The Lizhi FM team was thrilled that users had remained loyal even though the app used a lot of data, and then the team focused on revising the app to better fit user preferences. The team wisely did not rush to develop its own platform initially, which risked high costs if it failed. Instead Lizhi FM first validated user demand at a low cost, and launched a full-fledge app once it had a larger number of users.

The stories of Xiaomi and Lizhi FM point to the need to validate customer demand. Their products were launched after proving the existence of demand and figuring out the real needs the product is supposed to meet. Afterwards, the companies adapted their solutions according to market feedback, and through this

sometimes slow and painful process they have accumulated a considerable number of loyal users. This approach has been endorsed by venture capitalists and evolved into a range of unique and winning models. Yet if Xiaomi and Lizhi FM had found no user interest, they would not have pursued their initial ideas at all.[7]

7.5.2 Steps for Startups to Validate Customer Demand

We believe there are five steps for a startup to validate customer demand.[8]

Step One: Producing the initial prototype based on the startup's vision. The prototype can first be tested by the team and then by users who are tough. At this stage, the aim is to discover any defects at the lowest cost possible. The later the defects are discovered, the higher cost of addressing them would be.

Step Two: Looking for non-typical users who are keen on innovation and trying out new products. A prototype with simple core functionality can be offered to them for trial use. These test users are valuable assets, and of course it is not easy to find them. They can offer insights you would never have thought of yourself, and they may even lead you to redo your initial design. In this process, you should pay close attention to the users who react strongly to your product. You should not only listen to what they say but also figure out why they feel the way they do. Doing so may reveal new demands or even the unique selling point of a design, points that ordinary customers might never consider.

Step Three: Analyzing the data about demand, and updating the design according to feedback. That means repeating steps one and two until reasonable assurance is obtained that the new design is what customers really need and there is no need to test further. At this point, the basic features of the prototype are determined, although there are probably still bugs. This is not a problem, because you will need to find more customers to provide feedback anyway.

Step Four: Looking for a larger group of friendly test users. By listening to them and observing their behaviors, you will better understand more customer demand and its subtleties. For instance, someone may not like the color of the remote control. If any big change to customer demand is discovered, you need to decide whether to go ahead or not, because the cost of changing at this stage may become too high. It's best to ask open-ended questions—why, what, where, which, how, etc.—instead of close-ended questions like "Do you like it?"

Step Five: Fine-tuning product design, after which regular follow-ups can be made like market communication and promotion.

The five steps above are key to figuring out users' real needs—and to ensuring the success of the startup.

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[7]*How to Use the Lowest Cost to Verify the Most Critical Consumer Needs*, Lai Yilong, CEO of Lizhi FM, http://www.36kr.com/p/211150.html.

[8]*How Start-up Companies Verify User Needs*, http://www.zhihu.com/question/19554587.

7.5.3 Adapting and Adjusting

Creating customer demand is an ongoing task; the work does not end even when a successful product is launched. Instead, real demand creation takes place day after day, in thousands of places you may never have thought of. A winning product or business must always be able to adapt and adjust quickly. Only if every member of a company can become the creator of certain demand, can the company greatly improves its competitiveness.

The evolution of WeChat's functionality from version 1.0 (text messaging and photo sharing) to 2.0 (push-to-talk), 3.0 (shake-a-friend and drift bottle), 4.0 (WeChat friends and open API) and now 5.0 (emoticon market, game center and mobile payment) is a perfect example of adapting a product to meet new customer needs that appear over time. For an innovative startup or product, success depends on a real-time understanding of customer needs and relentless updating.

7.6 Conclusion

The digital age has embraced vast opportunities in the demand-driven economy. Demand may start with companies or consumers and be found in the upstream or downstream of the value chain, in any country, region, or culture. For demand that was once ambiguous, disconnected, rejected, fragmented has already been clarified, reconnected, accepted, consolidated and resegmented. More than ever before, businesses are listening, examining and leveraging demand that may have gone unnoticed or disregarded.

Customers worldwide are looking beyond the basic necessities to more personalized and diversified goods and services. Only once this demand is fully recognized and addressed can it properly function as the engine of growth. Efforts should be made to expand the aggregate demand, while to strengthen the structural reforms and achieve higher quality and efficiency in the supply side. The key is to increase total factor productivity.

Who will win out over competition in the future? The ones that truly unleash new customer needs, create new products and services, grasp the opportunities in both demand and supply sides, and make a transition to prosumer economy.

Chapter 8
The Long Tail Market—From Economies of Scale to Economies of Scale and the Long Tail Market

We can summarize the secrets of creating a prosperous long tail market in two sentences: Provide the customers with all the products; Help me to find it.

—Long Tail Theory

The biggest wealth comes from the smallest sales.

—Kevin Laws, venture capitalist

Now let's look back at the heated American presidential election in 2008. When the final results were in, the two key terms were "African American voters" and "the Internet". These two terms are tied to one person: Barack Obama.

President Obama established an fund-raising system unprecedented in American politics: he attracted attentions from both from the big shots and individuals, from those who wanted to donate and also who wanted to raise money, from experienced politicians and from newcomers, and from everyone who could access to the Internet from their computers and mobile phones. President Obama raised 55 million dollars in February of 2008 alone, a new fundraising record in American politics. Among the donations, 45 million came from people online. But Barack Obama never appeared in a fundraising event. More than 100,000 people donated money to support Barack Obama's election campaign, among which 50,000 donated money through the Internet. President Obama's team reported that 94 % of donations were sums of 200 dollars or less, compared with 26 % for Hillary Clinton and 13 % for John McCain. In March of 2008, 1,276,000 people donated money to Obama's campaign, and the amount of money raised each month only increased.

The secret to his success with netizens lay in the fact that he clearly understood the living habits and interests of people who supported his goals. His team worked to unite the young generation, who were used to making friends, chatting and finding information through such social-networking sites as Facebook and MySpace. The number of Obama fan clubs mushroomed online, as did engagement.

X. Zhu et al., *Business Trends in the Digital Era*, DOI 10.1007/978-981-10-1079-8_8

One Obama supporter made a 74-s video named *Vote Differently*. It has won more than 10 million clicks since its upload, helping to attract funding and support from 1.5 million smaller donors for the Obama campaign.

"Only the ones who can make full use of the potential of the Internet can win the presidential election," remarked an experienced commentator from Silicon Valley. "The key factor which decides the result of the Presidential election is not who knows politics better, but who knows The Internet better," echoed *The New York Times* in 2008. However, Howard Kurtz, the former media writer of *Washington Post*, pointed out that "in the age of the Internet, a citizen who knows a few Internet technologies will make those learned counselors who served the politician blush."

To a certain extent, the success of President Obama lies in the reform of the information system. This success ties back into the success of the Internet and that of long tail theory.

8.1 Learning About Long Tail Theory

8.1.1 The Golden Rule of the Industrial Age: Economies of Scale

In the industrial age, companies focus more on achieving economies of scale, meaning that average costs decrease with the increase of production. In other words, a company enjoys economies of scale if its profits increase with expanded production; the company experiences diseconomies of scale if its profits decrease with expanded production (refer to Fig. 8.1).

Economies of scale reflects the scale of production of a certain product through the use of capital for a specific purpose. A decrease in long-term average costs is the result of increased professionalization, greater efficiency in the purchase of material inputs and in transportation, and a stronger position in price negotiation, as well as the learning effect from increased production. In the industrial age, which features the shortage of supply and relatively narrow needs, economies of scale were quite prevalent.

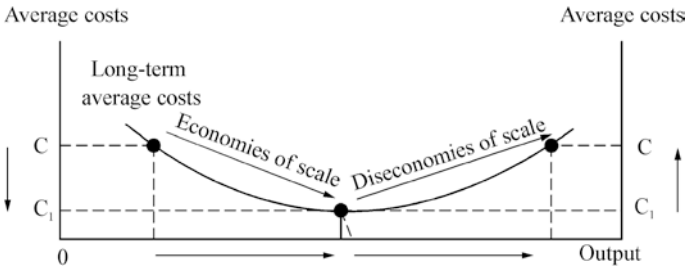

Fig. 8.1 Economies of scale and diseconomies of scale

The model of the Ford Motor Company reflects the concept of economies of scale. The core goal of the model is to reduce the cost of productivity and service through scaled production, standardized production and high proficiency. Henry Ford is supposed to have said that "we only produce one color of automobile: BLACK". In 1908, the company developed the first assembly line in the world. In the first year, the production of the Model T reached 10,600, setting a record in the automobile industry. Even after the Model T achieved success in the market, Henry Ford kept improving the production line, and continued expanding the production scale of this one model to its fullest potential. In 1921, the production of the Model T accounted for 56.6 % of all car production in the world. Output of the Model T ultimately reached 15 million, and as production scale increased, production cost decreased. The price of the Model T was 950 dollars in 1909, but it had dropped to 300 dollars by 1924 when it stopped being manufactured.

8.1.2 The Rise of the Long Tail Theory: From Chandler to Dixit and Anderson

If we use a productivity-cost diagram to illustrate economies of scope, we can see the relationship between brands and cost. The key factors include the shared key resources (manufacturing facilities, management knowledge, research results, and brands, etc.) and internet resources (sales net, purchase net, and transportation net, etc.). Original costs and long-term average costs are reduced by increasing the variety of products. Economies of scale and economies of scope are applicable not only in manufacturing, but also in wholesale and retail.

In *Scale and Scope: The Dynamics of Industrial Capitalism*, Chandler pointed out, "The western industrial age has always been trying to keep the balance between scale economy (productivity) and scope economy (variety)". This concept is captured in a binary "productivity-variety" framework. But as a professor of economic history, Chandler didn't elaborate on theoretical facets of this point.

Avinash Dixit, a professor of economics, took variety as an internal variable and developed a mathematically described system in economics. He explained the relationship between productivity and variety through the Dixit-Stiglitz (D–S) Model: on the one hand, economies of scale need to reduce the variety of products, the greater the production of a certain product, the more economically efficient it will achieve; on the other hand, the desire for variety calls for more types of products. The market will achieve a balance between the two, and the actual environment decides the variety of available products. This model provides the basis for explaining a range of phenomena in the new economy.

The American Chris Anderson developed what came to be known as long tail theory ("Long tail theory" refers to long tail distributions, a statistical term.). If the D–S Model allows functional analysis of the two dimensional "productivity-variety" coordinates, Anderson's long tail theory can be used to determine their statistical distribution. Productivity is measured on the graph's vertical axis and

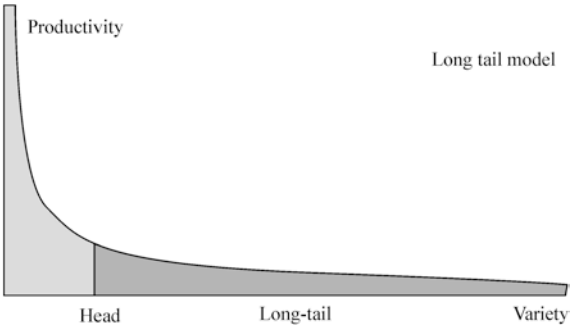

Fig. 8.2 Long tail theory

variety on the horizontal axis. At the top of the vertical axis are the few products with the greatest amount of sales (i.e., the most popular products). Furthest along the horizontal axis are the many products with smaller sales (Fig. 8.2).

Let's take CD sales as an example. 65 % of CD inventory at brick-and-mortar Walmart locations, are among the top 100 most popular CDs. Meanwhile, 53 % of the CD inventory at Radiso, an on-line retailer, is made up of CDs that are not among the top 100. Radiso deliberately chose the less popular goods because it wouldn't have to wage a price war for a small number of customers. The Internet can reduce the cost of manufacturing small numbers of products and use them to satisfy the long tail demand.

8.1.3 The Value of the Long Tail

The essential characteristics for the long tail is low cost differentiation. According to the older Porter's theory, we have to choose between a cost-orientated strategy and a differentiation strategy, which can't co-exist within a company or a project. But the Internet has changed their relationship between the two from contradictory to complementary, allowing the combination of a cost-orientated strategy focusing on low costs and a differentiated strategy focusing on surplus value. Here is where the value of long tail theory comes into play.

The market has also recognized this. Since the financial crisis in 2009 forced stocks to rock bottom, companies addressing long-tail demand have done quite well. Among the fastest-growing 100 companies, the long-tail-oriented companies account for 25 %.[1]

[1]Bloomberg, Changjiang Securities.

8.1.3.1 Long Tail Advertising: Google

The success of Google lies in the fact that it found and cultivated the long tail. Take its AdSense platform for example, the platform makes up half of Google's business and serves millions of small and medium scale websites, as well as individuals. For average media and advertising companies, the value of this group is negligible. Yet Google has acquired vast numbers of customers with its customized ad services, and turned a handsome profit in the process. Recognized as the most valuable media company, Google today is valued in the hundreds of billions and has surpassed traditional media companies to a large extent.

8.1.3.2 Long Tail Finance: Yu'E Bao

If cloud services are the technological key to Yu'E Bao's success (refer to Chap. 3), then the long tail is the market strategy that has given the company its momentum.

The most legendary story in 2013 is that of Yu'E Bao (an Ali Group product). The remarkable success of Yu'E Bao lies in long tail theory. In the past all the financial management products of the commercial banks were targeted towards high- or medium-end customers. Whereas many companies thought there was no need to pay attention to smaller customers, Ali Group decided to target the countless number of small businesses, trading companies and individuals that made up the long tail market. In so doing Ali Group captured this market and became a legend among traditional companies pursuing success through Internet finance. Compared with owners of traditional finance fund who had 70,000–80,000 yuan invested, the average Yu'E Bao user had only 5030 yuan per person in the second quarter of 2014, and some Yu'E Bao customers had only a few dozen yuan or several hundred yuan in their accounts. But even the market for traditional funds can't compare with a long tail market of a hundred million users. By June 30, 2014, Yu'E Bao had attracted 574.16 billion yuan, tripling in size from the end of 2013.[2]

Since Yu'E Bao flourished in the market, many similar companies with "Bao" in their name began to appear, such as "Yifu Bao", "Xianjin Bao", and "Huoqi Bao". These other "Bao" companies also focused basically on making use of the long tail financial market (Table 8.1).

8.1.3.3 Life-Service Long Tail Company: 58 Tongcheng

58 Tongcheng provides life-service related information on interior furnishing, house-moving, baby-sitting, and cleaning services. Presently, 58 Tongcheng's key services include providing information on job applications, rental homes,

[2]Financial columns of Sohu, http://it.sohu.com/20140702/n401651569.shtml.

Table 8.1 Characteristics of some "Bao" related financial management products in the long tail financial market

Product name	E-commerce companies	Fund companies	Product characteristics
Yu'E Bao	Alibaba	Tianhong fund	Comprehensive platform: gathers customers through business platform; creates profit through payment platform
Yifu Bao	Sunning Cloud Co.	Guangfa fund, Huitianfu fund	Uses O2O model: "double promotion" internet based financial-management
Bai Fa	Baidu	Huaxia fund	Estimated annualized returns will reach 8 %. The limit for the subscription is 1 billion yuan
Xianjin Bao	Tencent	Zhonglu fund	Charges small service fee, lets users make full use of spare cash
Huoqi Bao		Tiantianfund.com	Provides many investment choices for user to choose from
Huoqi Tong		Huaxia fund	Quick redemption: "Xiaoxia" helps WeChat users with banking services

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second-hand houses and cars. Although the usage of these types of information is not very frequent, the scope of its coverage is very wide and touches upon many aspects of life. According to Yao Jinbo, the CEO of 58 Tongcheng.com, by the end of July 2014, it had established direct companies in 27 cities, and it had 180 corporate agents and information covering more than 380 cities. This includes the information of more than 5 million local small businesses and merchants, among which there are more than 500,000 registered paying members.

The importance of the long tail effect here is obvious. 58 Tongcheng collects a vast number of long tail users, and according to the Q1 2014 financial report of the company, individual monthly users had surpassed 200 million. Daily active users have reached 30 million. The number of paid members reached more than 440,000, increasing by 85 % from a year earlier. Among these users, its mobile application users account for more than 50 %. Membership fees reached 27.5 million dollars, and profits from 58 Tongcheng's online promotions reached 20.5 million dollars in the first quarter. The company grew 146.8 % from the same period in 2013, underlining the business' rapid growth.

8.2 Rethinking "20/80" and "80/20"

If we make a comparison between economies of scale and the long tail market, we will find that economy of scale treats scarcity as the norm and follows the 80/20 principle. It seeks large-scale production or the "short head" of sales. Meanwhile

the long tail market focuses on the abundant stock regularly, which is the opposite of 80/20 principle, and seeks the long tail of other product types. The former is large-scale production and cost-orientated, while the latter is customized and needs-orientated.

The traditional 20/80 principle tells us that 20 % of products or customers will bring 80 % of sales. Therefore the company will spend 80 % of their effort on this end, and neglect the “tail” part in the curve graph, which needs more effort and cost.

But in Chris Anderson’s *Long Tail Theory*, he pointed out that the future of commerce and culture doesn’t lie in the top of the traditional need curve on the vertical axis representing the “popular commodities”, but in those unsought commodities that have always been neglected and lie in the long tail. For example, more than half of the sales of Amazon.com comes from those books that are not among the 130,000 most popular, 20 % of rentals from Netflix are for items ranked below 3000. For Rhapsody, songs ranked after 10,000 in popularity are downloaded more than those ranking before 10,000.

But before we talk more on the value of the long tail theory and its effect, we need to clarify the following question.

8.2.1 Is the 20/80 Principle Losing Its Meaning?

Chris Anderson raised the idea of long tail theory in 2004, and stressed that there would be new profit coming out of the long tail, which had been regarded as unprofitable or difficult to profit from in the traditional sense. The value of the long tail lies in the fact that if the stock and accessibility channel is wide enough, the market share occupied by those unsought goods or goods with small sales will be able to compete with those occupied by those few popular goods or even exceed them.

The unclear implications of this statement may be more of a guide for Internet companies. Internet companies can further reduce their costs related to certain individual commodities or even get rid of their stock entirely. Meanwhile, the cost of maintaining the company’s website and data flow will be much lower than the cost of rent for a traditional shop. Therefore this can increase the varieties of its goods to a great extent. At the same time, due to the “winner takes all” nature of the Internet economy, the website will often make its initial investment regardless of the cost, which further drives the expansion of variety of its goods. If the commodities sold by the web companies are virtual, then the cost for paying and distribution will be reduced to nothing, exemplifying the ultimate advantage of long tail theory. In other words, the long tail theory is perfect for selling virtual commodities.

Whereas for traditional business, the first question is how to reduce constant or fixed costs. Theoretically, if the company can reduce constant costs to a certain

extent, the amount of supply will not be connected to the cost for individual commodity. Under these circumstances, commodities with large and small sales potentials will have the same market development value. But this is almost inapplicable to the current traditional business rules and environment. The long tail market captures the demand for the large number of unpopular goods and services, but demand within each individual niche is sparse. Therefore, for the traditional retailers, the sales of these commodities cannot cover the related costs, making it difficult to meet demand. The selling of every commodity will incur certain costs, and adding varieties will also involve additional costs. Therefore sensible retailers will not sell those commodities that will result in losses.

In order to do business in the long tail market, the traditional commerce model will have to stick to the common sense business credo: the profits brought by the sales should equal or surpass the cost. If the number of customers in the sales network is still too small, the business cannot make a profit in this mode. In other words, even in the present day, the 20/80 principle still has relevance. For manufacturers and vendors of real products, it still matters.

8.2.2 Is the Top 20 % in the Chart Meaningless?

Even with regard to the Internet sales of virtual products, the top 20 % is still meaningful. If there is no top and only a tail, attracting customers will be chaotic. People need to start from a place of trust and closeness, and will begin to learn about the unknown area through trusted recommendation.

The website MP3.com has become a typical example of a failure because it had no "head".[3] In 1997, Michael Robertson set up a seemingly traditional long tail commercial model. The website enabled people to upload their music, which also facilitated musician's contact with listeners without having to resort to record companies. At that time, the entrepreneurs of the website had predicted optimistically that the musicians will begin to pay fees to website for promoting their music and that record companies would be beaten down because of this new model of promoting music. Music would flourish because of this change.

But does anyone remember what happened when MP3.com crashed in the Nasdaq? What MP3.com left on people's minds was the cacophony of voices on the Internet. A seemingly flourishing business that was supposed to change the world ultimately ended up with a fiasco. The root of the problem was that MP3.com didn't try to get the authorization of the big record companies to put some universally popular music on the website. Therefore users couldn't find the familiar starting point, not to mention a reason to explore the website's contents in depth. The issue seems obvious, but no one took it seriously. The fact proves that only paying attention to the long tail and ignoring the "head" will not lead to success.

[3]*Notable "Short Head"* (《不可忽视的'短头'》), Lin Jiashu.

8.2.3 Is the Long Tail Market Just the Segment Market?

The long tail describes a market-wide (not an individualized) phenomenon. The long tail market is not concerned with fragmented niche markets or individual products, but with the aggregation of varieties. It’s the market share occupied by the aggregation. As Chris Anderson put it: “Can you make money from the long tail market? It depends on who you are. If you are an aggregator, then of course you can. But if you are one of the numerous manufacturers in the long tail, then getting the direct profits from the market will be more difficult.”

8.3 The Forces that Foster the Long Tail Market

8.3.1 The Rise of Niche Demand

Currently, demand from customers tends to become individualized and varied. Many unusual niche demands begin to flourish. When customers gather together to discuss their experience, they find that their needs vary widely. Demand is not the monolithic entity that most advertisements make it out to be. Customers with diversified interests congregate in small, individualized groups, and they discuss the topics of interest to them in more depth within these circles. In today’s world, “Let’s go jogging on Sunday”, or “Let’s go to see a rock concert” will not arouse people’s interest that much, while “Let’s go parkouring on Sunday” or “Let’s get some music lovers together and put together our own rock concert” will.

Desire for differentiated products, which underlines these individualized tastes, is growing gradually. Today, popular, eye-catching products are not the only things that draw people’s attention. Before network technology reshaped the record and film industries, the trend towarding diversified demand was already very obvious. In fact, it can be in many other industries. Changing demands is making the long tail an important business opportunity.

The development of Internet technology allows pursuers of the long tail to base their products on customers’ needs. The Internet has provided more choices for customers, and fostered many excellent companies. But how can the long tail model not only bring profits in the Internet age, but also overtake the traditional top market? The following touches on the key factors.

8.3.2 Reducing the Cost of Customized Manufacturing

Modularized, flexible manufacturing and large-scale customization provide the technical foundation for achieving customized or made-to-order production. The quick, proficient, and timely transfer of information on customers’ needs (free

from concern for regional restrictions) has also promoted customized production. The marginal costs of production and selling certain digital products often disappear, as we often see in music, books, and software, which can be copied and transmitted on the Internet without cost worries. Meanwhile the popularization of production tools have blurred the distinction between manufacturers and customers. More and more customers are acting as manufacturers, and nowadays, many amateurs can create things that just a few years ago could only be done by professionals. For all these reasons, production in the long tail part has gone from unaffordable to affordable, leading to an unprecedented and rich variety of goods and choices.

For example, if you search for the key word "customized" on www.taobao.com, you will find 4,394,000 related products. If you search "DIY" as the key word, you will find 3,242,400 related results (as of August 26, 2014). There is a company called "KUSHEN" on Alibaba.com that can provide more than 3000 kinds of customized shirts. Their customer satisfaction rate is above 95 %. In addition to size, customers can select color, fabric type, collar and sleeve shape, and even fabric texture.

8.3.3 Reducing the Cost of Sales

No matter how big those traditional shops or supermarkets are, they can't get away from the problems of product racks, fences, staff, location, working hours, and climate. For a sensible "economic man", the high costs of racks and ads means he will have to consider the efficiency of the distribution of resources and lean toward allocating resources to those popular goods that account for 20 % of all goods, while neglecting the other 80 %. But in the Internet and digital age, under conditions of fixed primary investment, there is no need to consider the costs of renting houses, the racks, the exhibition booths, or even the stock. The sales is not restricted by the locations and the time. The cost of sales is not influenced by the scale of sales and the varieties of goods, which really leads to a situation where "there is not a product which can not be sold, there is no place which the products can not be delivered to, and there is no time which can not be considered as selling hours". The needs of the customers in the long tail market can be met with a very low sales cost.

For a C2C (Consumer To Consumer) website company like Taobao.com, netizens can own their own online shops without spending a penny. They can go ahead and manage a business selling second hand products or hand-made crafts. The instant messenger software, credibility guarantee system, and payment security settings provided by the trading platform minimize the transaction risks for both the buyers and the sellers. Digital products and services, in particular, don't require product racks, not to mention payments for manufacturing and distribution. There is no difference between selling a popular good and an unpopular one. Their marginal profit is the same. Both of them are just files in the data

base, waiting to be called on when needed, and therefore they have the same stock value. Thus popular goods are not the only way to profit. Customers will now be able to discover movies that have never been shown in theatres, music that has never been broadcasted on radio, and books that have never been exhibited in bookstores thanks to digitalization and reduced costs, even though these products have existed all along, unknown to the public.

8.3.4 More Channels of Discovery

Facing the countless products in the long tail market, you may find it difficult to locate the right one. Demand from the long tail market is individualized, which requires more comprehensive and precise searching. The Internet age providing the new information link and channel between the demand and the supply sides will help to connect the providers and customers of the long tail products. The long-lasting inefficiency in the transmission of information has been addressed, resulting in the transfer of the customers' buying focus from the top of the curve to the long tail part. And niche products continue to attract more consumer attention and spending.

The new channels of discovery go beyond search engines. They also involve giving precise recommendations to the customers based on the metadata analysis. In addition, providing samples (such as from books or songs) also greatly assists long tail customers in choosing products and services. In today's world, an important way to reduce search costs is by turning to the customers themselves. Customers publicize information through different social networks, circles, and we-media platforms on the Internet, which helps them to become the most efficient source of product recommendations and information. These recommendations and other grading systems act as filters that help people to judge whether the products are good or bad. They are also becoming more efficient than company advertisements at reducing search cost. The use of mobile Internet is also helping to eliminate the costs of connecting people together, and it is making search faster, cheaper, more timely and more efficient.

In the long tail market, customers are able to find their favorite goods among the sea of choices because of the new information transmission channel. Those goods that were neglected due to poor categorization or lack of information will be able to be rediscovered in the long tail market. For example, the books, music and other content that receive a lot of attention on www.douban.com are usually not found on the top 100 charts. Douban is home to many groups with different interests, focusing on individuals and their specific interests. Douban is not like the big web portals that promote huge amount of information; instead the information provided depends more on what is promoted by individual users. Through this platform, users' attention has shifted from known areas (popular goods) to unknown areas (niche products), and resulted in Douban's widely praised "discovery" function.

Try looking up a random book on Douban.com. When viewing the book, you'll be able to find related books on the corner of the webpage thanks to Douban's labeling system, which includes tags like "the most commonly-used labels by Douban members", "who likes this book", and "the most popular groups for people who like this book". These kind of labels are also effective in Douban's music channel. For example, young netizens who like Zhang Liangying's new album may be shown the label for "the most frequent group for those who like the album", leading them to "fashion alliance" group. And they can also find the books, the films, and the music that are now attracting the attention of their peers.

The overthrowing of product racks in shops has made niche products more likely to be found by the right customers. In a traditional shop, the resources on the racks are scarce. A single book can't be shown on two racks at the same time. Choosing where to show the product can be difficult, especially when you're choosing between two categories that are almost, but not quite, the same. But if you have a look at the numerous books and videos on Amazon, you will find they are found in multiple categories and searchable by many key words, and the customers can even add their own tags to the products. In a market with countless choices, any product can satisfy different needs, making it difficult to use a single standard to classify each product. The old descriptions of "good" and "bad" for products should be replaced by "the product is a fit for me" or "the product isn't suitable for me".

Therefore, when the cost of production is reduced to the extent that everyone can produce the product; when the places for the storage, circulation, and exhibition of the products are spacious enough that sales costs declines dramatically; and when customers can easily find the products that satisfy their needs, the market share occupied by those products, which individually may not generate great demand or sales, can compete with or even surpass the market share of the more mainstream products. When these conditions are met, we can create the state where anyone can get whatever they need in any place at any time.

8.4 Long Tail + Blue Ocean

8.4.1 Long Tail Versus Blue Ocean

If long tail part means looking for the unexplored 80 % of the market, then the blue ocean means exceeding the current needs and redefining the margin of the market. There is overlapping between the long tail part and the blue ocean part.

The concept of "Blue Ocean Strategy", was firstly raised in *Blue Ocean Strategy* co-authored by W. Chan Kim and Renee Mauborgne in February, 2005. Blue Ocean takes strategic move as the unit of analysis. The strategic move contains a whole set of management moves and decisions involved with the major projects for exploring the market. Based on the analysis of 150 strategic moves in more than 30 industries from 1880 to 2000, the authors hold that the value innovation is the basis for blue ocean strategy (Table 8.2).

Table 8.2 A comparison of long tail theory and blue ocean strategy

Items compared	Long tail theory	Blue ocean strategy
Core of the theory	Many a little makes a mickle	Innovative value
Basis of the theory	Economy of scope theory	Entrepreneur's innovation theory
Strategic measures	Finding incompletely explored niche markets	Create the rules, rewrite market boundaries
Customer service	Meeting individualized demand	Exceeding current demand
Enterprise vision	Expanding the long tail	Get away with the red ocean, create the blue ocean

Source Shanghai Institute of Digitalization and Internet Finance

The innovative value in the table challenges the traditional doctrines based on the competition: weighing the pros and cons of the value and the cost, which urges the enterprises to integrate innovation with utility and price with cost. The goal is not to beat the competition by following the best practices of other enterprises, but to change the current industry framework and reset the game rules. It is not to focus on "high-end" or "low-end" customers in the current market, but to center on the potential needs of general public. It is not to blindly segment the market to meet the demands of customers, but to combine the segmented markets and integrate their needs.

The blue ocean strategy thinks that focusing on the red ocean means the acceptance of the restricting factors of a trade war, which in turn implies trying to win the war in a limited area while denying the possibilities of creating the new market in the business world. Using the blue ocean strategy enables companies to transfer their focus from their competitors to the buying demand. This helps them to cross the existing border of competition and screen the value of buyers in different markets and resequence them, and to shift focus from the fixed choices in the existing structure to changing the structure of the market.

To put it simply, the red ocean is a very competitive and crowded arena in which most people are crammed together inside the shark barrier net and where the waters are murky and food is scarce. Opposed to this area is the blue ocean. It is the deep water beyond the shark exclusion net. The waters are clear and food is ample. The area is vast and there are very few competitors. Winners in the blue ocean will gain much more profit than the red sea winners.

The red sea strategy is concerned with the existing industry, focusing on the known market. Contrary to the red sea strategy, the blue ocean strategy refers to the strategy of going beyond traditional industry competition and exploring new and unknown markets. It requires enterprises to go beyond the red sea, which involves the traditional fierce competition, and to explore the new market, which is less competitive. Different from the need to seize market share, the blue ocean strategy focuses more on creating new demand and breaking through the competition. For those struggling companies which are used to imitation, the blue ocean strategy provides a vast, open expanse where they can sail freely.

8.4.2 Lvmama: Capturing the Long Tail and Exploring the Blue Ocean

Chinese tourism is booming and thus the competition is becoming more fierce. High demands on service quality, fast-developing technologies, and flourishing Internet marketing have brought both opportunities and challenges. In recent years, the definition of tourism has become broader. In addition to covering traditional trips to scenic locations arranged by a travel agency, tourism has expanded to include concepts like real estate tourism, community tourism, road trips, and self-service travel. As the concept of tourism has been redefined repeatedly, a group of new models of tourism with new selling points have begun to flourish. These have attracted the interest of venture capital companies, and sufficient capital is helping the new model of tourism to rapidly seize the market share of traditional tourism. In this fierce competition, industry reshuffling is unavoidable.

Among the many e-commerce tourism platforms, "Lvmama" tells a very interesting and inspiring story. Currently, there are many tourism platforms like Ctrip.com, Elong.com, and MangoCity.com that primarily cater to business people with accommodation booking service, but that haven't solved the problem of "touring". Two years ago, Hong Qinghua, the general manager of Lvmama decided to focus on the individual tourists making up 70 % of the Chinese tourism market. This has helped him to capture the long tail of the self-service travel market. He made inroads into the tourism industry and solved the problems of accommodations and touring at the same time by working together with the scenic travel destinations. As a result, Lvmama won the favor and support of foreign venture capital companies.

Looking back at the development history of Lvmama, Hong Qinghua confessed, "At that time I was thinking about creating a website that would be the first dot-com in China to sell tickets for all the scenic spots. Before that you could only get discounted tickets for those locations through package tours arranged by a travel agency. Since Lvmama was founded, a person can get a discount even on a single ticket, which was unimaginable before. So we began to segment the market consistently. So long as the last section segmented provides enough market share, we can make money out of it."[4]

"One person, one ticket, and you can get a discount on it." This is the core and most individualized service provided by Lvmama. For example, if you would like to watch the show *The Impression of West Lake* in Hangzhou, the price for the tickets for one person or several people is 220 yuan if buying at the ticket window. But if you buy it through Lvmama, you can get it at 160 yuan for one person.

The payment setup used by Lvmama is consistent with international practices, which is making payment before travel. The tourists pay through Alipay or an online bank, which is very efficient and convenient. In foreign countries, the "pay before you play" model has been widely accepted, but it is still new to Chinese

[4]From the October edition of the TV program *Boss Town*.

people. They are not used to this consumption model, so Lvmama has done a lot of preparatory work to help them to get accustomed to it. For example, the company uses a double compensation system and established a quality assurance department to support the effort.

When providing customers individualized services, if you can't reduce costs, you won't profit in the end. Therefore reducing costs effectively will be the key factor in the long tail strategy. For e-commerce companies, logistical issues are unavoidable, as the companies have to deliver the purchased goods to the buyers using a logistics system. But Lvmama avoids the issue successfully by using electronic tickets. Travelers receive a short message on their mobile phone when they book the service from the website. Through use of a QR code contained in the short message on their mobile phone, they can digitally access the exclusive route provided by Lvmama to visit scenic destinations. This not only saves paper and other resources, but also reduces costs from printing and delivering the tickets, while increasing efficiency. In doing so, it also provides customers with a better shopping experience.

Marketing is also a major source of costs, so Lvmama innovated and expanded its influence through word of mouth. The most trust-winning marketing model is use of close friends and relatives. New marketing media like blogs, microblogs, and WeChat are ideal tools to build company reputation. Lvmama found "opinion leaders" among its customers and rapidly built up interest towards destinations by publicizing the comments of those leaders, in turn building up a fad or trend. Lvmama obtained publicity effectively through low-cost marketing methods, which are key to implementing long tail strategy successfully.

8.4.3 Avoiding the Major Markets, Seizing the Blue Ocean Market, and Heading for Bigger Markets

Lvmama has become an excellent representative of the tourism category described above. But direct ticket sales for scenic locations is just the beginning for Lvmama. It hopes to eventually engage in tourism management consulting, offer planning and design services for travel destinations, enhance mutual value between different sections of the industry chain, and explore bigger markets.

According to the statistics of e-Marketer on the online tourism markets in leading countries and areas worldwide, China is one of the fastest growing countries. Although such countries as Brazil and Mexico have grown more quickly in certain years, China will still see rapid growth in the coming years.

The success of Lvmama lies in its ability to capture the long tail and use it to develop a blue ocean strategy, and thereby acquire a greater market. The long tail may not look very appealing in the beginning, but behind it lies the blue ocean market, whose profit-making potential should not be ignored by start-ups. If Lvmama can continue to utilize the long tail and the blue ocean, then it will be able to leverage even more opportunities in the growing market for Chinese online tourism and achieve greater success.

8.5 Achieving Success with the Long Tail

8.5.1 Making the Long Tail Longer

Nowadays, successful entrepreneurs should have long tail-based thinking and an open mind that focus on the concept of "customers supreme, service foremost". In order to bring the long tail theory in full play, it is first important to make the long tail as long as possible by lowering the entry threshold so that more customers who spend small amounts of money can be included, which in turn makes the customer group as big as possible. If there are no big groups of customers, then the long tail theory loses its applicability to the market environment.

Therefore, online marketing practice must be different from the usual approach for traditional companies that focus on taking big orders and traditional dot-coms that depend on membership fees for their profits. The online approach should focus on making the cake bigger. By encouraging customers to try out a product, Internet companies can bring together scattered individual customers and achieve big business value.

For most dot-coms in China, be they specialized websites that provide targeted professional services, or web portals that provide various individualized services, long-tail featured business will be impossible if they do not have a large number of customers.

Let's take the paid music downloading websites in China as an example. Compared with the traditional sales channels of music albums, these websites have the advantage of reduced cost of storage and transportation of their products. However, they can't compete with the music pirating websites that have become prevalent on the Internet. According to the statistics of Sina, although Sina intends to promote paid-downloading services, 90 % of netizens wouldn't pay for them. Therefore, the long tail theory still has a long way to go in the area of digital music.

Moreover, considering the fact that the security of e-commerce in China still needs to be improved, settling accounts between different payment methods is very complex, and the process is usually slow. Logistical issues still are the bottleneck in the development of e-commerce in the market environment today. The different levels of service quality provided by the logistics companies and the varying levels of informatization add cost and difficulty to the delivery of the products.

All in all, the implementation of long tail theory needs large numbers of small groups of customers, and the supporting services for businesses need to be improved.

8.5.2 Reducing Costs as Much as Possible

An important precondition for the long tail theory is minimal cost for the storage and logistics. Otherwise enterprises cannot bear the high costs resulting from the differentiated individualized needs of the customers.

Through Internet technology, we can reduce the cost of storage and logistical services for the digital products to a very low level. But for physical products, the storage and management costs are still very high. Even websites have to consider the cost of management. If they can't address the problem effectively, the cost of customer service will increase rapidly, leading to a crisis for the company.

The ideal long tail commercial model can be described this way: costs are fixed, while sales can be increased infinitely. Using long tail theory needs a careful attitude so that no costs increase with sales. The worst situation is when they increase equally, otherwise the enterprise will come to a dead end.

8.5.3 The Integration of the Short Head and the Long Tail

If companies can provide more types of products, they will be able to make profit and survive in the market. But if they want to have better and lasting operational performance, they need to have a pyramid-like product structure combining the red hot products, the popular products in different categories, and lots of product variety. This is because the ultra-popular products create hype and attract sales of other products as well. If there are no such products, the enterprise will find it difficult to establish its footing in building big brands and increasing market share. This explains why so many companies invest a great deal in a single popular product even when the investment doesn't appear proportional to the output. As the company operates, it should ensure that the tail part of the market has many niches, those seemingly small and unimportant areas that can actually produce huge influence. Only having the head of the market and no tail will place great restrictions on the company's decision making ability. Only once the pyramid structure has been established and possessed adequate product variety will the investment achieve maximum profit.

Moreover, the long tail theory is most applicable to the sales companies. But it is certainly worth probing how manufacturers can apply the long tail theory in their own businesses.

8.6 Conclusion

Peter Drucker once said the competition between today's enterprises is not between products but between commercial models. Therefore we need to break out of our current habits and fixed ways of thinking so we can explore. With the help of the Internet and the power of the long tail, we will be able to find our blue ocean where even the tiniest inhabitants have the opportunity to bring their potential into full play.

Chapter 9
Digital Finance-From Traditional Finance to Digital and Internet Finance

The essence of Internet finance is finance.
—Ma Weihua, former Chairman of China Merchants Bank

If banks don't change, Let's make change happen for them.
—Jack ma, chairman of Alibaba

Disintermediation is becoming a hallmark of society in recent decades. Especially as many non-financial companies rapidly make their way into the financial sector with Internet technology, Internet finance has gradually come into being. The birth of a new industry format has created a new environment and landscape, which weaken the role of banks as a payment intermediary, as well as other financial intermediaries, presenting rigorous challenges to traditional banking.
—Jiang Jianqing, Chairman of Industrial and Commercial Bank of China

2013 was described as the year when China's Internet finance really came into being. In this year, traditional financial institutions actively pursued reform to strengthen their market positions; Internet companies represented by Baidu, Alibaba and Tencent (collectively referred to as "BAT") aggressively forayed into the financial sector, erecting new business models and reshaping the industrial landscape.

The year saw a string of incredible new records:

- Online payments via Alipay hit 3 trillion yuan;
- The third-party payment platforms Alipay and Tenpay occupied 80 % of the market;
- P2P transactions exceeded 100 billion yuan in 2013, at over 600 % year-over-year growth;

X. Zhu et al., *Business Trends in the Digital Era*, DOI 10.1007/978-981-10-1079-8_9

- Within one year of launching in June 2013, Yu'E Bao attracted 81 million investors and more than 540 billion yuan in investor funds. Tianhong Asset Management, the fund management entity of Yu'E Bao that used to be a nobody in the sector, suddenly became the 7th largest fund in the world.

Why did so many non-financial institutions eagerly set foot in the financial sector? How did they sharpen their competitiveness with regard to this new area of business?

In this chapter, we use "digital finance" rather than the more familiar term "Internet finance" for the following reasons. First, Internet finance is widely perceived as referring to Internet companies that enter the financial sector, while financial Internet is used to describe the adoption of Internet-based tools by traditional financial companies. This simple classification can lead people to mistakenly assume that financial institutions and Internet companies are mutually exclusive and hence ignore the possibility of their integration. In fact, both traditional financial institutions and Internet-based financial institutions are vital drivers of the digital revolution and financial innovation. Second, the digital age is characterized by 4 key elements: big data, cloud computing, platforms and mobile Internet. None of the four is dispensable. "Software-defined everything" will become an unstoppable trend. Therefore, it is more appropriate to use the term "digital finance".

More specifically, digital finance involves three dimensions: the first is the Internet-based, non-financial institutions that operate financial businesses; the second is the traditional financial institutions doing businesses based on Internet technology (from building an e-finance system to e-processing of financial transactions and the establishment of digital financial business models; all can be grouped together); and the third is incorporation of companies or institutions fully engaged in Internet finance, e.g., the American Security First Network Bank (officially operational since 1995 and acquired by Royal Bank of Canada in 1998), and Bank of Internet (running traditional commercial banking businesses online).

9.1 Traditional Finance: Challenged by Cross-Sector Innovations

In fact, IT companies have long coveted a share of the financial market. As early as in the 1980s, Bill Gates thought of setting up his own bank rather than merely acting as an IT system provider for commercial banks. However, his proposal was opposed by the American Bankers Association (ABA) and ultimately failed to be approved by the Federal Reserve Board. Bill Gates shocked the banking sector by predicting that "the traditional banks will become extinct dinosaurs in the 21st century if they do not change themselves." Today, the trend of Internet companies crossing into the financial sector has only strengthened.

The increasing involvement of Internet companies in finance is closely linked to the rapid development of Internet technology. Internet technology enabled direct transactions between the capital demand and supply sides, thus reducing transaction costs and asymmetry of market information. In the meantime, the number of netizens boomed; spending time on the Internet and online consumption came into vogue. As a result, social networking platforms accumulated massive amounts of data about customer behavior and credit standing. Search engines and cloud computing enabled Internet companies to process all this data in an accurate, efficient and economical way, to develop customer information chart and evaluation system, furnish the basis for financial decisions and make many financial innovations possible.

At the same time they continued to pursue economies of scale, traditional banks focused their limited resources on the customer groups and businesses that were the most profitable, such as large enterprises, large customers and mid and top-end retail customers, while neglecting or shirking from the "tail" businesses (loans to small and micro-sized enterprises, micro finance, P2P services, personal loan guarantees, etc.) because of their costs, risks and unattractive profits. This left room for Internet companies to establish their presence in the financial market. Obviously, the cross-sector expansion of Internet companies into the financial sector catered to market demand, which used to be regarded as a niche market by traditional financial institutions.

The success of Internet companies' cross-sector expansion is also due to their own persistence. After Internet traffic grew to a certain amount, Internet companies realized that they could combine Internet traffic with financial businesses. They tried to harvest the Internet traffic by entering the payment and financing market segments, and began to offer wealth management and comprehensive financial services based on a strong foundation of data, funds and customers. As a result, a string of innovative financial business formats emerged. Of course, support from regulatory authorities, in addition to the relatively loose regulatory environment, also played an important part.

The factors above contributed jointly to a positive ecological environment for the upsurge of Internet finance, and stimulated the burgeoning growth of new financial business formats.

9.1.1 Alipay: The First to Shake up the Financial World

Alibaba first marched into the financial sector in 2002 by launching Alipay. Its cross-sector exploration since then can be divided into three phases and seven strategies. Its aggressive actions filled traditional financial institutions with awe and worry (see Fig. 9.1).

In traditional payment models, customers can't gain access to the settlement systems of all banks given the cost and efficiency restrictions. In contrast, the

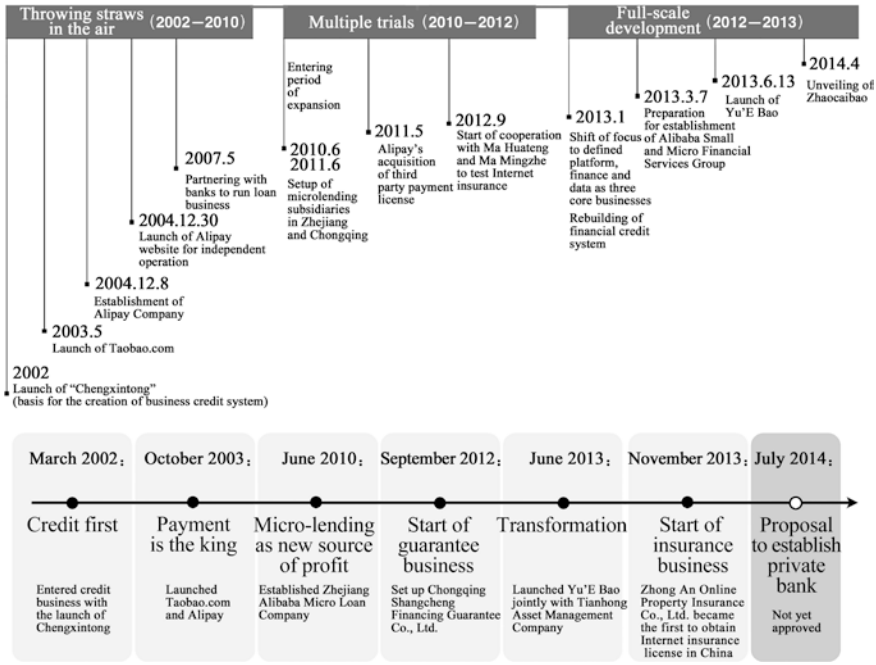


Fig. 9.1 Alibaba's positioning in the financial sector- "three phases" and "seven strategies". *Source* Shanghai Institute of Digitalization and Internet Finance

third-party payment companies represented by Alipay can integrate the gateway interfaces of various banks and thus build a bridge between numerous merchants and banks. The third-party payment platform was roughly compared to "an online UnionPay". The one-stop access services help both banks and customers avoid the costly establishment of a one-to-one gateway interface, boasting such advantages as high efficiency, low cost and convenience. As a result they effectively address the payment management needs of a large group of small and micro-sized enterprises and small merchants that used to be ignored by traditional banks. Backed on the e-commerce platform of Taobao and Alibaba, Alipay especially has unique strengths compared with traditional banks, due to its ability to provide diversified services at lower cost and in a more convenient way.

In the future, Alipay will penetrate every aspect of people's lives. In May 2014, Alipay entered the medical care sector by joining hands with several hospitals to build the "Mobile Intelligent Medical Care Platform", which accelerates the entire hospital visit process, from registration to receipt of medical reports, and reduces the time spent by the user in the hospital by more than half. It is also believed that such improvements will free up medical resources by identifying and limiting the

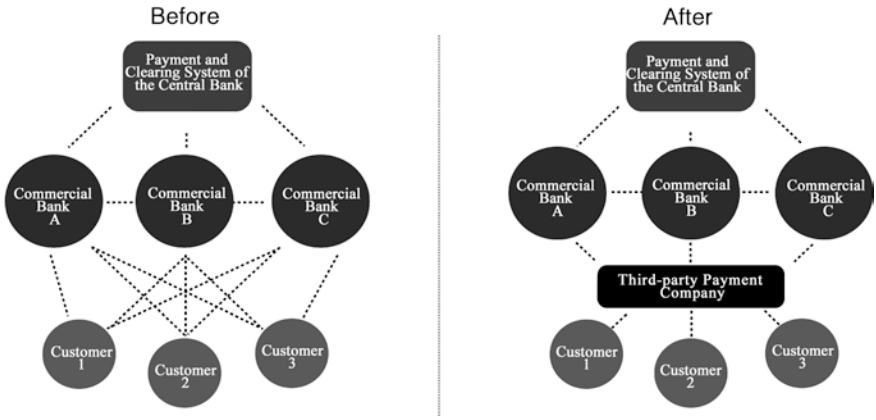


Fig. 9.2 Traditional payment model versus third-party payment model. *Source* Shanghai Institute of Digitalization and Internet Finance

repeated account registrations often used by appointment-ticket scalpers. So far, 7 hospitals have established a partnership with Alipay, and nearly 50 triple-A grade hospitals in first tier cities across China have reached similar cooperation agreements with Alipay. On August 10, 2014, Alibaba announced the start of cooperation with Hangzhou Municipal Government to develop China's first "future commercial area"—"Wulin Commercial Area", which allows consumers to experience an in-depth integration of the virtual and physical. When shopping in the area, consumers can access search, location and payment services easily by using the Alipay Wallet on their smart phones. Alipay has also been enriching its services for tourists. For example, Alipay has already launched a tax reimbursement service for Chinese tourists shopping in South Korea and Europe. Tourists will receive tax refunds directly into their Alipay accounts after 10 working days at the soonest (Fig. 9.2).

Alipay started its overseas expansion in 2008 and has registered brick-and-mortar subsidiaries in Singapore and the United States for local marketing. On December 23, 2013, China's convenience store giant Meiyijia entered into a strategic partnership with Alipay Wallet. To pay at any of the 5500 Meiyijia convenience stores, shoppers can open the Alipay Wallet app on their smartphone and let the cashier scan a barcode on their screen. The transaction should take just one second. More and more overseas shopping websites now accept payment via Alipay, including some famous B2C and C2C shopping websites and fashion and digital products direct-sale websites in the US, the UK and South Korea (Table 9.1).

Table 9.1 Alipay's horizontal expansion in domestic and international markets

Category	Classification	Partner companies
Air travel merchants	Air tickets	AirAsia, Singapore Airlines, All Nippon Airways, Garuda Indonesia, HotelClub
Physical commodity merchants	Cosmetics	Sasa, StrawberryNet, Joyo.com, TenByTen, Lotte (DFS), moximoxi.net, TOKOYOPRETTY, FELISSIMO, M18.com, DHC, hanskin
	Fashion	JAMY, FASHION LUAN, Muji, Nissen Co., Ltd, KENKO, shirohato, JGS, Brook's Coffee, STYLENANDA, PARTYSU, CHERRYSPOON, MIAMASVIN, BYTHER, HOLICHOLIC, THE JANY, JOGUNSHOP, Konest, Eminent Inc, Ymatou, UGG, eye-save, inerb, Net-The-Globe Ltd, Sykam Solutions Ltd
	Maternal and infant healthcare	Lilla Mode Sweden AB, usashopcn.com, Extrabux
	Imported food	Sugar Spice, chiate88.com, Dongseng
	Comprehensive	usashopcn.com, JSHOPPERS.com, eslite.com, Wirecard AG, lottedfs.com
	Convenience store	Hong Kong Circle K (336 stores), Bonjour (50 stores), Giordano (19 stores), and some convenient stores in Southeast Asia (e.g., Indonesia and Thailand)
Alibaba's international platform		Tmall Global, haitao.com, AliExpress (international retail), Alibaba.com (international wholesale)

Note Alipay started its overseas expansion in 2008 and has registered brick-and-mortar subsidiaries in Singapore and the United States for local marketing
Source Shanghai Institute of Digitalization and Internet Finance

9.1.2 Internet Companies Aggressively Moving into Financial Sector

Alibaba is by no means the only Internet company dipping its toes into the financial sector. Traditional financial services cover 7 categories including payment, wealth management, financing, insurance, funds, guarantees and securities. Each category is now witnessing the active participation of Internet companies, such as those involved in third-party payment and mobile payment discussed above. Online lending includes both the lending platforms backed by e-commerce players, e.g. Ali MicroCredit and JD Baitiao, as well as P2P lending platforms. The second type of lending platforms can be further divided into unsecured models (e.g., ppdai.com), secured models (e.g. renrendai.com), and emerging crowd funding models (e.g., demohour.com). In terms of wealth management, Internet companies have launched their "Bao" series of products. In terms of online insurance, Zhong An Online Property Insurance was the first to obtain an Internet insurance license not only in China but in the whole world. By closely observing the activities conducted by BAT, we will see that these three giants have expanded their presence to nearly every aspect of the financial sector in just three years (see Table 9.2).

Table 9.2 BAT expanding their presence to every area of the financial sector

Traditional financial services	Baidu	Alibaba	Tencent
Payment	caifu.baidu.com	Alipay	Tenpay
Wealth management	caifu.baidu.com	licai.taobao.com	money.tenpay.com
Financing	caifu.baidu.com	Ali MicroCredit	Tenpay micro lending
Insurance	caifu.baidu.com	Zhong An Online Property Insurance	Zhong An Online Property Insurance
Funds	8.baidu.com	Yu'E Bao	Tenpay e-fund
Guarantees		Chongqing Shangcheng Financing Guarantee	Tenpay intermediary secured transactions
Securities	Baidu.hexun.com		emoney.qq.com

Source Shanghai Institute of Digitalization and Internet Finance

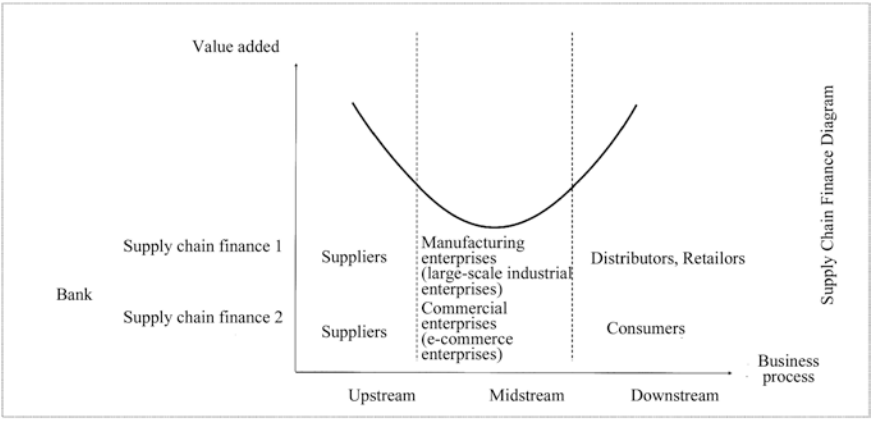
9.2 Supply Chain Finance

With the digitalization of credit, it was only natural for Internet companies to offer financing services. They use virtual credit rather than physical assets as collateral, take advantage of non-structural big data with regard to information flow, capital flow and social networking to resolve the information asymmetry in the financing process, and thus complete the credit evaluation and risk management process.

Small and micro-sized enterprises have long been vexed by the difficulty and high cost of financing. Supply chain finance can effectively solve this problem by identifying core enterprises in the supply chain and leveraging them to provide financial support to other enterprises in the supply chain. It is not only a chain of logistics, information and capital connecting suppliers with users, but a value-added one as well.

In general, supply chain finance has two modes of operation: one is the cooperation between large manufacturing enterprises and financial institutions including commercial banks, and the other is cooperation between e-commerce enterprises and financial institutions, including banks. Both modes can help shorten the accounting period and accelerate circulation in the supply chain. The difference between them lies in that in the second mode, e-commerce enterprises can provide commercial banks with various transaction data about small and medium-sized enterprises (Fig. 9.3).

For example, JD.com astounded observers by partnering with the Bank of China to offer supply chain finance services. JD has received revolving lines of credit from Bank of China, and in return, JD offers its annual cash flow (tens of billions of Yuan) as the guarantee. Suppliers, after obtaining their lines of credit, fulfill the shipment to JD. After confirming the numbers, JD sends an order to the Bank of China, which will then offer payment for the goods to the suppliers in advance. Finally, JD repays the payments for goods to the bank before the pre-agreed payment due date (see Fig. 9.4). JD plays the role of an intermediary



Supply chain finance 1	Large manufacturing enterprises partner with financial institutions.
Supply chain finance 2	E-commerce enterprises partner with banks and other financial institutions to offer loans to suppliers (mostly small and micro-sized enterprises) so as to help them shorten the accounting period and accelerate circulation in the supply chain.In the meantime, banks can obtain various transaction data from e-commerce enterprises.

Fig. 9.3 Supply chain finance diagram. *Source* China internet weekly, August 26, 2013

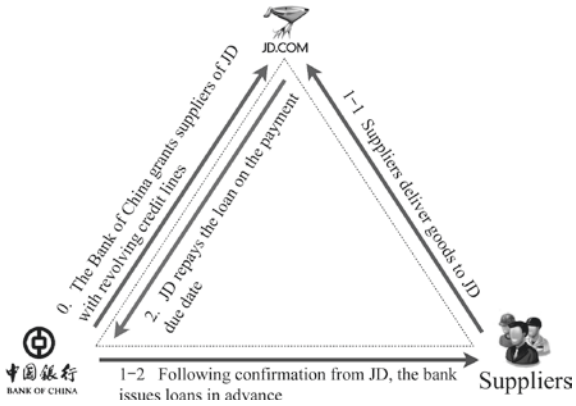


Fig. 9.4 Supply chain financing jointly developed by JD.com and bank of China. *Source* www.eastmoney.com. *Note* (1) JD offers its annual cash flow (tens of billions of Yuan) as the guarantee for the revolving lines of credit from Bank of China; (2) Following confirmation from JD, the Bank of China offers the payments for goods to the suppliers in advance; (3) Finally, JD repays the payments for goods to the bank on the payment due day

throughout the process. As of November 2013, the amount of financing attracted by JD's supply chain exceeded 8 billion yuan, and the biggest individual sum amounted to more than 100 million yuan.[1]

JD offers financing services based on various data from suppliers collected on JD.com, and targets mainly on small commodities, thus shortening the procedures and time needed for supply chain financing. "Jingbaobei", the upgraded version of JD's supply chain financing, offers a more convenient financing process—the loan application can be automatically evaluated, approved and issued in 3 min; the amount of lending is flexible; and the annualized financing cost for suppliers is as low as about 10 %. In comparison, the supply chain financing of traditional banks provides mostly loans for commodity and credit guarantees and targets large commodity transactions, therefore lengthening the procedures and time needed for financing.

9.3 P2P Online Financing Platforms

Non-financial private online financing platforms have grown to become the backbone of social financing, presenting serious challenges to commercial banks. The most representative and iconic P2P (Peer to Peer) platforms worldwide are the US-based Prosper and Lending Club.

Launched in 2006, Prosper is America's first online lending marketplace, with more than 2 million members and over 1 billion dollars in funded loans. It serves entirely as a platform intermediary. Borrowers can request personal loans ranging from 2000 to 35,000 dollars, while investors can loan a minimum of 25 dollars to an individual borrower. Prosper brings borrowers and lenders together on the same platform, determines the loan rates using an auction-like system and mitigates risks with the dispersion of loans (Fig. 9.5).

Lending Club is another well-known American P2P lending platform founded by Renaud Laplanche. In 2000, Laplanche founded MatchPoint and ran into cash flow problems. He discovered that the interest rate for credit card overdrafts was as high as 18 %, and no preferential interest rate could be granted even with years of good credit. He then developed the initial idea for Lending Club. Lending Club was incorporated in Delaware in October 2006 and was initially launched on Facebook as one of Facebook's applications in May 2007. By integrating its services into a social network, Lending Club could capitalize on Facebook's high popularity and leverage trust among friends who would lend money to their friends on Facebook. On Lending Club, lenders could browse the information of borrowers, and decide whether to offer funds according to

[1] http://kuaixun.stcn.com/2013/1211/10993845.shtml.

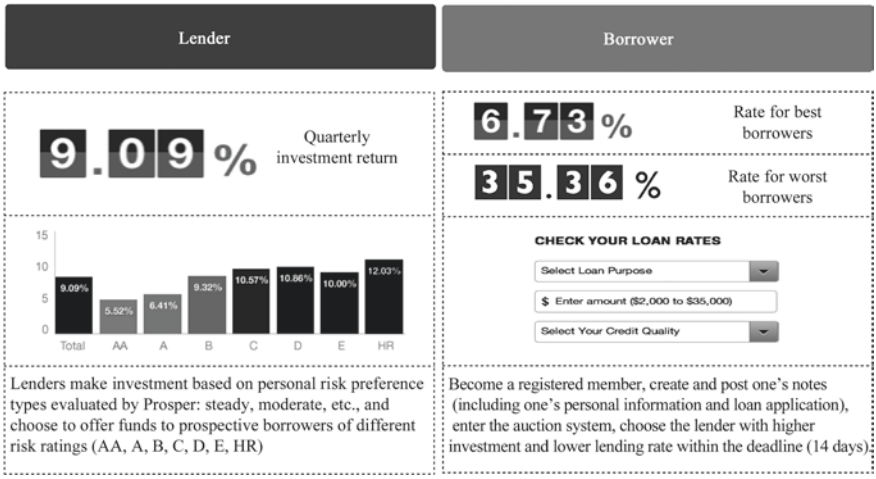


Fig. 9.5 Prosper's business flowchart. *Source* The official website of Prosper. *Note* All funds are deposited in a third-party payment company account rather than in Prosper's account or another third-party platform's account. In the United States, it is strictly regulated that the funds received must be handled by a custodian bank

the risk and individual friendship. It gradually developed into one of the most popular apps on Facebook. In August 2007, Lending Club unveiled its own official website to provide a comprehensive range of P2P lending services with simpler fund transfer procedures and at lower costs. The business model of Lending Club has the following characteristics: first of all, unlike Prosper, Lending Club didn't adopt an auction system but rather developed a system of seven credit grades (A through G) to offer lending rates from 6 to 25 %; second, lenders include not only individuals but also banks and other financial institutions; third, it places higher requirements for borrowers, who must have a personal credit scores of at least 660; fourth, it integrates with Facebook to leverage trust between friends so as to increase the probability of successful lending and save borrowers from disclosing their credit history.

Currently, Lending Club holds 75 % of the American P2P online lending market and is diversifying its product offerings. In contrast, Prosper is only one fourth as large as Lending Club. Proactive registration, bigger liquidity and borrowers with a higher credit grade all contribute to the market leading position of Lending Club.

Internet-based financial innovation products, including funds, wealth management services, e-commerce micro lending, P2P lending, crowd funding and Internet currency, have thrived since they were first launched. Internet companies have become an indispensable and powerful part of today's financial system.

9.4 Traditional Finance Transforms into Digital Finance to Fight Cross-Sector Rivals

The rise of Internet-based financial enterprises has had an immense impact on traditional financial institutions. Banks, for example, are receiving direct challenges to their functions, liability strength, customer services and profitability. The burgeoning of e-commerce, in particular, has greatly impaired payment channels offered by traditional commercial banks via their physical banking branches and online banking systems. The emergence of Yu'E Bao and other similar products cause frequent change and outflows of current deposits in banks. Banks are suffering from higher capital costs and shrinking sources of profits.

More importantly, as Internet companies continue to expand their business scope, their customer bases are increasingly overlapping with those of traditional financial institutions. Customers are the greatest source of wealth. If banks become a mere channel for funds traveling between virtual accounts, fail to develop and maintain a large and stable base of premium customers, and are unable to gather sufficient customer information, they won't be able to address changing needs of their clients, let alone engage in any successful product R&D, marketing or cross-selling. Ultimately, they will lose market sensitivity, miss opportunities for cross-sector expansion, and fail to sustain development in the long run.

In the face of the innovative initiatives of Internet companies and the challenges they have thus created, traditional financial institutions will not wait for the end with hands tied. In general, traditional financial institutions function as an intermediary of payment, financing and wealth management, all of which are dependent upon an IT system. Information technology is indispensable to financial institutions, just as air and water are to human beings. According to statistics, financial enterprises were next only to Internet companies in terms of the size of investment in IT equipment (see Fig. 9.6).

Financial institutions not only rely on IT technology to promote management informatization and business digitalization, but take advantage of Internet technologies to vigorously innovate financial businesses and service modes. For example, in recent years, banks actively launched and extended mobile banking and mobile payment services, offered online lending, as well as interactive online banking services, such as WeChat-based customer service and payment. In addition, several banks were committed to marketing model innovation based on big data—i.e., building up e-commerce platforms and developing e-commerce businesses. For example, the five major banks successively launched their own e-commerce platforms (see Table 9.3). Some worked in close collaboration with third-party e-commerce companies, some focused on marketing financial products on e-commerce platforms, and some others aggressively set up comprehensive e-commerce platforms with the ambition to reshape the entire industrial landscape (see Table 9.3).

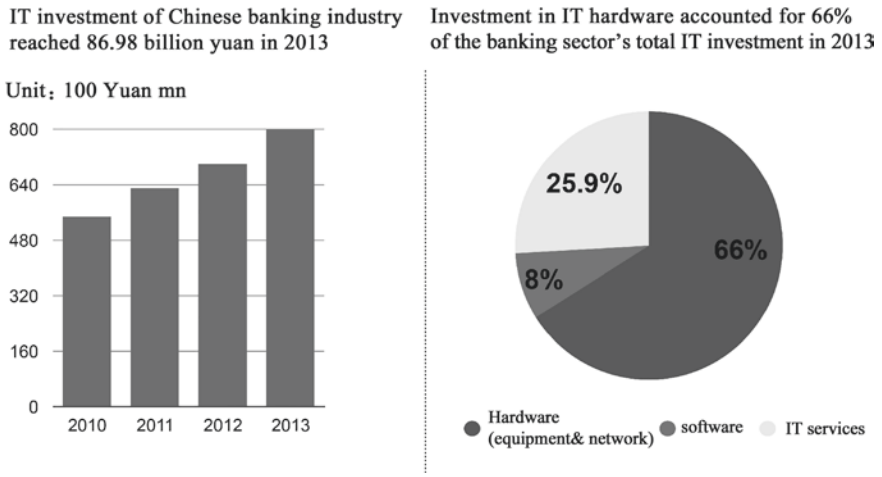


Fig. 9.6 Size and structure of the Chinese banking industry's IT investment in 2013. *Source* IDC *China Banking Industry IT Solution* 2014–2018 *Forecast and Analysis*. Since 2005, ICBC has invested 10 billion yuan annually in IT construction, including in the construction of various software, hardware and services, as well as in a team of technology talents—ICBC in the Digital Era Case A, P2

Table 9.3 Ecommerce platforms launched by China's five major banks

Time	Bank name	Platform name	Product features
Jan. 18, 2013	China Construction Bank	buy.ccb.com	B2C shopping platform, secured payment, online personal loans and installment payments
Apr. 22, 2013	Agricultural Bank of China	e.abchina.com	Tailored comprehensive financial services integrating supply chain management, multi-channel payment and settlement, cloud services, etc.
Oct. 25, 2013	Bank of China	open.boc.cn	Based on the "crowdsourcing" product development model, building "BOC financial ecosystem"
Jan. 28, 2014	Industrial and Commercial Bank of China	mall.icbc.com.cn	Building an integrated platform of consumption and procurement, sales and marketing, payment and financing platform, and various financial services
Jan. 28, 2014	Bank of Communications	e-mall BOCOM	Allowing enterprises to set up their own online business platforms in ten minutes, for goods sales, corporate procurement, payment collection, wealth management, financing and crediting

Source Shanghai Institute of Digitalization and Internet Finance

9.4.1 Industrial and Commercial Bank of China (ICBC): The Leading Giant of Banking Digitalization

As of the end of 2013, ICBC had 18.917752 trillion yuan in total assets, 17.639289 trillion yuan in total liabilities and 262.965 billion yuan in total profits, achieving a year-over-year growth of 7.8, 7.5 and 10.2 % respectively; ICBC topped the rankings of the World's Top 1000 Banks by the UK-based magazine The Banker and was No. 1 in the *Forbes* Global 2000 List.

For years, ICBC has attached great importance to IT investment and digitalized development. The bank's annual investment in IT infrastructures first exceeded 10 billion yuan in 1999, and since then has held 46 % of the technology patents in Chinese banking industry and operated a software R&D team of 4300 people. By 2013, all of ICBC's businesses were computer processed. Its e-banking businesses accounted for 81 % of its total businesses, and Internet banking transactions surpassed 350 trillion yuan. The number of its Internet banking users hit 170 million, and the numbers of mobile and telephone banking users each exceeded 100 million.

Over nearly three decades of informatization construction, ICBC has upgraded its business operations and management system 3 times and established 4 systems. The creation of the "9991 Project" took about 3 years and adopted a double-center design—it compiled data from ICBC's 37 computing centers in different provinces in the two major data centers in Beijing and Shanghai, and build a centralized, unified and standardized core business system to ensure non-stop around the clock all year long system operation. ICBC Chief Information Officer Lin Xiaoxuan explained why the bank decided to build its own databases: "Data centralization is a natural choice for commercial banks in the process of development. Data centralization is the prerequisite to management centralization, risk control, product selling and decision making." (See Fig. 9.7).

9.4.2 Financial Institutions Trying to Catch up

Yu'E Bao was a miracle in the financial world. Seeking to counter Yu'E Bao's every move, traditional financial institutions are also vigorously launching low-entry-threshold wealth management products similar to Yu'E Bao. These institutions are determined to catch up and outperform the "Bao" products offered by Internet companies (Table 9.4).

Mobile payment is no longer exclusive to Internet finance. Over the past year, traditional banks have accelerated mobile payment service offerings. As a result, mobile payment is likely to become the future battlefront of financial innovation (see Table 9.5).

There are many other examples. Ping An launched the "small cash" business to enable non-card and non-ATM encashment via mobile phone; 14 securities

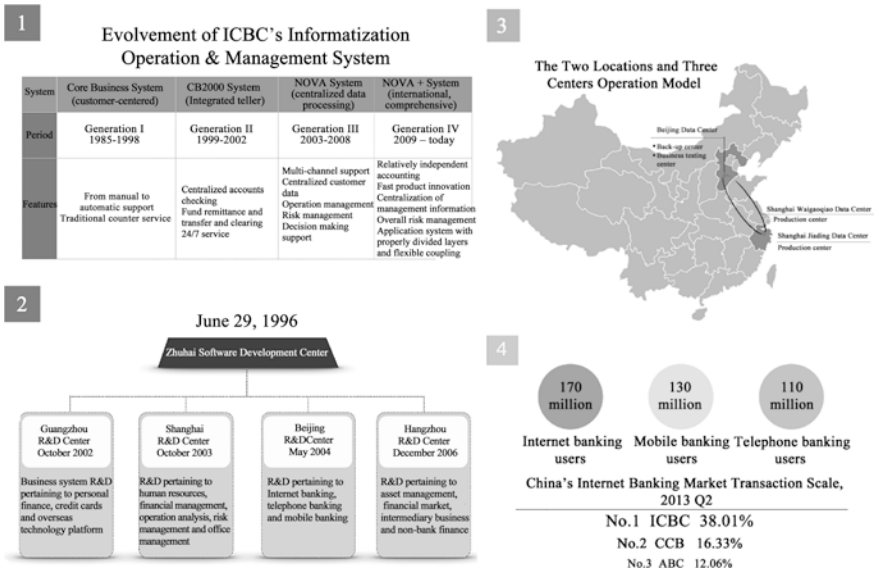


Fig. 9.7 ICBC's informatization/digitalization projects. *Source* ICBC, Shanghai Institute of Digitalization and Internet Finance

companies, including GF Securities, Industrial Securities, Ping An Securities, China Dragon Securities, Great Wall Securities, Chinalin Securities, CITIC Securities and Guotai Junan Securities, were approved to operate Internet securities business as pilot enterprises. The new business involves not only the offering of financial products on an Internet-based financial platform, but the establishment of an account system independent of securities accounts, as well as the offering of competitive financial products. In doing so, securities brokers took a big step forward in Internet finance.

9.5 Transboundary Collaboration Between Traditional Finance and Internet Finance

9.5.1 Becoming Partners Rather Than Enemies

Internet finance is overturning the traditional operating models of traditional financial institutions, rather than the core of finance itself (i.e. to improve the allocation efficiency of social capital). In this regard, traditional financial institutions and Internet finance both have advantages. More specifically, Internet finance boasts large customer databases, as well as bigger service area and lower service cost. For example, as early as in 2000, the European banking sector calculated the per transaction cost via different terminals as follows: 1.07 dollars per transaction via

Table 9.4 Internet-based financial products launched by traditional banks versus by internet finance companies

	Traditional banks			Internet finance companies			
Investment product	China Merchants Bank Zhaozhaoying	Ping An Bank Ping An Ying	China Minsheng Bank Royal Fund Xianjin Bao	Alipay Yu'E Bao	Baidu Bai Zhuan	Suning Ling Qian Bao	WeChat Licai Tong
Go-live date	Jul. 10, 2014	Dec. 9, 2013	Dec. 2013	Jun. 13, 2013	Oct. 28, 2013	Jan. 15, 2014	Jan. 15, 2014
Binding fund	CMB Money Market Fund B	China Southern Asset Management Ping'an Dahua Fund Daily Profit Increase	China Universal Minsheng Royal Fund Management	Tian Hong Zeng Li Bao	Harvest Fund	GF Tiantian Hong 99fund Xian Jin Bao	China AMC Wealth Pot In the future: efunds, GF, 99fund
Minimum threshold	0.01 Yuan	0.01 Yuan	1 Yuan	1 Yuan	1 Yuan	1 Yuan	0.01 Yuan
Annualized return of the past seven days (as of Sept. 22, 2014) (%)	4.536	5.58	4.543	4.17	4.55	5.186	4.574
Where/how to buy	Mobile phone app	Official website	Official website	Official website Mobile phone app	Official website	Official website	Mobile phone app
Flexibility	T + 0 real-time cash transfer	T + 0 real-time transfer for personal use or investment in other funds or financial products	T + 0 real-time redemption and transfer	Fast cash for 50,000 Yuan and under; amounts over 50,000 Yuan transferred by 24:00 on T + 1	Fast cash: transferred in 20 min Normal cash: Transferred on T + 1 working day	T + 0 Redemption, transferred within 2 h	T + 0 Redemption (except for China Guangfa Bank), transferred in 1–3 days for the products of CGB

Source Shanghai Institute of Digitalization and Internet Finance

Table 9.5 Milestones of listed banks in exploring the mobile payment sector, 2013

Bank name	Partner	Mobile payment partnership	Date
China Guangfa Bank		The first to launch SD-mall, enabling SD card-based mobile payment	Jan. 2013
China CITIC Bank		Enabled users to submit, confirm and complete money transfer and remittance by shaking their mobile phones	Jan. 2013
China Merchants Bank	China Mobile	Carried out cooperation on the basis of the NFC-SWP model, including financial payment apps such as e-cash and debit/credit card apps	Feb. 2013
China CITIC Bank	MasterCard	Partnered with MasterCard in developing QR Code and virtual payment businesses in mainland China and overseas	Apr. 2013
Bank of China	China Telecom	Entered into strategic cooperation agreement on mobile payment with China Telecom	Jun. 2013
China Merchants Bank	China Unicom	Jointly launched Unicom-CMB Mobile Wallet, enabling small-sum near field payment	Jun. 2013
China Merchants Bank		Unveiled the first "WeChat banking" tool	Jul. 2013
China CITIC Bank	Suning Commerce Group	Officially launched the "Cyber Payment" brand, taking QR Code payment as its flagship product	Jul. 2013
China CITIC Bank	China UnionPay	Completed the coordinated adjustment of the NFC-based mobile payment business, getting ready for commercial promotion	Jul. 2013
China Everbright Bank	China Unicom	Cooperated extensively in mobile financial businesses such as mobile payment, wallet and apps	Aug. 2013
China Guangfa Bank	China Unicom	Signed mobile payment cooperation agreement, and launched mobile payment card based on SWP-SIM technology	Aug. 2013
China CITIC Bank	China Unicom	Signed mobile wallet full cooperation agreement, expanding NFC-based mobile payment business	Aug. 2013
Shanghai Pudong Development Bank	China Mobile	Launched the SIM-based NFC mobile payment bank card (the first of its kind in China) with proprietary intellectual property rights	Aug. 2013
Bank of China	China Mobile, China UnionPay	Officially commercialized and marketed NFC-based mobile payment products in Shanghai	Aug. 2013
Ping An Bank		Launched the "Yiwallet" in late January containing money transfer/payment and chat functions	Jan. 2014

Source DZH news agency

a bank branch; 0.54 dollars via telephone banking; 0.27 dollars via ATM; and 0.1 dollars via Internet banking. In general, the cost of online payment was 1/16 to 1/6 of the cost of payments conducted in brick-and-mortar branches.

Traditional financial institutions, especially commercial banks, have certain irreplaceable advantages built up through more than 400 years of history, such as a vast base of customers, a highly-developed customer service network, sustainable sources of capital, sophisticated risk control approaches, and diversified portfolios of financial products and services, etc. In short, the Internet can shorten the distance only in the virtual world rather than in the real world, and can provide massive amounts of data but it can't create mutual trust between people. Effective information, human-centered channels and real-life trust are critical in the network era. In this sense, Internet finance and traditional finance can complement each other's advantages and work together to achieve Pareto optimality in capital allocation for both the investing and financing sides, and promote the development of digital finance. Similarly, government departments and visionary entrepreneurs should try to identify grounds for cooperation rather than competition between the two forces.

Take the financing business as an example. There is enormous potential for business cooperation between banks and online lending platforms. Given their very different target markets and customer positioning, there are greater opportunities for them if they complement rather than compete with each other. Ali MicroCredit and P2P services primarily serve micro-sized and small-sized customers with a line of credit of 100,000 yuan and 20,000 yuan per transaction respectively; commercial banks largely serve individuals or small and micro-sized enterprises applying for a loan worth more than 1 million yuan. Obviously, they have different target markets. Online lending platforms often boast a large number of customers, but few of these platforms are flush with cash. These platforms cannot replenish their capital pool with deposits. In contrast, commercial banks are well-funded but struggle to reach the long tail market due to cost limitations. Cooperation between online lending platforms and commercial banks can bring about win-win results.

With regard to payment services, Internet-based payment platforms and commercial banks again have different merits. Banks dominate the offline payment market, and they boast a large customer base and strong credibility. Third-party payment companies dominate online payment and are known for their short payment-processing cycle, highly compatible payment interfaces, outstanding product innovation and excellent customer experience. However, so far neither online third-party payment nor mobile payment can operate independently of the banks. In fact, both online and mobile payment must connect to users' bank accounts and bank cards. To some extent, these platforms function as the payment intermediary of banks and enable payment in every corner of the virtual world. Therefore, banks should take a positive attitude to cooperating with such platforms in pursuit of joint development. To date, 85 banks and financial institutions have established partnerships with Alipay and 52 banks with Tenpay. Banks can enhance their cooperation with e-commerce platforms and especially with third-party payment

enterprises to jointly expand their presence in the payment market. Similarly, banks can strengthen their wealth management business by partnering with third-party financial product sales platforms, gaining commissions and selling their own financial products via these platforms.

9.5.2 Digital Finance Is an Effective Way to Realize Inclusive Finance

The original intent of inclusive finance was to provide financial services to all people, especially poor and low-income groups. But equating "inclusive finance" with "finance for the poor" gives a biased perspective. Compared with the traditional financial system, inclusive finance would be defined better and more comprehensively as "satisfying the financial needs of as many people as possible" (see Table 9.6).

Traditional financial institutions and Internet-based financial enterprises should take advantage of digitalized tools like big data, cloud computing, platforms and mobile Internet, continue to pursue financial innovation, explore the long tail market, lower service costs, improve service efficiency, and enlarge the coverage and availability of financial services to enable low-income groups and small and micro-sized enterprises (i.e., the groups previously neglected by the financial service system) to obtain financial services. To this end, we believe that digital finance is an effective way to achieve inclusive finance.

The "Internet gene" of Internet-based financial enterprises decides their inherent advantage to engage in the inclusive finance. Take fragmented investment as an example. Due to the economic costs, traditional banks won't be willing to develop an investment product that features an entry threshold of 1 yuan; in contrast, Internet-based cash management products represented by Yu'E Bao can gather together scattered funds of clients at a low cost and make invest accordingly, which captures the essence of inclusive finance. Many traditional financial institutions are also practicing the philosophy of inclusive finance by exploring digital finance businesses.

Did you know that the Nobel Peace Prize 2006 was awarded to a banker? It's true. It is normally assumed that this prize should go to a sociologist, a politician or someone similar. Instead it went to Muhammad Yunus, a Bangladeshi banker and economist who believed that "Credit is a fundamental human right and everybody should have access to it". Based on this belief, he founded a rural bank in Bangladesh, Grameen Bank, and pioneered the concepts of microcredit and microfinance, offering loans to entrepreneurs too poor to qualify for traditional bank loans. Grameen Bank had loaned over 7.6 billion dollars to 10 million people in poverty and achieved the world's highest loan recovery rate of 98.89 % in 30 years.

Microcredit is not an exclusive business of banks in developing economies: Some banks in developed economies also offer microcredit services. The American bank Wells Fargo, for example, primarily serves small enterprises and other small clients. About 53 % of its net income is generated by its Community Banking segment

Table 9.6 Traditional Financial System versus Inclusive Financial System

Economic theory	Traditional financial system	Digital and internet financial system
Asymmetric Information theory: in the traditional financial system, the quantity of information available to financial institutions and small clients is not the same, leading to the high transaction costs of financial services and weak scale effect. As a result, small- and micro-sized enterprises and people in poverty are often not covered by the financial service system	Credit and loans: As small and micro-sized enterprises and poor people often lack credit records and are exposed to higher risks, the transaction costs (e.g. information collection cost and risk cost) for a bank to provide lending services to them can be 100 times higher than the costs for a large client	Credit and loans: (1) With big data technology, banks can evaluate the credit standing of an applicant rapidly and accurately, thus reducing the risk cost; (2) The availability of clients' online transaction records can help lower the information collection cost to a great extent
	Deposit/investment: Since a RMB 100,000 deposit account and a RMB 1000 deposit account are charged the same account maintenance fee, it is hard to achieve a scale effect	Deposit/investment: (1) Thanks to mobile communication technology, the poor can also enjoy convenient deposit services; (2) Relying on online platforms, the poor can make small investments and get return on investment
	Payment and settlement: Since a RMB 100,000 fund transfer/remittance and a RMB 1000 fund transfer/remittance are charged the same management fee, it is hard to achieve a scale effect	Payment and settlement: Using Internet and mobile communication technologies, low-income groups can enjoy easy and convenient fund transfer and remittance services at 25 % of the original costs
	Insurance services: To handle an insurance policy with a premium of RMB 100 will incur roughly the same service cost as a policy with a premium of RMB 10,000, making it hard to achieve a scale effect	Insurance services: Thanks to Internet technologies (e.g. email), service costs can be greatly reduced so that the poor can also afford the insurance services to withstand the impact of accidents

Source Shanghai Institute of Digitalization and Internet Finance

(retail banking, small enterprise banking). It was able to ride out the financial crisis of 2008 due to its lack of involvement in credit derivatives and securitized assets. Following the Acquisition of Wachovia Corporation, the combined assets of Wells Fargo exceeded 1 trillion dollars (though this is still smaller than Citibank). Wells Fargo thus ranked the first provider of small business loans and mortgage loans in the United States, and it was the only bank in the United States rated AAA by Moody's. Starting in 2009, it has been listed among the top 100 of *Fortune* 500 companies for 4 consecutive years. As of the end of 2011, it was the most valuable bank by market capitalization and the fourth largest bank by asset size in the United States. In June 2013, it became the world's most valuable bank by market capitalization.

In China, the effectiveness of digital finance in promoting innovative services of inclusive finance has been sufficiently evidenced. For example, Shanghai Rural Commercial Bank (SRCB) launched "financial convenience stores" to provide banking services at customers' doorstep. Beijing Rural Commercial Bank developed a mobile banking device integrating POS, ATM and mobile communication functions to provide small individual merchants with comprehensive small-amount settlement services available at anyplace and anytime, and to facilitate mobile payment services for small and micro-sized retailers. Established in March 2007, the Postal Savings Bank of China (PSBC) actively sought cooperation with e-commerce companies to carry out farmer-oriented, microcredit and pension services, and provide small and medium-sized suppliers with a line of credit. According to data released by the PSBC, agriculture related loans distributed by the bank in 2012 totaled 198.6 billion yuan, increased 25 % year-over-year, benefiting 2.2 million agriculture related customers. As of the end of November 2013, PSBC had granted more than 15 million loans worth a total of 1.8 trillion yuan to small and micro-sized enterprises (Fig. 9.8).

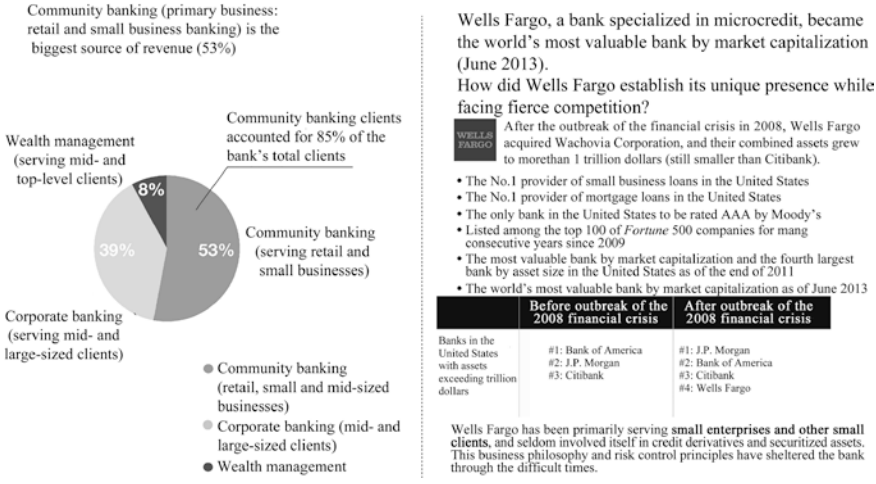


Fig. 9.8 Rankings of wells fargo and its client structure. *Source* Shanghai Institute of Digitalization and Internet Finance

Tips

What Is Inclusive Finance?

The term "inclusive finance" was first put forward by the United Nations (UN) in 2005. Following the naming of 2005 as the International Year of Microcredit, the UN defined five key objectives for the year: first of all, expand and promote microfinance and microcredit to achieve the Millennium Development Goals, and half the world population in extreme poverty by 2015; second, increase public awareness and understanding of microfinance and microcredit's vital role in the development equation; third, promote inclusive financial institutions; fourth, support sustainable access to financial services; fifth, encourage innovation and new partnerships to promote and support strategic partnerships, to build and expand the outreach and success of microcredit and microfinance. To meet these objectives, the UN mobilized a group of experts from various countries to jointly draft the Blue Book on building an inclusive financial system through online surveys, expert interviews and seminars. In May 2006, the UN held its Global Meeting on Building Inclusive Financial Sectors in Geneva and officially put forward the concept of inclusive finance. The Blue Book depicted the prospects of inclusive finance: "Supported by a sound policy, legal and regulatory framework, each developing country should have a continuum of financial institutions that, together, offer appropriate products and services to all segments of the population. This would be characterized by: (1) access at a reasonable cost of all households and enterprises to the range of financial services for which they are "bankable", including savings, credit, leasing and factoring, mortgages, insurance, pensions, payments and local and international transfers; (2) sound institutions, guided by appropriate internal management systems, industry performance standards and performance monitoring by the market, as well as by sound prudential regulation where required; (3) financial and institutional sustainability as a means of providing access to financial services over time; and (4) multiple providers of financial services, so as to bring cost-effective and a wide variety of alternatives to customers".[2]

[2]UN. Building Inclusive Financial Sectors for Development, 2006.

The UN specified in the Blue Book that finance played an important role in helping poor and low-income people get out of poverty. The Consultative Group to Assist the Poor (CGAP) also highlighted the poverty alleviation function of financial services.[3] The Asian Development Bank (ADB) pointed out that to continuously provide the poor with a variety of financial services would facilitate the advancement of the financial system and society as a whole.[4] The United Nations Development Program also emphasized the significance of an inclusive financial system—"a small loan, a savings account or an insurance policy can make a great difference to a low-income family".[5]

In Chinese, the term for "inclusive finance" (puhui in Pinyin) carries two important nuances. One is "common" or "universal", connoting extended coverage of the financial system so that everyone has the access to the financial services they need. The other is "benefit", alluding to the ability for everyone to have proper access to the financial services they need—i.e., to improve their financial situations and escape poverty. Hence, the primary meaning of "inclusive finance" is to offer access to the financial service system to all members of society, especially poor and low-income groups.[6]

In 2006, the UN urged countries to add the construction of inclusive financial sectors to their lists of financial service objectives, alongside prudent supervision of savings and maintenance of a stable financial system. Since then, inclusive finance has gained in popularity in many countries around the world. At the 2009 Pittsburgh Summit, G20 leaders made a commitment to improve access to financial services for the poor and launched the Financial Inclusion Experts Group (FIEG). The International Monetary Fund and World Bank joined the G20 in vigorously promoting inclusive finance and urging other countries to make a commitment. They also organized efforts to develop inclusive financial indicators and evaluated the performance of countries in building inclusive financial sectors. At the 2010 G20 Toronto Summit, a set of "9 Principles for Innovative Financial Inclusion" was drafted and released. India mandated financial inclusion as a national goal and the Central Bank of India defined a string of quantitative indicators and adopted a series of reinforcing measures. In June 2012, former Chinese President Hu Jintao spoke at the Los Cabos Summit, and pointed out that the issue of inclusive finance was essentially about development. He urged all countries to jointly develop a financial mechanism that would benefit

[3]CGAP. Building Inclusive Financial System: Donor Guidelines on Good Practice in Microfinance, 2004.

[4]ADB. Finance for the Poor: Micro-finance Development Strategy, 2000.

[5]UNDP. Building Inclusive Financial Sectors for Development, 2006.

[6]Jiao Jinpu, Chen Jin, Building an Inclusive Financial Sector in China—Making Financial Service Opportunities and Channels Available to All People, 2009 Edition.

all nations and peoples and ensure that all consumers, particularly those in developing countries, could enjoy modern, secure and convenient financial services. President Hu's speech was regarded as a public endorsement of inclusive finance from the Chinese government, showcasing its willingness to build an inclusive financial sector. In November 2013, the Third Plenary Session of the 18th CPC Central Committee released the *Decision of the Central Committee of the Communist Party of China on Some Major Issues concerning Comprehensively Deepening Reform*, which clearly stated in Part III clause 12 that "We will develop inclusive finance. We will encourage financial innovations, and enrich the financial market with more levels and more products."

9.6 Digital Finance[7]

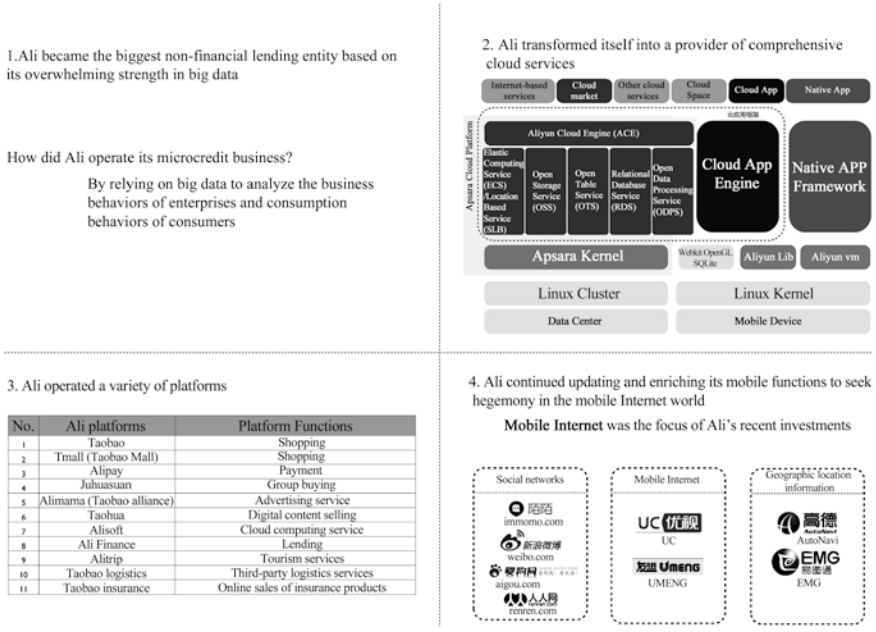
9.6.1 Capitalizing on Big Data, Cloud Computing, Platforms and Mobile Internet to Promote Financial Innovation

As mentioned above, big data, cloud computing, platforms and mobile Internet constitute the soft infrastructure of the digital era. The robust growth of "Ali finance" over the last 10 years was built upon its successful implementation of big data, cloud computing, platforms and mobile Internet. More concretely, Ali (Alibaba) became the largest non-financial lending entity by utilizing big data to probe the business behaviors of enterprises and the consumption behaviors of consumers; Ali was a provider of comprehensive cloud services, and expanded its presence rapidly by launching Yu'E Bao; Ali also operated a variety of platforms and defeated other third-party payment entities with its unique platform strength; the company also updated its mobile functionality again and again to secure its dominant position in the world of mobile Internet, and kept expanding its coverage in the financial sector (see Fig. 9.9).

To sustain their existence and development in the future, the traditional financial institutions should take proactive actions to adopt digital technologies, intensively integrate such technologies into their financial services, and give special attention to the development of big data, cloud computing, platform and mobile Internet.

First of all, make full use of big data. Information is the core of finance. The operating activities of financial enterprises are actually centered on information

[7]Some of this section's content is excerpted from Mr. Ma Weihua's speech to the graduating CEIBS Master Class.



No.	Ali platforms	Platform Functions
1	Taobao	Shopping
2	Tmall (Taobao Mall)	Shopping
3	Alipay	Payment
4	Juhuasuan	Group buying
5	Alimama (Taobao alliance)	Advertising service
6	Taohua	Digital content selling
7	Alisoft	Cloud computing service
8	Ali Finance	Lending
9	Alitrip	Tourism services
10	Taobao logistics	Third-party logistics services
11	Taobao insurance	Online sales of insurance products

Fig. 9.9 Ali's development based on big data, cloud computing, platforms and mobile internet. *Source* Shanghai Institute of Digitalization and Internet Finance

collection, mining, matching and transferring. With the high-speed development of Internet technologies nowadays, the information asymmetry gap is gradually closing. Against such a backdrop, non-financial enterprises versed in Internet-based operations can rely on online channels and data mining to fully tap the commercial value of financial businesses, consequently endangering the survival of traditional financial institutions and presenting a serious challenge to the business model profiting from the intermediary commissions closely related to information asymmetry.

Therefore, traditional financial institutions should put more time and energy into collecting and analyzing information, and into gaining accurate insights into customers' needs, preferences and changes based on in-depth analysis of various data related to the customer's identity, social relations, daily life and behavior, so as to provide customers with individualized and differentiated services and secure sustainable and stable excess profits. In addition, traditional financial institutions should learn to use big data to dissolve the risks inherent in long-tail markets, as well as the mismatch between cost and income in order to launch precision marketing and attract a larger group of customers from the long-tail markets. These institutions also need to jointly build a centralized and unified real-time data warehouse to translate user behavior data into credit data to effectively control credit risk, and undertake full-time and dynamic observation and supervision of customers' transaction behaviors, identifying risks and responding to them as soon as possible.

Second, take full advantage of platforms and traffic. The well-known Internet-based financial products like Yu'E Bao, Licai Tong and Bai Fa were backed by China's largest e-commerce platform, Alibaba, social networking platform Tencent and search engine Baidu respectively, and they showcase how to turn the traffic generated from e-commerce, social network and online searching into money. When a market connected with the platform enterprise gets bigger, the platform enterprise gains influence due to the network effect, while customer traffic increases in a geometric ratio.

As far as traditional financial institutions are concerned, customer traffic means data accumulation and market opportunities. Without sufficient customer traffic, it would be impossible for banks to increase their customer base and create higher value. In the face of the challenges of Internet-based finance, traditional financial institutions should try to build a multi-layer platform to address the hard demands of customers in different market segments, and seize the centralized transaction flows. These businesses should not only cooperate with e-commerce players online, but enter into alliances with offline businesses; vigorously build up their own business platforms and carry out cross-sector cooperation; and gradually set up a business hub platform to identify customers via big data, acquire customers on a large scale, seize opportunities, conduct precision marketing and offer embedded services.

Finally, achieve mobile Internet integration and combine online and offline businesses. Traditional financial consumption heavily relied on the marketing abilities of client managers and counter staff; Internet finance initiated a pull-style consumption model to enhance the availability, timeliness and convenience of financial services via online transactions and mobile payments, creating a strong appeal for customers. Internet finance saw success by effectively combining financial applications with the realities of daily life, and by addressing customer demand offline with financial services online. This has led to the contextualization of apps.

App contextualization is a striking characteristic of mobile Internet. The "WeChat Red Envelope" launched on the eve of the Chinese Year of the Horse was a good example. According to statistics, more than 200 million bankcards were bound to WeChat Wallets in just 2 days. From the eve of the Lunar New Year of 2014 to the afternoon (16:00) of New Year's Day, more than 5 million people took part in the game, receiving over 75 million red envelopes. Over 20 million red envelopes were drawn, averaging to 9400 per minute (Table 9.7).

To this end, it is necessary for financial institutions to be active in approaching customers and linking financial services to people's daily activities. More specifically, they should consolidate and classify e-banking services by usage scenario, and launch integrated service packs for customers; accelerate the transformation of brick-and-mortar outlets from payment oriented to marketing-service orientated, and from business-processing based to application-experiencing based; and take advantage of the real-time interaction with customers online to help them obtain a better experience offline.

Table 9.7 WeChat red envelope versus alipay red envelope (2014 Lunar new year's eve)

	WeChat red envelope	Alipay red envelope
Number of users	5 million	0.22 million
Total sum	240 million yuan	18 million yuan
Red envelope givers	Post-70s, post-80s and post-90s generations	Post-70s and post-80s generations
Red envelope receivers	Seniors, juniors, friends, lovers, colleagues	Seniors, juniors, friends, lovers, colleagues

Source Shanghai Institute of Digitalization and Internet Finance

9.6.2 No Time to Waste: Catching up with the Advancement of "Technology Forecasting and Financial Innovation"

Both traditional financial institutions and Internet-based financial firms need to catch up on the latest trends in science and technology, and leverage cutting-edge technologies to achieve financial innovation. World-leading information technology research and advisory companies like Gartner have estimated that there are 42 cutting-edge scientific and technological innovations in the payment sector. Of these 42 innovations, Alipay and WeChat Wallet each held 9, in addition to 7 that overlapped and 11 that were jointly controlled. Alipay and WeChat had overlap in innovations related to gift economics, e-wallet solutions, QR code identification, Internet micropayment systems, e-payment gateways, e-payment processing and alternative solutions to credit card payment. As it is based on a social networking platform and has been in partnership with large group-buying websites, WeChat Wallet provides users with retail e-coupons and a social network payment system; Alipay uses its MintChip e-wallet and biological payment system. An in-depth understanding and application of the 11 jointly controlled innovations will be of great significance to financial institutions in their process of transformation and innovation. The followings are details about several of these innovations (Fig. 9.10).

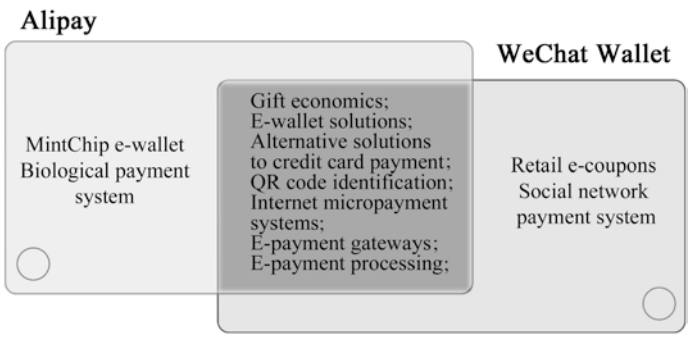


Fig. 9.10 Financial technology innovations of alipay and wechat wallet. *Source* Gartner

9.6.2.1 User Behavior Analysis

In the traditional credit system, pre-lending risk control largely involved checking the payment and credit records of borrowers. In the American FICO system, a loan applicant without credit history is likely to be refused. The Internet-based financial company ZestFinance believed that "all data is credit data". How does a business decide whether to extend a loan to a certain applicant? With user behavior analysis technology, you can get the credit standing of the applicant in 5 s via an algorithmic model that gives dozens, hundreds or even thousands of risk evaluation results based on analysis of the applicant's web browsing history. For example, as people's income varies by region, a monthly expenditure of 4000 yuan on house rent is judged as a moderate consumption, while the same expenditure in a second or third-tier city in the central and western regions can be classified into excessive consumption category. Frequent changes in mobile phone number may be viewed as an indicator that the person will have a higher probability of disappearing or having a bad debt. A person driving a sedan may have stronger sense of family and more stable ability to repay than those driving sports cars. How the applicant actually fills in the application form online (e.g., whether proper capitalization is used) can be taken into account in judging whether the applicant has a strong sense of responsibility, which will, in turn directly influence his or her credit standing.

9.6.2.2 Quantum Money

Before we discuss the technology of quantum money, let's first have a look at its underlying basis—quantum computing. Modern digital computers require data to be encoded in binary and process data in a serial pattern in four steps, from 00 to 11, or 0 to 3 in the decimal system. In contrast, quantum computing involves parallel processing, through which data is processed in one step. Once the technology matures, quantum computers will be able to crack an encryption key much more quickly than traditional computers. For example, it would take more than a hundred million years for traditional computers to crack a 1024-bit complicated code, versus one second for a quantum computer. This massive difference has quite clear implications on the existing code system. The massive difference in processing power also applies to weather forecasting. With the adoption of quantum computing technology, weather forecasts will be more precise, accurately forecasting the weather situation at a specific location at a specific second. In addition, quantum computing goes beyond the limitations of time and space, and enables the secret transfer of information from one location to another.

This superfast computing speed means a quantum computer could quickly and easily crack a standard firewall. In the future, how can we protect our financial system from hacking? The answer is quantum money, developed on the basis of anti-counterfeiting quantum technology. As early as in 1982, the American physicist William Wooters discovered that a single quantum cannot be cloned, and he believed that it would be impossible to make perfect copies of an unknown

quantum state. Therefore, the quantum state can be used as the anti-counterfeiting label to address counterfeit money and hacking. A quantum computer can be compared to a spear that penetrates encryption protections, while quantum-based anti-counterfeiting technology is the shield.

Quantum money is imagined as an anti-counterfeiting currency with two important characteristics: one is that quantum money should be issued by the central bank; the other is that quantum money cannot be reproduced by any other entity except for the central bank. But at the same time, we need a technology that will enable anyone to check the authenticity of money. According to Gartner's Hype Cycle, quantum money technology won't be mature for at least another 10 years.

9.6.2.3 Time Bank

In August 2014, a "time bank" was established in Toronto, Canada. At this bank, people deposit not money but time. Registered users can obtain points by helping others and exchange the points for others' help. A model similar to the time bank has been introduced into many cities in China including Nanning, Nanjing and Chongqing: residents devote some time to helping the elders and exchange the time devoted for other services in their community. It is predicted that payment in the form of labor and time will be of equal significance in the future.

There are also many other scientific and technological predictions and innovations relevant to the financial sector, but due to limited space we won't go into the details here. To embrace the emerging digital trends, traditional financial institutions should devote sufficient attention and effort to studying these forward-looking technologies, integrating them with users' needs and becoming the pioneers who lead the trend.

9.6.3 Changing Traditional Financial Business Management with Internet Thinking

9.6.3.1 User Experience First and Foremost

In the era of the Internet, it is possible for you to market a product or service without spending a penny on advertisement: as long as your product or service is good enough to go far beyond consumers' expectations, you will get more customers through word of mouth. Your product or service can even become part of the social discussion. Why did banks lose their dominance in the arena of online payment? The reason was that all the innovations made by the third-party payment platforms were designed to create greater convenience for users. Though traditional financial institutions also strove to improve customer service, they still lagged behind their Internet-based counterparts. Their business philosophy diverged greatly from the

online players'. More specifically, traditional banks are dedicated to maximizing the input-output efficiency through standardized rules and procedures and rigorous risk control measures, while Internet companies focus on creating value for customers by improving the customer experience, thus generating robust financial returns. Putting the customer experience first is a big challenge for traditional financial institutions. A thorough revolution is needed to radically change their business philosophies with regard to product design, customer service and brand value.

In terms of product design, banks should start with users' needs, prioritize the user experience, respond quickly, turn the processes of financial transactions into one of data exchanges, collect and analyze user data throughout the transaction process so as to provide users with more considerate and comprehensive services, and deliver an excellent user experience. For example, banks should create a comfortable, modern and convenient service interface online, and enhance the availability of their service channels in neighborhoods.

In terms of process management, banks should—just as their Internet-based counterparts have done—adopt customer-centrism in designing and managing their business process, and ensure their front offices focus on customer relationship management, their middle offices on customer data mining and analysis, and their back offices on centralized operations. The coordinated work of the front, middle and back offices will enable banks to provide their customers with high quality, efficient services, and thus improve the customer experience to a great extent.

9.6.3.2 Open and Inclusive

The Internet is an open ecological system where crowd sourcing, crowd funding and crowd innovation can use collective wisdom and energy to create universal value. Internet companies are adept at bringing customers into the value chain and getting them to contribute creative ideas and participate in product design, manufacturing and marketing. Customer participation and feedback, in turn, can help Internet companies achieve continuous improvement to deliver excellent services. In contrast, traditional financial institutions need to focus on breakthroughs. For example, in terms of product innovation, the old-fashioned operating models that feature a clear division of labor, a high degree of alignment and interdependence, as well as the R&D models based on mechanical work, can no longer satisfy the need for innovation in the online era. What should traditional financial institutions do to truly adopt an open mindset?

First, consolidate customer information and business data from multiple dimensions, enter into alliances with all possible partners, integrate cross-sector and cross-boundary, online and offline, near-field and far-field services, and build a mutually beneficial business ecological environment. Second, capitalize on crowdsourcing, crowd funding and crowd innovation, listen not only to the specialists,

but also to ordinary staff and customers regarding product and service design, and involve them in the whole process to further improve the product or service.

Third, join hands with Internet companies. For example, Citibank has entered into a preliminary data cooperation program with Facebook which has seen positive results so far. Citibank launched a Facebook app allowing its customers to share their credit card rewards with others. This initiative enhanced the interaction between the bank and its customers, and persuaded more prospective customers to apply for credit cards and register for membership. In the meantime, the bank collected not only "hard data", such as customers' names, birthdays and addresses, but also "soft data", including information on customers' consumption habits and preferences. More importantly, Citibank identified a group of customers with shared hobbies and thought patterns, facilitating the bank's precision marketing efforts. Through this cooperation, Facebook also obtained many high quality customers from Citibank.

9.7 Conclusion

On December 20,2012, Shanghai Institute of Digitalization and Internet Finance was officially established.[8] At the unveiling ceremony, Ping An Group Vice General Manager and Shanghai Lujiazui International Financial Asset Exchange[9] Chairman Ji Kuisheng said at the end of his speech that "I had a same dream every night. In my dream, Appleventured into the financial sector." I then spoke after him, and at the end of my speech I said, "Mr. Ji's dream is that Apple will compete for the business of Ping An. In other words, that Internet companies will compete with financial companies… or vice versa. Faced with the ruthless competition, sometimes the best outcome may come from cocompetition."

Digital Finance is a teaching material I used often when I gave lectures at CEIBS. The name of the book also refers to a combination of the digital and the financial. Since it is impossible for Internet finance to completely overthrow traditional finance, after the competition between traditional finance and Internet finance is transformed into coopetition, who will be the ultimate beneficiaries? The answer is businesses, consumers, traditional financial institutions and Internet-based companies.

[8]The institute is located in CEIBS' campus. CEIBS Prof. Zhu Xiaoming acts as its director.

[9]Lufax: its full name is Shanghai Lujiazui International Financial Asset Exchange.

Chapter 10
The O2O Model—From Online/Offline to the O2O Model

The O2O business of the mobile internet model is at least ten times the size of current e-business of internet model.
—O2O: Business Revolution in the Age of Mobile Internet

The service economy is evolving towards an experience economy when human beings will create more experience-related economic activities and businesses win out through offering experience services.
—Alvin Toffler, American futurist

Why did Wanda Group, an offline real estate enterprise, announce its launch of an intensive e-Commerce campaign in July 2014?

Why did e-business S.F. Express set up 518 brick-and-mortar convenience stores called "Hike" in May 2014?

Why did online mogul Alibaba and offline retail group Intime establish a joint venture in March 2014 focused on integrating systems of membership, payment and commodities?

Why did e-business JD join hands with tens of thousands of offline convenience stores and ERP service association in March 2014 to enact a revenue-sharing partnership based on online traffic + logistics delivery + information technology?

Never for a moment has the war of competition ceased in the modern business world. From commercial giants to small companies, online to offline businesses, attacking to defending, fighting alone to seeking alliances, the combatants face battlefields as fierce and intense as those of the spring and autumn period. But among these ever-changing rivalries, the O2O model, a model of online and offline integration, has become a pervasive trend.

X. Zhu et al., *Business Trends in the Digital Era*, DOI 10.1007/978-981-10-1079-8_10

10.1 Online Versus Offline

10.1.1 The Offline Model: Challenged by e-Commerce

Nowadays, new-generation consumers can remain at home while enjoying online shopping and door-to-door delivery. Higher urban population density and consistent improvement in e-payment and logistics systems have fueled the explosive growth of e-Commerce while posing enormous challenges to pure offline models.

For example, owing to skyrocketing online garment sales, brick-and-mortar stores are now reduced to "fitting rooms" for e-Commerce. As larger quantities of customers move online, offline dealers struggle to compete with online shopping. Falling profits leave brick-and-mortar stores unable to afford high rents, even bringing in a wave of store closures in some parts of China (Table 10.1).

Despite Suning's original plan in early 2012 to open up 400 new stores by year end, the first-quarter report released in April showed only 26 stores had opened while another 36 had closed. The 2014 first-quarter report showed a 14.2 % fall in revenue from brick-and-mortar stores. In order to deal with the great pressure brought by e-Commerce, traditional retailers like Suning are seeking solutions online.

10.1.2 The Online Model: Still Rising, But Unable to Completely Replace the Offline Model

Along with rising Internet penetration, online shopping, though its growth rate is leveling off, enjoys considerable potential for future development. Momentum is increasingly coming from the growth of mobile Internet. The total volume of online shopping through mobile terminals amounted to 167.64 billion yuan in

Table 10.1 Number of stores closed by major retailers nationwide between May and September 2014

Supermarket	Total number of stores closed	Department store	Total number of stores closed
Carrefour	2	Parkson	3
Walmart	4	Shin Kong	1
Yonghui	1	Central Department Store	1
Metro	1	Lotte Mart	1
China Resources Vanguard	1	Wangfujing Department Store	1
Tesco	1	Printemps	1
PDL	1	Chongqing REF	1
		Ito Yokado	1

Source Linkshop

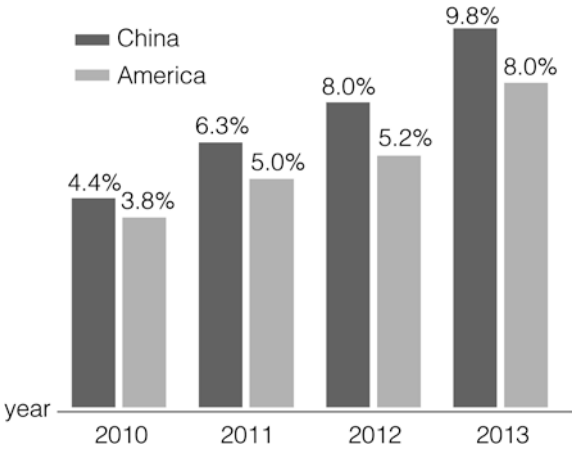


Fig. 10.1 Proportion of e-retailing in retail sales of social consumer goods in China and America between 2010 and 2013. *Source* China e-Commerce Research Center, 2013 China E-retailing Market Data Monitoring Report, March 2014

2013, with a year-on-year growth rate of 165.4 %. The size of the market is expected to reach nearly 1 trillion yuan in 2017, with a growth rate of 39.4 %.[1]

Enormous potential also lies in the e-Commerce market of China. The number of online shoppers shot from 33.57 million in 2006 to 302 million in 2013, while per capita online expenditure leapt from 929 yuan in 2006 to 6125 yuan in 2013 (See footnote 1). The number of internet-users in China will continue to surge over the next few years.[2] The prevailing trend of growth in online shopping and enhanced viscosity of online commercial platforms have paved the way for the future development of e-Commerce in China.

In 2012, domestic e-Commerce transaction totaled 8.0163 trillion yuan, with a year-on-year growth rate of 31.7 %. Of that amount, over 1.3 trillion yuan came from e-retail which itself enjoyed a year-on-year growth rate of 67.5 %. The proportion of online to total retail sales of social consumer goods increased from 0.41 % in 2006 to 6.3 % in 2012, and reached 7.89 % in 2013.

The online market is mainly concerned with commodity transactions, but nowadays, local lifestyle services, including food and entertainment, might take up a bigger part of people's daily consumption. Moving forward, the combination of lifestyle services and the Internet will create a market much larger than that of online commodity transactions.

The online model is still on the rise, but it cannot completely replace the offline model. For example, China and America were the first and the second respectively in 2011 global ranking of e-retailing market size, but between 2010 and 2013, the proportions of online retail in retail sales of social consumer goods for both countries were still below 10 % (Fig. 10.1).

[1]Resource: China Merchants Securities.

[2]iResearch expects the figure to be 731 million by 2015.

As traditional retail is squeezed by the rise of e-Commerce, both businesses and consumers are wondering: How long will the offline model survive in the market? How long will the online model continue to thrive? Is there a better model, one that is more practical and long-lasting?

10.2 Online and Offline Integration: Easier Said Than Done

Nowadays, the prospect of huge profits is causing both e-Commerce and traditional brick-and-mortar companies to integrate online and offline models, but this is easier said than done. Given their different profit models, price systems and marketing approaches, the two independent channels can't simply be mixed together. If properly integrated, they can interact with each other and achieve win-win results; otherwise, strong internal rivalry can arise at any time.[3]

10.2.1 Online Businesses Test the Water in the Offline Market

A considerable number of online businesses have been testing the offline market to improve customer experience, product credibility and brand reputation. Take the cosmetic website Jumei.com as an example. It is said that Jumei's highest daily sales exceeded 500 million yuan, equivalent to the total sales volume of up to 1000 offline stores. At the end of 2013, Jumei launched its first offline boutique located in one of the most prosperous business districts in Beijing—Qianmen Street, where foot traffic is extremely high. Offering consumers opportunities to shop with Jumei in a more direct way, the boutique contributes to improving brand credibility.

Consumers are encouraged to scan QR codes for prizes, and these codes can be seen everywhere inside the boutique, to run Jumei's app and log in through mobile terminal. In this way, Jumei's boutique is able to initiate the interaction between online and offline models. However, it is still not able to compete with online stores with respect to the diversity of promotional events and flexibility in price adjustment, despite its efforts to maintain a price level similar to its online counterpart. The same problem occurs in many online businesses testing the water in the offline market, and some have suffered great losses.

Here is another living example in the world of business. Inman, an online original brand of woman's wear, launched its first online store on Taobao in 2008 and

[3]Cases of this section come from Cnii.com.cn, authors: Yao Ge, Xie Yu, Xiao Zhong, Cong Wen, Huang Yu, April, 4, 2014.

managed to achieve a sales volume of over 100 million yuan in only four or five years. Encouraged by such strong growth in its online business, Inman opened its first brick-and-mortar store in Guangzhou in September 2011, followed by 39 others in Shandong, Inner Mongolia, Heilongjiang, Anhui and elsewhere. However, the online boutique, with its flexibility in online sales, diversified forms of promotion and faster mobilization of goods, is "undermining the strengths of offline distributors" and crushing its offline counterparts. In Inman's original plan, 70 % of products sold online and offline would be the same and have identical prices, but in practice, online stores often gave discounts on these products. The price gap led more customers to give up offline shopping and crowd into online boutique. All of Inman's brick-and-mortar stores ended in closure.

10.2.2 Offline Businesses Move Online

It is undeniable that the brick-and-mortar store model has reached a bottleneck. Moving online seems to be the best option for offline businesses.

Boasting a relatively more mature O2O model among apparel retailers, Uniqlo started to explore an online marketing strategy and strengthen online promotions in 2008. In 2013, Uniqlo launched its own app helping users to find store locations, contact information, store hours, product lines, discounts at the nearest store, and directions to nearby stores with navigation tools.

To strengthen online sales, Uniqlo entered into cooperation with Tmall. In 2013, the single-day sales volume on "11.11" (Singles Day, November 11) in Uniqlo's Tmall store amounted to 120 million yuan, with more than 1 million pieces of clothing being sold and a year-on-year growth rate of over 500 %. With its store on Tmall, Uniqlo is able to not only satisfy the shopping needs of customers who are not able to buy in offline stores, but also identify consumers' needs and geographical location through analyzing feedback data from online users, helping inform the site selection and construction scheduling of brick-and-mortar stores.

In addition to operating various traffic-boosting online promotions, Uniqlo has been actively exploring how to improve the offline customer experience. Its New York boutique even has a Starbucks inside, the first ever among apparel retailers in the US. In order to extend customers' stay, Uniqlo provides tables, chairs, sofas and iPads inside its stores, encouraging consumers to surf and shop online so as to increase sales volume. In addition, all offline stores proactively recommend Uniqlo's app to offline customers through inside-store posters and broadcasting, cashier introductions, promotions and discounts.

It is noteworthy that Uniqlo uses separate price systems for online and offline products, which serves as a solid foundation for the integration of its online and offline businesses. For example, Uniqlo's app can direct users to offline stores; some QR discount codes can be obtained online but can only be redeemed offline. At the same time, the offline store successfully fulfills its task of retaining

customers who aren't covered by the online boutique and of directing visitors to its online counterpart. And with different product ranges and staggered promotional periods for its online and offline stores, Uniqlo succeeds in avoiding infighting. While many companies are strengthening online business and cutting down on their offline business, Uniqlo is accelerating the construction of brick-and-mortar stores.

But there are a considerable number of offline businesses that made huge investments to move online, with poor results. Famous home furnishing brand Red Star Macalline invested in setting up an online shopping mall called "Mmall.com" in 2012 to sell building materials and home furnishing products, becoming the first large-scale traditional furniture retailer to enter the online market. Mmall failed to obtain support from physical stores, however, and so it could share neither resources nor brand strength with its offline channels. Its online traffic and trading volume remain low, despite the huge investment. During a media interview, Mmall staff explained the difficulties in promoting online group-purchase business: "Offline stores see us as a competitor rather than as a partner. We can't get any resources from them without paying."

At the beginning of 2013, Mmall started a large-scale staff reduction including replacement of person in charge. To extricate itself from its predicament, Mmall attempted to include online sales volume as part of the evaluation system of its offline stores, encouraging offline stores to participate in online business with integrated working procedures and shared resources. In March 2013, Mmall was officially renamed "Xing Yi Jia", and today is continuing to explore the path to effective online and offline integration.

10.2.3 Are the Two Models Compatible?

It is an irreversible trend for traditional companies to move online, but their individual approaches vary depending on their core business. In order to withstand the huge impact of user-centrism brought by e-Commerce, traditional industries, which used to follow the concept of product-centrism, should make full use of Internet technology to meet individualized demands and consistently improve user experience. Therefore, before moving online, traditional businesses require rigorous self-inspection to determine whether they conform to the basic laws of survival in the Internet age in terms of thought mode, supply chain, marketing and so on.

As for e-businesses, the primary concern to be addressed before decision-making is how to position brick-and-mortar stores. Are they merely a place for product demonstration and experience, or for out-and-out commercialized operation? Are e-businesses accustomed to an asset-light strategy and capable of exploring offline resources as efficiently as they did online? Will they be able to offer excellent face-to-face service and skillfully deal with the various challenges of offline operation? All these questions need to be answered before offline operation trials.

At a certain stage, improving one's e-business operations outweighs rushing to expand into the offline market.

There are some common problems confronting both online and offline businesses during the integration process. Firstly, pricing. When a product is sold through both online and offline channels simultaneously, how should prices be set to ensure benign market development without causing chaos? Brick-and-mortar enterprises with traditional sales channels retain, in particular, the need to protect the profits of intermediaries. Secondly, to ensure rational profit allocation between online and offline units, it is essential for business operators to have a flexible mindset to be able to shift smoothly between the two models. Without appropriate solutions to the above problems, online and offline integration will only lead to trouble.

In short, to determine whether a business should take the path of online and offline integration or not, multiple factors, such as product attributes and consumption scenario, need to be taken into consideration. Instead of blindly following the trend, companies should get back to the essence of retailing to ensure that they understand and are meeting the individualized demands of targeted consumers, pleasing and surprising them with products, services and experiences that exceed their expectations.

10.3 The O2O Closed-Loop: A Model Worth Exploring

Imagine a situation where smart devices have reached maximum penetration and a store network with large geographic coverage enable people to enjoy services wherever they go, enriching the user experience. Meanwhile, offline business services attract more people online, who in turn further contribute to business offline, creating a virtuous cycle. To turn this scenario into reality, we need to establish a complete business closed-loop, based on online and offline integration, with a new business model and type of customer experience. This is called the O2O closed-loop. O2O integrates offline business opportunities with the Internet, which becomes the front desk for offline transactions—one that lets users make selections, issue payments and set up appointments online while enjoying the product or service offline.

10.3.1 O2O Closed-Loop: Why It Emerged?

As a trend or model, the O2O closed-loop did not emerge overnight. Instead, it is a product of multiple factors arising in the Internet era.

The Internetization of traditional businesses is the foundation of O2O. From a business perspective, promotion through online channels will be more efficient than distributing printed brochures in a competitive market. Intensified

competition forces local offline vendors to take the initiative and seek customers online. Lessons learnt from the group buying business have strengthened the network mindset. High requirements of marketing and management also necessitate the trend of Internetization and facilitate the penetration of O2O model.

Users have been upgrading their lifestyle and consumption habits. Valuing freedom and high quality, young consumers are more sensitive to price-quality ratio. The proportion of service consumption (including food and drink, movies, cosmetics, Spas, traveling, working out, car rentals and apartment renting) and online spending in their total expenditures (including shopping and eating out) continues to rise. Changing attitudes toward lifestyle and consumption, especially the intangibility of service, inseparability of production and consumption, and lack of storability, cannot be satisfied by the e-Commerce model or traditional offline model alone. This is leading to consistent improvement in marketing approaches and innovation in services to meet market changes.

Mobile devices are better suited to the development of the O2O model since the mobility and portability of mobile devices perfectly matches the real-time demands of users. 2011 and 2012 witnessed tremendous technological development in mobile terminals from the emergence of various innovative technologies and applications, accelerating the expansion of O2O closed-loop model. Statistics also show that O2O corporations have shifted their business focus to mobile devices. Dianping.com announced in August 2012 that the number of mobile users was about to exceed 40 million, with mobile devices generating more page views than desktops; In October 2012, data from 58 Tongcheng showed more than 40 % of its total visitor volume came from mobile devices; Mobile devices now make up approximately 20 % of total sales volume for Meituan.com and mobile client is increasing more rapidly than desktops'.

With regard to payment technology, which is closely tied to O2O business, many technology companies have offered a helping hand to traditional industries through innovations that address challenges from inadequate standardization and informatization. For example, since 2011, Chinese businesses like Alipay have spent great effort in simplifying the payment process and improving user experience. This is particularly visible in the area of mobile payment, where innovative payment methods, such as instant payment, QR code payment and iBox payment, have started to gain popularity.

Whether discussing online vendors, offline consumers or transaction technologies, the time is ripe for the O2O model, based on further online and offline integration, to prevail.

10.3.2 O2O Closed-Loop: Constituents

The O2O closed-loop contains two basic elements: E-payment and LBS (location based services). The former topic has been discussed in previous chapters, so we will not reexamine it here.

LBS, based on a combination of mobile communication network and satellite positioning technology, obtains location information (latitude/longitude coordinates) of mobile users through the networks (such as GSM and CDMA) of mobile telecom operators, and offers various location-related value-added services for individual users or for other communications systems through a mapping platform. For example, after locating a mobile phone user, LBS can provide the names and addresses of hotels, cinemas, libraries and gas stations within a one-mile radius of the user's current location. Therefore, LBS requires Internet or wireless network access to complete its two main functions—positioning and service.

Following the rapid progress of science and technology, the concept of the "last mile" in logistics and navigation has been replaced by the "last meter". How can the "last meter" problem be solved? Given the fact that most offline merchants are indoors where GPS, an outdoor navigation tool, cannot work efficiently, LBS cannot live up to its full potential due to technological constraints. Hence Apple came up with iBeacon technology as a solution.

What can iBeacon do? Basically any Internet-related indoor activities, such as indoor navigation, mobile payment, in-store shopping guide and foot traffic analysis. Suppose you are shopping in a large shopping mall carrying an iPhone 6 (with iOS 8 and iBeacon support), which enables the iBeacon base station to transmit all kinds of information to you, such as coupons or in-store navigation, as soon as you enter the iBeacon signal area of a certain store. When you walk to the section of a store for a certain brand, it can tell you your points balance and your VIP level or give you customized recommendations. In essence, while they are within the signal area of the iBeacon base station, users are able to obtain personalized information through their smartphones.

Based on these two elements, an O2O closed-loop must follow several basic steps that may vary by industry. The following two examples will bring us a preliminary understanding of the O2O closed-loop.

Let's start with the "O2O closed-loop" solution for the field of digital medical care, which includes 6 steps and 2 key elements. First, an offline patient makes an appointment and completes registration online; second, the patient goes to the hospital at the scheduled time; third, data generated during the diagnosis process is uploaded to the cloud; fourth, therapeutic plans and examination report are delivered to the user's personal mobile device; fifth, a home medical testing device or wearable device monitors patient's health condition and uploads the data in real time to the cloud for doctors to track; sixth, if any abnormal data is detected during the real-time monitoring, doctors can react quickly and contact the patient to return to the hospital for further treatment.

The other example is the O2O closed-loop in passenger transportation industry. First, the user submits the requested travel time, destination and other information online; second, the user receives offers based on the submitted requirements and preferences; third, the selection is confirmed online and payment is made; fourth, the tickets are issued and reservations are made offline for whatever service is needed, e.g., short-distance transportation and car rental; fifth, the information is updated online and sent to the user, including the itinerary, location and degree

of satisfaction to the service; sixth, LBS offers value-added services along the trip based on user's personal preferences, such as for transportation, restaurants and travel destinations. The cycle begins again the next time the user sends a request.

It is noteworthy that the value of the O2O model lies not only in better connecting users with vendors through online displays and offline experience, but also in enabling businesses to provide systematic and complete services during the whole transaction process, even including follow-up tracking and maintenance. Only in this way can users enjoy the whole purchasing experience and service and be willing to share their experience with others, strengthening reputation by word of mouth and improving customer loyalty (Figs. 10.2 and 10.3).

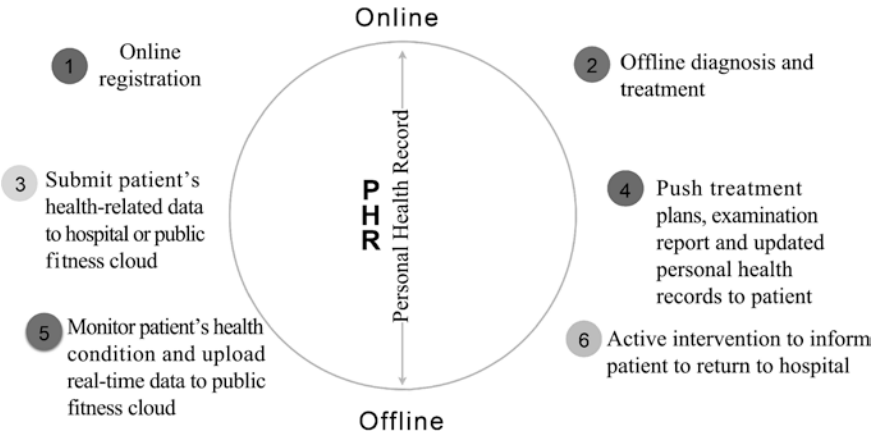


Fig. 10.2 O2O Closed-loop solution in the field of digital medical care. *Source* Shanghai Institute of Digitalization and Internet Finance

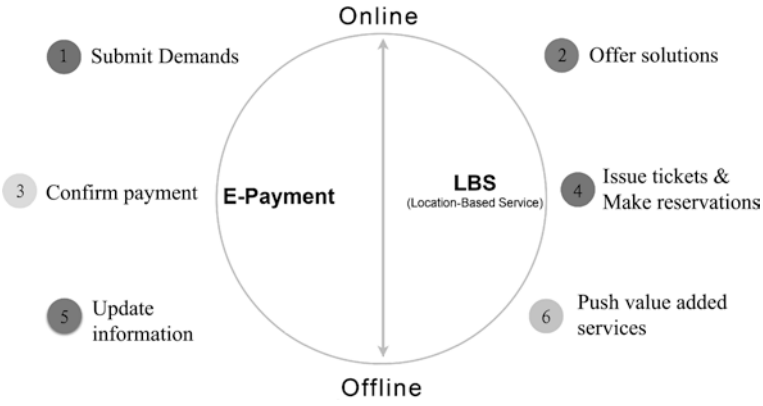


Fig. 10.3 O2O Closed-loop in passenger transportation industry. *Source* Shanghai Institute of Digitalization and Internet Finance

Therefore, as an indispensable element to O2O closed-loop model, data feedback enables further analysis of user data by recording and tracking every order, helping businesses to accurately target users, segment the market, push information and provide differentiated value-added services at lower cost to users. Accomplishing all these tasks together would be impossible for the traditional model. Through analyzing customers' personal data as well as their expenditures and investments in real estate, many corporations, such as OpenTable, SpaFinder and 5i5j, are able to differentiate high-value customers from ordinary ones at a very low cost and offer special services accordingly.

10.3.3 O2O Closed-Loop: Who Are the Competitors?

Compared with the model of online and offline integration discussed in the previous section, there is one more market entity in O2O closed-loop, and that is the O2O platform. The platform could be BAT, the three Internet moguls, or a community forum of lifestyle services, or a site specializing in classification, reviews, group purchasing/discounts, or a website targeting certain vertical markets.

Take BAT, which were frustrated in their initial O2O campaigns, as an example. Both QQ Group Purchase (owned by Tencent) and Gaopeng.com (jointly funded by Tencent and Groupon) lost the fierce battle among thousands of group purchase websites; Baidu's Youa quickly fizzled; Koubei.com of Alibaba has already disappeared from public view. In contrast, independent O2O websites have established stable traffic on mobile with their own apps. More importantly, such professional O2O apps can serve as an integrated filter to retain and accumulate users who have already gotten accustomed to O2O consumption habits, thereby maximizing conversion rate.

However, instead of giving up O2O, BAT launched a series of integration and restructuring campaigns to make O2O a part of strategy. Notwithstanding different styles in acquisition, a close examination of the businesses acquired reveals that the three giants are constructing their own O2O ecosphere in four ways, namely, payment services, social media/messaging services, mapping services and lifestyle services. In just half a year, BAT's O2O battlefield has extended to 8 more industries, including education services, medicine and healthcare, film and television, and car rentals, each with its own unique features (Fig. 10.4).

Contextualization-Baidu. Thanks to its technical prowess in search and LBS, Baidu has relied on its map services and search engine, coupled with the offline resources of Nuomi, to gain a foothold in O2O market. As a major entryway to mobile and contextual applications in the future, Baidu Map enjoys great strength in the field of O2O contextual applications.

Transaction-Alibaba. Thanks to its own strength in transaction, the high market share of Alipay and support from products like Taobao Life and Amap, Alibaba has successfully penetrated into every link of lifestyle services with its transaction

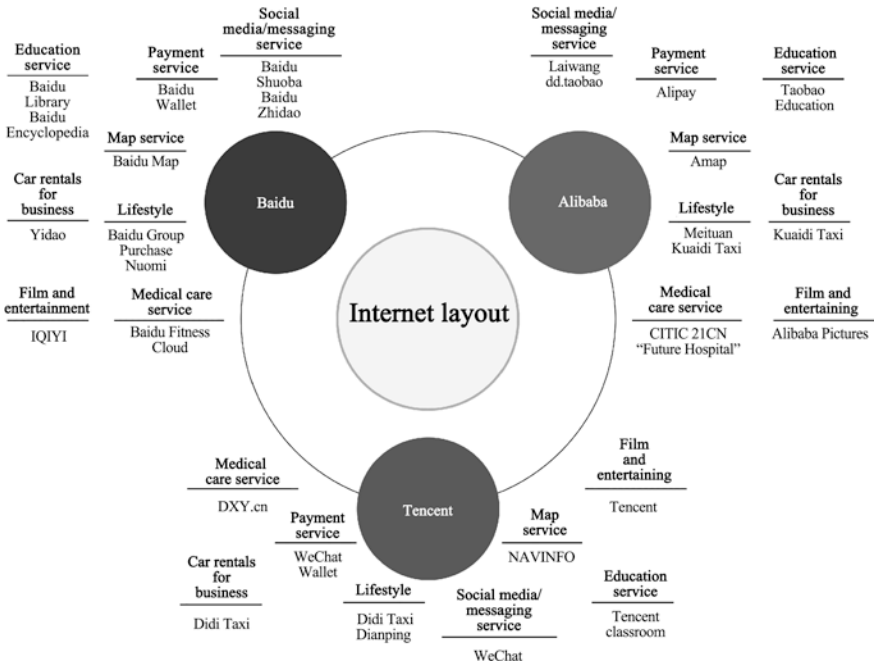


Fig. 10.4 BAT's O2O layout. *Source* Shanghai Institute of Digitalization and Internet Finance

service. Meanwhile, Alibaba is constructing a transaction ecosphere that will serve as a solid foundation for extending its influence as the O2O industry develops further.

Socializing-Tencent. With the super gateway application WeChat, Tencent has found its own way into the O2O market, establishing an entryway for mobile lifestyle applications based on social networking on mobile devices. WeChat's role in introducing transaction resources from outside into the O2O market has been thought of highly by the industry.

In addition to BAT, traditional corporate titans have now joined the battle in the O2O market. Following the start of cooperation between Alibaba and Intime, it was been announced that Wanda, a real estate leader in China, would be joining forces with Tencent (boasting 800 million active users) and Baidu (China's largest search engine and Internet portal in terms of traffic) to establish Wanda E-business Company (hereinafter referred to as "Wanda E-business"), in which Wanda holds 70 % equity while the remainder is equally divided between Baidu and Tencent. The partnership is committed to transforming the experiential commercial real estate giant into an O2O complex, evoking infinite possibilities for new smart business districts and painting a more complex picture of the competitive O2O market.

10.4 The O2O Closed-Loop in Our Lives

As for offline vendors, the O2O model not only cuts their expenditure on rent through reducing their reliance on the geographical location of brick-and-mortar stores, but also makes it much easier to collect consumer data for precision marketing, in turn helping the businesses maintain old customer relationships and develop new ones.

As for consumers, O2O offers abundant and timely discounts and other information, letting people select and order appropriate products or services more cheaply, conveniently and quickly.

As for the O2O platform, O2O attracts a large number of highly-committed consumers and obtains more vendor resources. A massive volume of users (including both vendors and consumers) conduct transactions on the O2O platform, generating cash flows several times larger than that of B2B and B2C, great potential in advertising revenue and, after the scale effect has been achieved, more innovative profit models.

All in all, as the interface between online and offline services, the Internet can redress the imbalance of service information between vendors and users, break down the obstacles of geography and space, and meet the promotional and marketing demands of businesses, achieving a "win-win-win" effect. This triple victory convincingly illustrates why the O2O closed-loop model has been well received and widely applied in so many fields.

10.4.1 The O2O Closed-Loop: Accelerating the Transformation of the Lifestyle Industry

At present, the lifestyle O2O market mainly deals with ticket purchases, hotels, dining, convenience services, recreation, education and training, healthcare, etc. Group buying is not only the primary format of lifestyle O2O services but also their leader and driving force.

Through the joint efforts of all market players, China's lifestyle O2O market witnessed rapid development during 2011 and 2012 and explosive growth on related websites. Since 2011, lifestyle businesses have increasingly recognized online channels as effective marketing tools. The improvement in both quantity and quality of lifestyle websites is encouraging a growing number of users to use online channels for queries, reservations and purchases related to local lifestyle services. In addition, great progress had been made since 2011 in areas of infrastructure, such as financial payments, IT systems and verification technology, facilitating the overall development of the domestic lifestyle O2O industry, whose online market, according to iResearch, grew from 36.11 billion yuan in 2011 to 75.56 billion yuan in 2012, a growth rate of 109.2 %. The market is expected to exceed 270 billion in 2015.

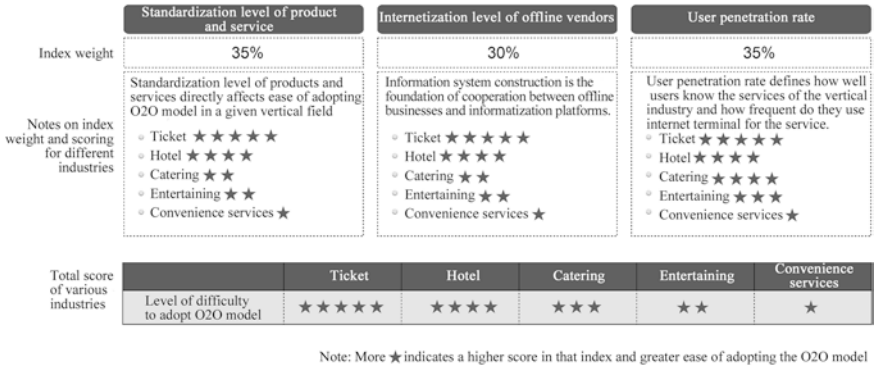


Fig. 10.5 Level of difficulty of adopting the O2O model for life service vertical industries. *Source* Analysys International, 2014 Thematic Study Report on O2O Life Service Market in China

Due to different levels of informatization, the level of development in the lifestyle O2O market differs from one industry to another (Fig. 10.5). In the domestic market, the hotel and plane ticket industry, represented by Ctrip and eLong, enjoys a greater level of O2O development and online penetration. The ticketing markets for movies (represented by companies like Gewara, Spider and Mtime) and travel destinations (represented by companies like Qunar, Lvmama and LY) in particular, have witnessed remarkable growth in online penetration in the last two years. With the help of offline automatic ticket-collecting machines, some film ticket websites have managed to greatly improve the user experience. In 2012, the dining O2O industry, led by Dianping, moved into the fast lane, with the amount of online commercial users skyrocketing to 98 million at an annual growth rate of 58.1 %. That number rose to 139 million in 2013 and is expected to exceed 200 million by 2015.

Restricted by low levels of standardization and informatization, most local lifestyle industries are still stuck in the early stages of development and have a low rate of online penetration. In the next few years, facilitated by the growing number of netizens and greater convenience of online booking and purchases in the age of mobile Internet and coupled with the efforts of Internet moguls like Alibaba, Tencent and Baidu, China will maintain rapid growth in the number of commercial users of local lifestyle services. The steady development of the lifestyle O2O market in China will accelerate the informatization of offline traditional business operations. Application services will continue to become more mobile and contextual and will be able to cover all kinds of consumer demands. Real-time data generated in all different settings will be analyzed with big data technology to facilitate more accurate and efficient decision-making, motivating the reconstruction and upgrade of the whole industry chain.

10.4.2 O2O Closed-Loop: Boosting the Development of Smart Business Districts

Perfectly combining the strength of both online and offline models, O2O model manages to integrate the Internet with brick-and-mortar stores in an ideal way. Consumers can enjoy both affordable prices online and amicable service offline. Meanwhile, an alliance of different businesses can be achieved in the O2O model. That is why, when constructing smart business districts, O2O has been a highly praised concept among regional planners, business leaders and executives of investment companies.

Located in the People's Square area in the center of Shanghai, Huaihai Road of Huangpu District is one of the most flourishing business streets in Shanghai. Its most bustling section starts from South Shan'xi Road in the west and ends in South Xi'zang Road in the east, greeting passers-by with the scents of delicious foods from time-honored stores and a wide variety of fresh groceries. For more than 100 years, Huaihai Road has been synonymous with romance and fashion in the minds of many old Shanghainese, representing the city's unique culture and commercial atmosphere in the most vivid way.

However, in the last two years, the old business street seems to have grown more desolate as more and more stores move or close down entirely, including Barbie's Boutique, Me & City, The First Department Store, Novel Department Store and Media Markt. Many stores along the 2.2-kilometer-long Middle Huai'hai Road have closed down, such as the G2000 specialty store at No. 680 Middle Huai'hai Road, Swarovski at No. 522, Su Feiya Wedding Dress at No. 462, Jordan Sports at No. 366, AP Watch at No. 193 and Cybermart at No. 1. After the store signs came down, three stores between No. 568 and No. 576 have been used for short-term sale events by a mid-range brand.

In order to tackle the problem, Huangpu District government launched a three-year action plan, re-positioning stores in East Nanjing Road and Middle Huai'hai Road. Traditional grocery stores are being replaced by new types of businesses, such as an experiential shopping centers that combines art and commerce (e.g., K11), and APM[4] stores, which have longer opening hours. In addition, for the purpose of boosting sales, Huangpu District has encouraged the expansion of online business and coordinated development of online and offline units. Since August 2014, the third-party payment platform for Huangpu one-card-through system has been launched with new technologies, such as NFC short-distance wireless communication technology, to strengthen interaction. In the future, when

[4]APM is a business philosophy originating in Hong Kong. A combination of "AM" and "PM", APM signifies the concept of entertaining at night, and most APM stores are open until the early morning hours or even all night. Due to long working hours in Hong Kong, many people have nowhere to go for entertainment after work since many shopping malls close at 10 pm. Therefore, developers position APM as a shopping mall with where customers can enjoy themselves without worrying about the time. In addition to two branches in Hong Kong and Beijing, APM has become a symbol of "around-the-clock operations", with many business streets and office streets following the APM concept.

walking by a store on Huai'hai Road, customers will automatically receive text messages about its corporate culture and current promotions. The new model of Nanjing Road and Huai'hai Road already combines elements like experiential shopping, online and offline coordination and third-party payment. Is there any other element that can take it a step further? LBS! With LBS, a more complete O2O closed-loop can be established in business districts.

Imagine what would happen if a complete closed-loop were formed by TBW (Tencent, Baidu and Wanda): (1) Customizable appointments, indoor navigation services, smart identification of members, shopping without wallets, personal shopping guides and other functions would be available; (2) The POS system would be replaced by WeChat payment; (3) Wanda shopping points, Q coins and Baidu points would become interchangeable. You could download music with shopping points or buy coffee with game tokens.

O2O will generate numerous business opportunities. Facing a large number of "urban complexes" in China, is it time for those real estate executives who are still indulged in the old glorious dream to wake up.

Tips Diversified Forms of Integration

Shopping in the Virtual Supermarket:
Recently, B2C shopping mall YHD, in whose stock Walmart holds a controlling number of shares, launched a fancy-sounding virtual offline store called "Infinite YHD". When you run the app on your mobile phone and walk to a (seemingly empty) designated location, and the virtual store will appear before you. To obtain detailed information of a particular product, the customer just walks to the "shelf" and clicks. In the future, it will be possible to make purchases in this virtual supermarket. Described as an "ultra-modern" way of shopping by netizens, the virtual supermarket has not surprisingly attracted a lot of attention.

According to Yu Gang, chairman of YHD, the most distinctive feature of "Infinite YHD" is its moving e-business offline, integrating the strengths of traditional retailing and e-Commerce. "Consumers can enjoy both the fun of going shopping and the convenience of e-Commerce with one-stop shopping, affordable pricing and last-mile delivery."

Sharing the same online payment method with "mobile YHD", "Infinite YHD" frees consumers from long lines in brick-and-mortar supermarkets, but will it be able to go any further in the market as it requires both travel time and data from the user? The answer depends on how YHD will upgrade the "Infinite YHD" to improve its value as a business model.

Shopping for Rewards:
In contrast to the "Infinite YHD" model, some Internet enterprises are studying how to use virtual approaches to attract consumers to brick-and-mortar stores. The shopping app "Qu Guang", launched online in April 2014, has

landed cooperative agreements with several shopping centers and supermarkets in Beijing, winning the favor of capital investors.

On walking into the cooperative vendor area, the user is automatically signed in by the app, which offers virtual rewards as well as custom discounts and product information. Insiders believe that customized marketing is "geared to maintaining VIP customers for brands or retailers". In the future, signing in on one's mobile phone will be linked to the store membership card, as one of the conservative ways for brick-and-mortar retailer to kick the tires on O2O model. At present, Qu Guang has established cooperation with retailers like Capita Malls and Wu Mart, and will increase coverage for more shopping malls and brands in the next round.

O2O Mobile Payment: **Buy Offline**, **Pay Online**

In many areas, it is quite common to place order and pay with your mobile phone. But O2O mobile payment, which involves purchasing offline and paying online, is still quite new.

At the end of August 2014, Alipay, together with an offline shopping mall called Shopin, launched a mobile payment service that allows consumers to make payments with their mobile phones and walk away without waiting for a cashier. All they need to do is to install Alipay's app and take a picture of the QR code of the products they want to buy. This was Alipay's first time working together with offline malls after its entry into the field of O2O payment. The "offline purchase and online payment" model has been well received among users and in the industry.

In order to reach the market that is not covered by POS systems, Alipay launched its "Super Collection" service for offline small and micro-sized businesses. One high executive of Alipay maintains that the biggest market for mobile payment lies offline, not online. Alipay will gradually move the focus of its future mobile payment strategy offline.

Source: Huxiu.com.

10.5 Are You Ready for O2O?

A good O2O model can be described as follows: (1) It possesses bountiful offline resources, a clear profit model and a wide variety of products; (2) It consistently improves its service and credit mechanism with a relatively good user experience and penetration rate; (3) Users' online transactions and offline experience facilitate the fan effect with social feedback; (4) Analysis of transaction data contributes to better exploring customer needs and improving operational management levels; (5) Supported by an integrated service network system, it will help merchants and group-purchase websites with smart decision-making. Of course, the above is the ideal situation, and to achieve it requires solving a number of challenges.

10.5.1 Do You Know Users' Pain Points?

The complexity and variety of participants involved in the O2O industry chain make it difficult to standardize the online models. Most consumers are required to first pay through platforms such as Alipay and online banks before receiving and confirming the quality of the product or service. This model of online payment and offline consumption reduces consumers to a passive status, failing to protect their rights and interests after payment.

One common problem is that the made-to-order tangible product fails to meet the expectation of the consumer. Since the responsibilities that the website and merchant should take respectively have not been well defined, it is difficult to efficiently solve after-sales problems as each side tries to pass responsibility to the other. Some websites use various excuses to defer or even refuse refund, transferring all transaction risks to consumers. Hence disputes are common.

Take online group purchasing as an example. Some vendors are eager to attract more customers through the huge discounts offered by group purchase websites but are resentful of the low-price promotion strategy or are simply not able to afford it. Therefore, the vendors often cannot offer consumers quality services as promised. Facing scale and resource limitations, the group-purchase website has low bargaining power in its cooperation with vendors, leading to consumers' interests being undermined in consumption disputes.

According to Analysys International, among all the reasons users gave for their preference of popular group-purchase websites, "it offers products and services that I need" was chosen by 55.07 %, "easy refund and satisfactory after-sales services" by 44.44 %, "user inertia" by 34.78 % and "brand influence of the website" by 33.33 %. The first two are the primary reasons for consumers selecting a group-purchase website. Ease of getting a refund, in particular, is a pain point for users.

In March 2014, Baidu Nuomi announced on its official micro-blog that all unconsumed group-purchase coupons could be refunded in any city at any time. Soon Meituan responded with its immediately-effective "all refundable" and "cash refund" policies. Baidu's strategy, which directly addressed a key pain point of consumers, might accelerate the transformation of the group purchase industry (Fig. 10.6).

10.5.2 Do You Know Where Your Users Are?

Group purchase, as a major form of O2O, can reflect the overall trend of O2O user migration through its data change.

In the physical world, users are migrating from first and second-tier cities to third and fourth-tier ones. While the group purchase market in first and second-tier cities is almost saturated, the first half of 2014 witnessed a 3 and 2 % growth in market share of third and fourth-tier cities respectively. With great potential to be tapped, third and fourth-tier cities are now becoming the main targets

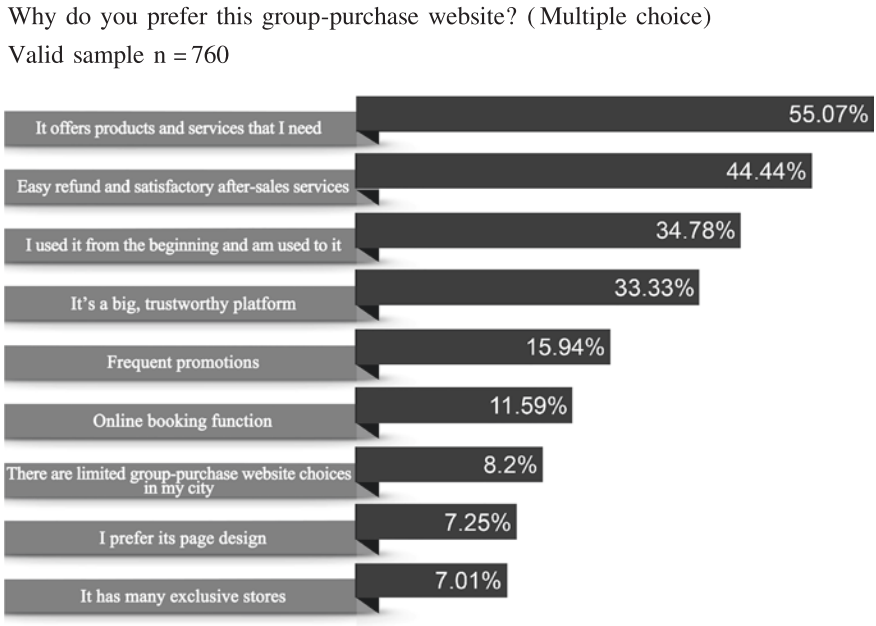


Fig. 10.6 Reasons for users' group-purchase website preferences. *Source* Analysys International, 2014 Thematic Study Report on O2O Life Service Market in China

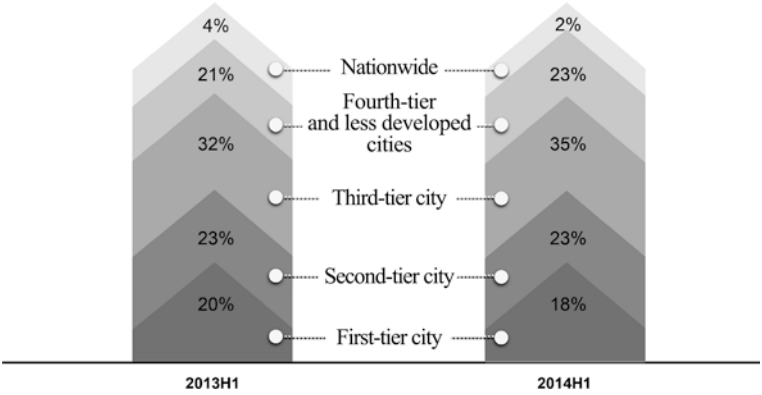


Fig. 10.7 2013H1–2014H1 group purchase market shares of different tiers of cities. *Source* Analysys International, 2014 Thematic Study Report on O2O Lifestyle Market in China

for O2O platforms to expand their market. The following concerns should be addressed. Is there any difference in consumption habits and behavior between users in third and fourth-tier cities versus in first and second-tier ones? Is it necessary to localize the service models? (Fig. 10.7)

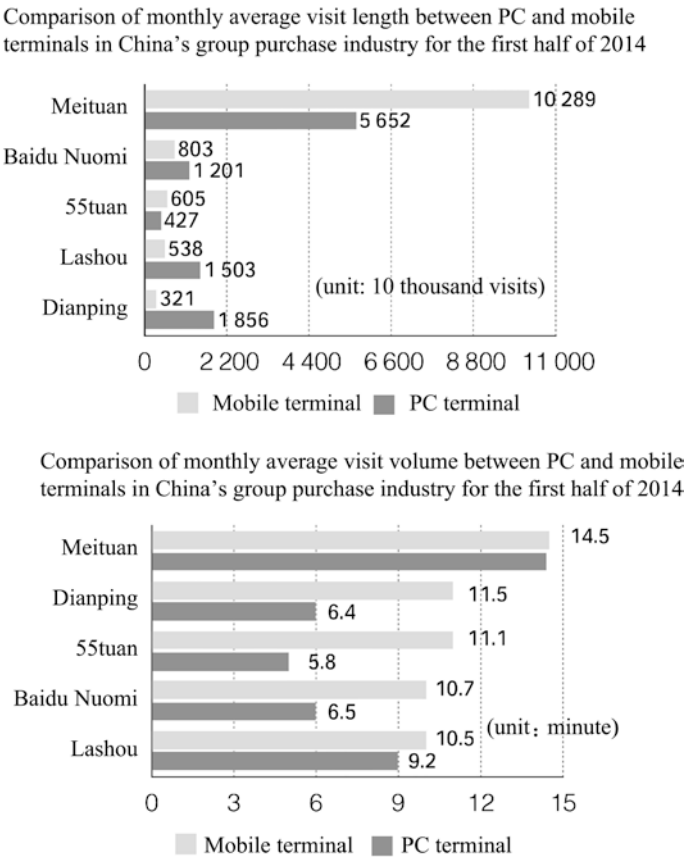


Fig. 10.8 Comparison of PC and mobile terminals in the group purchase industry. *Source* Analysys International, 2014 Thematic Study Report on O2O Lifestyle Market in China

In the virtual world, users are migrating from PCs to mobile terminals. Although the mobile user base and total length of mobile visits are still lagging behind, mobile devices have overtaken desktops in terms of monthly average visit length of group-purchase users (an index measuring depth of visit), and the number of monthly average visits of group-purchase users, which reflects user activeness. During the first half of 2014, the monthly average visit length through mobile devices to Meituan and Dianping was 14.5 and 11.5 min respectively. Meituan's mobile site enjoyed a monthly average visiting volume of 102.89 million, twice the number for the desktop site (Fig. 10.8). Along with the development of mobile Internet, mobile devices will become the main battlefield for the future group-purchase market. Lifestyle applications will evolve to be more contextualized, human-centered and real-time.

Therefore, it is critical for the future O2O market to figure out how to attract mobile users and convert online traffic into revenue, transform consumption

demands and behavior generated in each link and situation in the user experience into portable applications that can provide services to consumers wherever they go, and find a way to develop the enormous potential of third and fourth-tier cities.

10.5.3 Where Is Your Weakness?

O2O, as the name suggests, stands for "online to offline". Wang Xing, CEO of Meituan, believes that a picture showing human muscle combined with computer chips found in Groupon's prospectus delivers the essence of the group purchase model as well as of the whole O2O model, that is, a combination of technology, standardization and people. In other words, online and offline are the two pillars of stable operation of the O2O platform, but many businesses are unable to keep a balance due to weaknesses of either online or offline.

Offline weaknesses. Not as simple as the Internet model, this O2O model requires outstanding offline competence for successful implementation. In other words, the O2O model poses a great challenge to the offline operation competency of a company. It is difficult for Internet companies, which are used to a asset-light model, to incorporate the heavy model of O2O. As the focus of the O2O market shifts to third and fourth-tier cities, the offline weaknesses of Internet companies will become more prominent. Meituan's business now extends to over 300 cities and Dianping is aiming to cover 200 cities. Both of these goals would be impossible for traditional Internet companies with direct—marketing teams.

Dining and entertainment, for example, are industries with a low level of standardization. Meituan and Dianping rely on their large offline workforce of several thousand to establish and maintain cooperative relations with vendors scattered across many cities, which is a painstaking task disdained by BAT.

Another example. After its acquisition of Nuomi, Baidu continued the agency model of Baidu Search, authorizing agents to set up an offline promotion team rather than increasing direct-marketing strength. The conflict between the agents and direct-marketing staff became so intensified that the two teams were not willing to dine in the same restaurant.

Online weaknesses. Pressed by the rapid growth of the Internet and e-Commerce, traditional businesses are suffering from extreme insecurity, leading to the popularity of so-called "Internet thinking" and the "Xiaomi Model". Misled by the concept of "No transformation, no future", many companies feel lost in the stampede and struggle to find the right direction for transformation. Some are establishing their own O2O platforms while others seek cooperation with third-party ones.

It should be further noted that, once the platform is ready, the following concerns need to be addressed by offline businesses before developing an O2O model: Are you truly applying a user-centered mindset, one that stresses consistent improvements in products and services to improve users' experience on the basis to their behavior, focusing, in other words, on their latent demands? Are you applying

a big-data mindset that facilitates in-depth analysis on behavior, transaction and location data generated by the O2O platform to help you achieve greater success in marketing precision, resource allocation and restructuring of the industry chain?

10.6 Conclusion

Modern businesses, both e-Commerce players and traditional retailers, are exploiting efficient and practical ways to implement the O2O model. The model is a beautiful one, but it is not suitable for everyone. Companies must be adhere to the basic laws of business, respect the personalized demands of the user and find out their own strengths and core values.

The CEO of IKEA, Peter Agnefjall, once said that what IKEA seeks is not an opportunity for explosive growth within a short period of time, but a path that leads to sustainable improvement in the industry chain.

The same holds true for what businesses should look for in the O2O model.

Chapter 11
Seizing Innovation Opportunities

With the ten mega business trends discussed in the previous chapters, this chapter aims to provide readers with two facts about these trends. First, business trends in different countries, regions and sectors may not necessarily resemble each other. Second, the ultimate goal of identifying the trends is to seize opportunities while avoiding uncertainty, which is, to go beyond gaining an understanding of these trends.

On June 18, 2014, Nobel Laureate in economics Prof. Lars Peter Hansen delivered a lecture during the CEIBS Master Class titled *Consequences of Uncertainty*. Prior to Hansen's lecture, I gave an opening speech, *Business School: Telling Interesting Stories and Explaining Classic Theories*, in which I explained several mathematical models that I had used. Given that the emergence of various innovative financial products, like Alipay and Yu'E Bao, caused public concern over potential risks, I asked Hansen two questions: How do you manage risks effectively in the Internet era, when unstructured data greatly outnumber structured data? And how do you distinguish systematic risks from systemic risks?

Systematic risks, Hansen told the audience, are the market risks that financial institutions face on a daily basis, while systemic risks are risks that may lead to the collapse of an entire financial system or entire market, for instance, the outbreak of global financial crises in 1998 and 2008. The rise of new industries and new technologies will open up more possibilities for economic development, making uncertainty an essential characteristic of the economy. Therefore, we must consider the implications of uncertainty when evaluating the macroeconomy's impact on financial markets and when formulating feasible economic policies.

X. Zhu et al., *Business Trends in the Digital Era*, DOI 10.1007/978-981-10-1079-8_11

11.1 Identifying the Trends and Seizing the Opportunities

11.1.1 Imagination: The Most Wonderful Quality of Human Beings

Imagination is probably a human-specific endowment and is "the source of invention, discovery and other creative activities"[1] and the distinguishing characteristic of "a thinking, rational and real human being".[2] Imagination is more important than knowledge. "For knowledge is limited, whereas imagination embraces the entire world, stimulating progress, giving birth to evolution. It is, strictly speaking, a real factor in scientific research."[3] All the inventions of human beings are the fruits of imagination.

In the digital age, we are confronted with unprecedentedly significant changes that come at a higher speed and exert a stronger and wider influence than ever, thus creating more uncertainties and more confusing choices. Therefore, it is more necessary than ever for us to make the best forecast on what will happen in the future, in other words, to identify various trends and the trends in business circles in particular.

11.1.2 Encouraging Tomorrow's Technological Innovations Based on Technology Development Forecast

Given the rapid advancement of science and technology in today's world, anything seemingly impossible may one day become a reality, just as nobody 100 years ago had imagined the prosperity that would be brought by the Internet. It is interesting to review *Scientists' Insight on the 21st Century*, published in 1959, to see how many predictions concerning digital technology in the book have come to pass.

"In the 21st century, anybody will carry a minitube in the pocket, with which people can talk face to face no matter how far apart they are." Isn't this the cellphone we use today?

"Abaci is out of sight in stores. Instead, the shop assistants put all kinds of goods on a glass panel equipped with a computerized scanner, which not only indicates the different prices of the goods but also produces a receipt for the shopping." Isn't this the cash register in today's supermarket?

Even many bold predictions that seemed impossible then—e.g., "driverless electric cars running freely down the highway", or "the rise of automatic plants

[1]Philosopher Aristotle.

[2]French philosopher Denis Diderot.

[3]Scientist Albert Einstein.

where the tasks originally undertaken by workers, technicians and engineers are all carried out by robots"—have been realized one by one.

It is more surprising that many prospective business trends including the emerging O2O business model, e-payment and LBS were described in videos produced by Microsoft in 2004—when such mobile terminals as the iPhone were simply non-existent! All these examples are telling the same truth: yesterday's predictions on technological development stimulate today's technological innovation.

11.1.3 Re-examining the Significance of Mastering the Hype Cycle

In October 2014, we translated a book authored by the well-known global consulting services provider Gartner into Chinese and published the simplified Chinese edition—*Mastering the Hype Cycle* (《精准创新》) it focuses on forecasting technological development and on technological innovation.

There were three reasons behind our decision to translate this book. First, innovation has become the major theme of our era, which bears our countless dreams and ambitions—technological innovation is a driving force in achieving those dreams. Second, having served as the founding director of China Outsourcing Institute (COI), a state-level research center, and then for 7 years as editor-in-chief of the *Report on China's Outsourcing Development*, I have seen firsthand how Gartner's Hype Cycle research reports have become a key source of information for researchers of service outsourcing. Third, we believed it would be a valuable way to provide more cutting-edge knowledge to students, a goal shared by my colleagues throughout our years at CEIBS. When I delivered lectures for participants of CEIBS EMBA, MBA, EDD and China Entrepreneurial Leadership Camp programs during the previous 3 years, I often referred to the annual Gartner's Hype Cycle for Emerging Technologies, discussed business transformation, innovation and the business trends in the digital age and occasionally provided interesting supplementary audio and video materials. Time and again, students were amazed by the accuracy of the technology development forecasts based on the Hype Cycle.

I also realized this past year that CEIBS students' interest in the subject was not a passing one. The rapid increase in the number of entrepreneurs who are involved in technological innovation and take active part in entrepreneurial activities has stimulated growing demand for knowledge about innovation. Meanwhile, CEIBS professors are trying to provide students with research frameworks and methodology related to technology development forecasting and technological innovation. Among these frameworks is the technology maturity curve or hype cycle described in *Mastering the Hype Cycle*.

Scientists' inventions serve as a primary source of innovative ideas for entrepreneurs. However, choosing the right innovation at the right time has repeatedly posed great challenges for them. The Hype Cycle described in this book could offer a fundamental solution to this problem, thus enabling entrepreneurs

to achieve greater success. The Gartner Hype Cycles for 2013 include 53 hype cycles profiling 97 subject areas in 7 categories, revealing how Gartner, drawing on a broad and complex range of sources, managed to identify the innovations that were most valuable and best able to show the future developmental path of science and technology.

Gartner created an innovative research framework by revealing the general trend in global technological innovation based on technology development forecasting. Gartner's hype cycles coincide almost exactly with the curves produced under scientific observation, making it possible to provide expert guidance for general managers intending to maximize their profits. In a nutshell, the Gartner Hype Cycles aim to provide cutting-edge approaches to studying the impact of technological innovations on business trends, enabling us to understand how to choose the right innovation at the right time. Any entrepreneurs engaging in investment, mergers & acquisitions, business transformation and innovation should develop a clear understanding of the right innovation and the right time to learn how to predict technological innovation trends and business trends.

11.1.4 Gartner's Top 10 Strategic Technology Trends for 2015

Gartner releases technological innovation predictions annually. It defines the strategic technology trend as the one with the potential for significant impact on the enterprise in the next three years. Factors that denote significant impact include a high potential for disruption to the current IT framework or business model, the need for a major dollar investment, and the risk of being late to adopt. These technologies impact the organization's long-term plans, programs and initiatives. Gartner's top 10 strategic technology trends for 2015 include:

- Computing Everywhere
- The Internet of Things
- 3D Printing
- Advanced, Pervasive and Invisible Analytics
- Context-Rich Systems
- Smart Machines
- Cloud/Client Computing
- Software-Defined Applications and Infrastructure
- Web-Scale IT
- Risk-Based Security and Self-Protection

Despite that general managers themselves aren't the "doers" of these technological innovations, it is necessary for them to identify the strategic technology trends as they will facilitate the decision-making process.

11.1.5 Identification of Business Trends Cannot Be Separated from the Prediction of Technological Innovation Trends

We expounded this viewpoint in Chap. 1, and its significance can not be overstated. Recently, *The Internet Age*, a Chinese TV documentary series produced by CCTV, became a hit in China. Technology has become a driving force propelling humanity from the agrarian age to the industrial age and then the information age. The Internet has restructured many industries and driven business model innovation by changing how we gain access to information, leading to deep changes in all aspects of society.

Surpassing and being surpassed are commonplace in the Internet Age. Consider the example of batteries for electric cars. Lithium-ion battery parallel connection technology transformed the electric vehicle industry. However, in 2014, scientists at the Nanyang Technological University in Singapore declared that they have developed a lithium-ion battery that can be recharged up to 70 % in 2 min and has a lifespan of more than 20 years. The traditional material used in lithium-ion batteries was replaced with a new gel material made from titanium dioxide which is an abundant, cheap and safe material helping speed up the chemical reactions in the new batteries, thus allowing for superfast charging. If this invention works as they claim, an electric vehicle could be recharged within a few minutes, consuming less time than refilling it in a gas station. By significantly improving the convenience of using electric vehicles, this invention would transform the electric vehicle sector and even the automotive industry as a whole.

I was deeply impressed by an statement in *IT Doesn't Matter*: "All technological changes are intergenerational changes. The full power and consequence of a new technology are unleashed only when those who have grown up with it become adults and begin to push their outdated parents to the margins. It's in this way that progress covers its tracks, perpetually refreshing the illusion that where we are is where we were meant to be." Today, the evolution of a technology doesn't require a time span of 2 generations any more. Instead, some technologies become outdated only 2 years after their birth. More and more entrepreneurs are becoming increasingly aware that identifying the trend of technological advancement helps predict the general trend in business model innovation.

11.2 Making Integrated Use of Business Trends

Although the ten mega business trends are explained separately in ten chapters, making integrated use of business trends helps pave the way for business development, as shown by the success story of Apple Inc. An in-depth analysis of Apple's business model and business strategy can demonstrate how the company follows the ten business trends.

Big Data. Apple does not enjoy a considerable advantage over Google and Amazon in this field. Having realized this, the company took action. In December 2013, Apple purchased social analytics firm Topsy for over 200 million dollars. Topsy is one of a few firms being able to do real-time analysis of the messages that appear on Twitter. And in July 2014, Apple and IBM announced an exclusive partnership that combines the market-leading strengths of each company to transform enterprise mobility through a new class of business apps—bringing IBM's big data and analytics capabilities to the iPhone and iPad.

Cloud Computing. In 2011, Apple launched its cloud computing service platform—iCloud. The service lets users wirelessly back up iOS devices directly to iCloud by logging in to the platform with their account and password. Users can store content such as music, e-books, photos, videos, and device setup and application data.

Platform. As a link between developers and users through terminals like the iPhone, the App Store not only constantly provides users with Internet-based content and application-related service but functions as an application selling platform for developers. By attracting more and more users and App developers to the platform and adopting a revenue-sharing model, Apple has created a win-win situation for users, App developers and the company.

Mobile Internet. Apple's iPad, iPhone, iPod Touch and iTunes are the fastest growing products in the tech industry, making Apple a winner and letting it maintain its leading position in the mobile Internet industry. The launch of the iPhone to some extent was a watershed in the development of the mobile Internet industry, as it was a suitable vehicle for mobile Internet access. In September 2014, Apple unveiled iWatch alongside iPhone 6, signifying its entry into the wearable device market.

Software-defined Everything. Apple's core competency has been its hardware-software integration model based on iOS, enabling the company to evolve from a consumer electronics manufacturer to a provider of terminal-based comprehensive content services. In June 2014, Apple unveiled a list of new products including Mac OS X 10.10 Yosemite, Homekit (a smart home App), the Swift programming language, Safari (a Web browser), Carplay (platform that links smartphones and in-car infotainment system) and a new Healthkit application (monitoring health-related information), intending to continuously expand the boundaries of its value-added services by attracting users through its software platforms.[4]

Outsourcing and Crowdsourcing. Apple has outsourced the production of most of its accessories to manufacturers abroad except its A5 processor. In October 2014, Apple launched a new web service called Apple Maps Connect, allowing small business owners to add information to create an Apple Maps listing or modify an existing description with additional details. In Apple's App Store, there are

[4]Apple CEO Tim Cook had claimed: "Because we're not a hardware company, we have other ways to make money and reward shareholders. We don't look at the sale of the product as the last part of our relationship with the customer, it's the first."

only about 20 Apps developed by Apple Inc., with the other 99 % being developed by third parties. In addition, Apple does not impose any requirement for App developers in terms of fundraising ability and qualifications, thus creating a friendly environment for entrepreneurs.

Prosumer Economy. The App Store provides users with access to a huge variety of selected mobile Apps developed by Apple and third parties. The company often discloses some data analysis results, helping developers better understand the latest needs of users and providing free guidelines in such areas as pricing and price adjustment for the Apps. There are even some software enthusiasts who develop Apps based on their own needs and release them in the App Store.

Long Tail Market. As of June 2014, Apple boasted 9 million registered App developers and more than 1.2 million Apps available in the iOS App Store that had been downloaded 75 billion times. The number of visits to the App Store reached 300 million per week. Diversity of developers and Apps can meet the needs of different users, creating a long tail market. The App store has benefited considerably from the long tail market: customers of the App Store spent more than 10 billion dollars in 2013.

Digital Finance. On September 10, 2014, Apple unveiled a mobile payment system, Apple Pay, partnering with Visa, MasterCard and American Express as well as 6 banks including Bank of America, which together cover approximately 80 % of credit card users in the US. The company also announced a list of Apple Pay's initial participating vendors, which include Subway, McDonald's, Disney, Walgreens, Sephora and Macy's, as well as the App Store. From this it was evident that Apple planned to enter the digital finance market.

O2O Model. In 2014, Apple purchased several startups involved in navigation tools including Locationary, Hopstop and Embark in an effort to improve its mapping service. In September 2013, Apple released iBeacon, a technology that can be widely applied in areas such as in-door positioning and store promotion with an accuracy as far as 1 m (see Business Trend No.10 for additional details). In September 2014, a new version of iOS (iOS 8) was released. Thanks to a new app recommendation feature introduced to the system, iOS 8 is able to suggest Apps to users according to their geographical position, thus connecting users with vendors, both online and offline. All these efforts indicate Apple's ambition to adopt the O2O strategy.

However, we should be willing to make adjustments at times when applying the ten business trends to different sectors and environments. Eastman Kodak Co., having filed for bankruptcy protection in 2012, rejoined other companies on the New York Stock Exchange on November 1, 2013. The company decided to center its efforts on being "a technology company focused on imaging for business". If you were the boss of a company confronted with the same difficulties Kodak faced, how would you identify and follow business trends to stage a comeback?

11.3 New Trends in the Manufacturing Sector: Industry 4.0

Despite the popularity of smart phones, smart home technologies, Internet-based networking, e-business, Internet entertainment and online education in our everyday lives, we've only seen the beginning of the manufacturing revolution that is integrating reality and virtual reality.

If Industry 1.0 can be defined as "the Steam Era" of mechanized production powered by water and steam, Industry 2.0 "the Era of Electric Power" characterized by mass production and Industry 3.0 "the Era of Electronics and IT" characterized by digitalized automation, then Industry 4.0 can be defined as "the Era of Network-based Production" based on Cyber-Physical Systems.

One of the most important characteristics of both the term "Industry 4.0"[5] introduced by the German government and the concept of the "Industrial Internet" put forward by GE (General Electric) is "intelligence": intelligent products, services, equipment and processes. The driving force behind them is the development of softwares and the Internet. In other words, the integration of the Internet, softwares and industry are transforming the traditional industrial world.

How does studying Industry 4.0 fit in with our discussion of the ten mega trends in the business world? We can answer this question by taking the foundation of Industry 4.0—Cyber-Physical Systems—as an example. In the smart factories of the future, information about a product will be embedded in its parts and accessories, which will be able to communicate directly with manufacturing systems and equipment and provide instructions for the next step in the manufacturing process based on the product requirements. In addition, the smart manufacturing tools will be able to exchange information, developing the ability to "imitate" and "learn" by drawing on past "experience" from big data, enabling them to arrange production independently and react appropriately to complicated situations in the production process This production model can satisfy each and every customer's "personalized needs".

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[5]The term "Industry 4.0", which was first used in 2011 at the Hannover Fair, was formally introduced by the Industrie 4.0 Working Group at Hannover Fair 2013. According to the *Sino-German Action Plan on Bilateral Cooperation* released after the third round of intergovernmental consultation between China and Germany, the two countries will cooperate closely on issues concerning Industry 4.0, opening new fields for Sino-German cooperation.
The Recommendations for Implementing the Strategic Initiative INDUSTRIE 4.0 gives a detailed description of the term: In a "smart, networked world", the Internet of Things and Services will make its presence felt in all of the key areas. This transformation is leading to the emergence of smart grids in the area of energy supply, sustainable mobility strategies (smart mobility, smart logistics) and smart health in the realm of healthcare. In the manufacturing environment, vertical networking, end-to-end engineering and horizontal integration across the entire value network of increasingly smart products and systems is set to usher in the fourth stage of industrialization—"Industrie 4.0".

With regard to virtual production, human beings, machines and information will be connected to each other thanks to cloud computing, autonomous devices and the Internet, thus integrating existing technologies and innovation into a digital corporate platform. It is possible to design, simulate and optimize any step of product development and production process and carry out simulation operation through softwares prior to the beginning of production process.

In networked production, all factories are connected in a similar way. Suppliers in the production value chain are able to acquire and exchange production-related information in real time while the parts and accessories provided by the suppliers can be delivered to the production lines at the right time and in the correct sequence, so as to meet the needs of individual consumers.

We can say that the business trends identified in this book will be seen at every step of the way to the fourth industrial revolution (Industry 4.0). For Chinese firms, the new industrial revolution driven by Internet technologies will present not only great opportunities, but also formidable challenges.[6]

Traditional manufacturers and a group of manufacturing enterprises with Internet DNA and innovative outlooks have gone into action. For instance, Gree, a China-based electrical appliances manufacturer, uses robots to install air conditioners and monitors customers' products in real time by bringing Internet technologies to the field of commercial air-conditioning. Haier, another home appliance manufacturer in China, plans to get involved with smart cities and has become a passionate advocate of user involvement in product design. Rapoo, originally an OEM manufacturer of computer mouses and keyboards, has built a virtual platform for its production plants, providing customized software for each robot. By integrating software and hardware with its eco-system, Chinese smart phone maker Xiaomi has managed to create a new customer experience and disrupt the normal practices of traditional Chinese manufacturers.

At PTC Live Global 2014, PTC's CEO James Heppelmann offered insights into 3 key trends concerning the changing source of value in products: "Software is replacing hardware to create value that once was created by hardware. greater connectivity offers more choices in software innovation while value shifts from the product to the cloud; and business models that had been based on product offerings are transforming into service business opportunities." Chinese enterprises, especially manufacturing enterprises, must grasp the business trends of the Industry 4.0 era and use them according to their company's stage of development and industry, so as to catch up with their international counterparts in the new industrial revolution.

[6]See article http://www.forbeschina.com/review/201410/0038044.shtml.

11.4 New Trends in Multinational Operation and Investment: Is Innovation Getting More Attention?

11.4.1 Why Did Huawei Set up a Research and Development Center in Israel?

Why did Huawei, one of the leading businesses in China in terms of technological innovation, set up a research and development center in Israel? Besides Huawei, nearly 50 % of the Fortune 500 companies had established R&D centers in Israel. At present, there are more than 5000 IT companies in Israel, with another 200 innovative companies being founded there annually. Many significant, innovative technologies like chip, processor and instant messaging technologies are products of innovations in Israel.

Israel's national strategy of rejuvenating the country through science and technology, which was developed in the 1980s, has not only spawned a large number of high-tech start-ups but created a dynamic venture capital industry. Investing in Israeli startups has become an important means of realizing industrial diversification and improving R&D capabilities for the world's leading high-tech companies. Currently, there are over forty local venture capital companies and about two dozen private equity firms in Israel. For instance, Google Chairman Eric Schmidt invested in 8 Israeli high-tech start-ups though Google's venture capital investment platform Innovation Endeavors in 1 year.

11.4.2 Why Did Russia Plan to Build the Next Silicon Valley?

As the 2008 global financial crisis greatly hurt Russia' economy, reducing the country's dependence on oil and gas exports was once again given strategic priority by the Russian government. The focus would be the development of high-tech industry. In November 2009, the then President of Russia Dmitry Medvedev, known for his enthusiasm for high-tech products, proposed a plan to establish a high-tech innovation center similar to the Silicon Valley in Skolkovo village, near Moscow, aiming to build it into an innovation center promoting research and the commercialization of new technologies.

In an interview with Xinhua News Agency in January 2014, Igor Agamirzian, CEO of Russia Venture Company, claimed that Russia's venture market was the fastest-growing market in Europe. According to him, Russia's venture market was ranked fourth in Europe in 2012 in terms of total amount of investment, with a further increase in 2013. Russia's booming venture capital industry has created a new generation of legendary "capitalists".

11.4.3 Why Did Tesla Open up Its Patents and Technologies to Its Competitors?

In June 2014, Elon Musk, founder of Tesla, announced that the U.S. electric car maker planned to release all of its patents and technologies to other players and individuals. Tesla had more than 160 U.S. patents, including such technologies as a system to protect battery packs from overcharging and improved rotor construction for electric motors. Allowing other players to use these patents in "good faith" free of charge could be regarded as an experiment with "open source cars". What was Musk's real intention in making this move?

Some industry experts believed that he was looking for a new business model, one that would enable Tesla to accelerate the exit of traditional gas-powered vehicles. If Tesla could attract a large number of followers by sharing its patents, it might be able to establish an industry standard or build itself into a technological platform for electric vehicles. In this way, Tesla and other players would benefit from a common, rapidly evolving technological platform. And if the "open-sourcing" initiative enhanced development of the electric vehicle market, Tesla would be the biggest winner. In addition, more and more manufacturers entering this market would drive down the cost of parts and accessories and improve the supply chain, thereby helping Tesla to solve the problem of insufficient capacity in the long run. More importantly, Tesla's decision to open up its patents allows it to attract more talents. In short, Tesla intended to "provide the best but not the only product in the industry". But first the company needs to make sure there was an industry before worrying about being the best player.

The three examples described above reveal a general trend in both manufacturing and investment sectors, characterized by closer attention to technological and model innovation, and by greater open-mindedness. Referring to Tesla' decision to release its patents, a tech media outlet concluded that Tesla would not undermine its leading position but rather consolidate its competitive advantage, "showing confidence that they will maintain a lead over other electric vehicle producers."

11.5 Can the O2O Model Broaden Our Horizons?

On October 16, 2014, Zhejiang Alibaba E-Commerce Co., Ltd., the parent company of Alibaba's third-party online payment platform Alipay, announced to build a small and micro financial services company based on Alipay—Ant Financial Services Group (hereinafter referred to as "Ant Financial"). Ant Financial comprises Alipay, Alipay Wallet, Yu'E Bao, Zhaocaibao, Ant Credit and the yet-to-be-completed online banking service MYbank. According to Jing Xiandong, CFO of Ant Financial, the company will focus on serving small and micro enterprises, as well as individual consumers. It aims to build a financial ecosystem based on 3

open platforms (i.e. data, technology and transactions), working with members of the ecosystem to create value for customers.

From Mr. Jing's statement we can see Ant Financial's interest in many of the latest business trends, such as big data, platform, digital financing, demand-driving and cloud services. It seems that the main ambition of the company is to establish a strong presence in the Internet finance sector or to try its hand at online banking. Some analysts, however, speculated that this move showed that Jack Ma intended to build an O2O ecosystem based on Alibaba's existing financial service system.

Executives of Ant Financial didn't deny the rumor. When asked about the allocation of functions between Ant Financial and Alibaba Group, Fan Zhiming, president of Ant Financial's domestic business division, said, "Ant Financial and Alibaba Group have focused on different O2O markets and met the needs of different ecosystem participants. In the future, we will maintain the existing relationship." Specifically, Ali Group concentrates on serving physical stores offline, establishing a connection between online and offline branded stores and providing integrated membership services. However, Ant Financial focuses on services related to consumers' basic necessities, such as future public transportation and future hospital, convenience stores and vending machines.

Ant Financial has been gradually building up its online-to-offline business. Alipay Wallet has launched a series of new initiatives including its "Future Business Districts", "Future Hospital", "Future Plaza" and "Future Public Transportation" programs and plans to implement more of these programs. In addition, it is expanding its online-to-offline service from urban areas to rural areas and even to overseas markets. We can't help noticing that Alibaba's ability to identify and follow the mega business trends is key to its success.

This is not the company's first time launching an O2O campaign. In August 2014, Alibaba established China's first "future business district" in Wulin, Hangzhou in cooperation with Intime Retail (Group) Company Limited. Integrating offline businesses with mobile Internet, the Alipay Wallet lets smart phone users enjoy a list of services including searching, positioning and online-payment while shopping in Wulin business district.

The traditional real estate developer Wanda Group has also stepped into the O2O market. Wanda, a leader in China's real estate market, has joined forces with Tencent (boasting 800 million active users) and Baidu (China's largest search engine and Internet portal in terms of traffic) to establish the world's biggest O2O e-commerce company. The partnership will create an online-to-offline (O2O) e-commerce business model by transforming the experiential commercial real estate giant into an O2O commercial complex.

Pan Shiyi, Chairman of SOHO China, also started an O2O initiative by incorporating Internet thinking into short-term office leasing service. Under this new office leasing model, tenants can rent a shared office space and even a desk in an office building for as short as one week, while paying monthly rents as low as 500 yuan. The whole rental process can be handled online, after which the tenant can go directly to work with a mobile phone and a computer.

Besides leading Internet and traditional companies, more and more new entrants are showing great interest in online-to-offline business. For instance, haowu.com, a real estate brokerage service, transformed itself into the first O2O real estate marketing platform in China. Another business, Lvmama.com, has raised 300 million Yuan to build an O2O one-stop tourism platform.

The competition between the Tencent-Baidu-Wanda partnership and Alibaba has been compared to a horse race and to "the three heroes against Lv Bu", alluding to a famous battle in Chinese history. No matter who will be the winner, we can see that the O2O model will continue—it may even be the furthest reaching of the 10 mega trends.

11.6 Conclusion

It is a good time for the transformation of traditional industries with digital technologies and a good time for entrepreneurs and venture capitalists. *Business Trends in the Digital Era* painted an exciting picture. Companies can mine data for resource sharing, and the tendency toward information symmetry will drive down cost. "Long-tail" and "blue-ocean" strategies enable companies to integrate resources and thereby reshape the market.

Though future trends in the business world are subject to change, innovation is a constant. We can expect to see more cross-border innovation, technological innovation and model innovation.

In *The World is Flat*, author Thomas Friedman claimed, "This is a world in which there will be no more 'developed' and 'developing countries,' but only HIEs (high-imagination-enabling countries) and LIEs (low-imagination-enabling countries). Therefore, countries can be divided according to their ability to stimulate and enable innovation." This prediction applies not only to the competition among countries but to the competition among companies and cities.

Business Trends in the Digital Era reveals changes that are led by trends. In the near future, we will see cities with stronger competitiveness evolve from industry centers to industry and innovation centers, and enterprises with enhanced competitiveness evolve from product centers to product and innovation centers.

Innovation is the key to success!

Innovation-driven development is the trend of the times!

Postscript

(I)

The business school is supposed to focus on business. What we share with readers, including MBA and EMBA students, in this 200-plus-page book are simply business trends. But after getting through the book, you may be surprised that all the aforementioned business trends originate primarily from scientific and technological innovations.

This is hardly coincidental. Today, scientific and technological innovation provides the underpinnings for a country's overall strength, leading to revolutions in production and in our ways of life. Any country that can get a head start in scientific and technological innovation can gain a sustainable competitive edge. This explains why it is imperative to develop Shanghai into a world-renowned hub of high-tech innovation.

In this time of mass entrepreneurship and innovation, digitalization and the Internet place us on an equal playing field with the elders of the business and high-tech communities. Acquiring deep insight into business trends and grasping opportunities for innovation will make you and your company the next success.

(II)

In 2014, CEIBS celebrated its 20th Anniversary and a series of brilliant achievements in both teaching and research.

In early 2014, the *E-Payment Revolution* was published; in October, *Mastering the Hype Cycle* saw its Chinese translation issued; in November, we finished the draft of *Business Trends in the Digital Era*.

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It is my sincere hope that after the book is published, more entrepreneurs will join me in writing cases that enrich our business school's teaching and research.

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