Grassroots Informatisation: The Internet and Everyday Information Seeking Practices in Rural and Urban China

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Declaration

I declare that this thesis is entirely my own work, and except where otherwise stated, describes my own research.

Pu Yan

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Abstract

Contemporary China has seen a proliferation of Information and Communication Technologies (ICTs). Part of this transformation is that mobile technologies have rapidly become widely used among rural and working-class Chinese populations. Meanwhile, the dichotomy between online and offline has become less distinct compared to the early years of Internet development, leading to a convergence between the Internet and traditional sources of information. Previous research on these topics has primarily focused on the Internet's disruptive role in challenging the Chinese authority of Party-state or on the co-evolution of Chinese civil society and government. However, it is unclear without substantial empirical evidence how the rapid development of ICTs has influenced the routine and mundane lives of ordinary Chinese people. These routine practices, however, are fundamental to understanding the impact of the Internet on Chinese society and economy. The study of information practices in everyday life offers a way to understand how ICTs complement or displace traditional information sources. Instead of studying savvy Chinese Internet users in major cities, this research aims to understand how the Internet fits into the everyday lives of rural and working-class Chinese users. Through extensive fieldwork in Central China, this research studies how rural and working-class users have adapted to digital technologies, how ICTs satisfy or fail to meet daily information needs, and whether digital technologies have caused disruptions in information seeking practices. The research takes a bottom-up perspective in studying how the Internet is embedded in everyday information seeking practices. In terms of methods, the research employs both a quantitative approach including surveys and qualitative data such as interviews and focus group studies. By detailing how the Internet changes information seeking practices in everyday life, the thesis contributes

insights to understanding the challenges and opportunities brought about by various social divides and divides in information seeking practices.

Keywords: information seeking practices, everyday life, China, mixed methods

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Chapter 1 Introduction

This thesis is about how Information and Communication Technologies (ICTs), and specifically digital technologies, are transforming Chinese society. It argues that how people increasingly seek online knowledge and information in everyday life is reconfiguring China's social divides. This argument is in some ways not new. It builds on and advances upon earlier work such as Daniel Bell's *The Coming of Post-industrial Society*, published in 1973, which forecast a series of changes in economic sectors, professional roles and dominant technologies. Bell argues that in the post-industrial society, information will replace traditional energy sources such as oil, gas and nuclear power as a defining and transformative resource in society. Bell also predicts the rise of a new information age that "is founded not on a mechanical technology but on an intellectual technology" (p. 53).

Decades after the publication of Bell's book, the accelerating adoption of information technologies has profoundly influenced the world. ICTs have transformed the structure of the global economy and labour markets and they have brought changes to the social and cultural realms of everyday life. With the widespread adoption of ICTs, digital technologies such as the Internet and mobile phones have been driving the prosperity of the digital economy. Companies such as Google (or Baidu in China), eBay (Alibaba), or Facebook (Tencent) compete fiercely against each other for market shares in the booming global Internet industry. ICT products are also deeply embedded in almost every aspect of our everyday lives, from romance, shopping, commerce and health to education.

Having witnessed the potential of digital technologies for social and economic development, leaders of many countries have initiated national plans for the construction of national information infrastructures (NII) and the provision of digital services since

the 1990s. The Information Superhighway and National Research and Education Network (NREN) in the US, for example, aimed at engaging US users in the national information infrastructure to facilitate an information industry (Kettinger, 1994). After the US started its NII plan, many other countries initiated similar projects. Korea was one of the first Asian countries that outlined national policies for developing ICTs. Its National Informatization Promotion Plan was initiated in 1996, promoting the provision of ICT public training and Internet centres across the country. In the early days of ICT development, most of the countries focused more on the deployment of high-speed broadband infrastructures and services than the education of users. Nevertheless, the national-level policies have increased Internet accessibility in these economies, building the foundations for the Internet industry.

The concept of the information society has received unprecedented attention in China, a country where developing an information society (*xinxi shehui*, 信息社会) has become a national economic strategy. While most of the developed countries nowadays have replaced national informatisation policies with guidelines or regulations on ICT applications and services, Chinese central and local governments still use the framework of "informatisation" to highlight the importance of digitalisation in both the public and private sectors. The Chinese government's efforts on informatisation have paid off. In late 1997, there were only 0.05% of the Chinese population with access to the Internet (CNNIC, 1997) compared with 18% of US households[1] that already had Internet access. However, in 2011, China replaced the US to have the most installed bandwidth capacity worldwide (Hilbert, 2016) and China has the highest number of Internet users.

However, while the Chinese top-down, government-initiated informatisation has been successful mainly in providing ICT infrastructures for the development of a digital

[1] https://www.census.gov/prod/2001pubs/p23-207.pdf

economy, the deployment of broadband Internet has not yet bridged the long-existing gap between Chinese rural and urban societies. The rise of the mobile Internet has created a new opportunity for the development of grassroots technologies, which are not only affordable to adopt but are also user-friendly to use by new or inexperienced users. Chinese Internet users nowadays have access to a broad range of Internet services, including social media, news apps, video sharing platforms and search engines. As users spend the majority of their free time on digital platforms without the constant moderation from the authorities, the government wants to regain its dominance in Chinese Internet users' everyday lives through digitalising official media content and tightening information control. Meanwhile, the growing amount of digital information and increasing speed of information diffusion on the Internet have resulted in new challenges in information seeking; namely, widening information divides between users with different levels of digital skills and problems of misinformation and information overload. This introductory chapter will provide the background of the Chinese informatisation policy and grassroots adoption of ICTs, discussing their strengths and limitations in facilitating technology development. I will also provide an overview of the information ecology on the Chinese Internet and of the Chinese government's attempts to dominate this online information ecology. Finally, this chapter will give a preview of the content of the chapters in the thesis.

1.1 Top-down and bottom-up informatisation

1.1.1 Informatisation as a national strategy

Informatisation (*xinxihua* 信息化) in China means the advancement of an economy and society through the development of ICTs (Qiang, Bhavnani, Hanna, Kimura, & Sudan, 2009). The Chinese central government has implemented informatisation as a national strategy for techno-economic development since the late

1990s. In 1997, the Conference for National Informatisation was held in Shenzhen, Guangzhou. On this conference, informatisation was defined as "the application of modern ICTs in agriculture, manufacturing, national security, and other aspects of the society". The goal, as stated in the 10th Five-Year Plan for National Informatisation[2], approved by the National People's Congress (NPC) (2001), is "to accelerate industrialisation and modernisation through informatisation". The plan also identified informatisation as "a potential advantage for developing countries to achieve a great-leap-forward in productivity"[3]. The first national informatisation policy in China[4] which was published in 2002 specified the guidelines, goals, and policy measures to facilitate national informatisation. According to the guidelines, the government should oversee the overall planning of the information infrastructure to avoid repetitive investments in its construction. The plan also emphasised that Chinese informatisation is both application-oriented and market-oriented (The National Leading Group on Informatisation, 2002).

Similar to the national information infrastructure plans in other countries, the Chinese informatisation plans initially aimed at developing an information infrastructure and an information industry. In the late 1990s, two leading telecommunication companies, China Mobile (中国移动) and China Telecom (中国电信) separated from the China Postal Service (中国邮政) system. In recent decades, the competition between telecommunication companies has been intense. After several rounds of mergers and splits, the Chinese telecommunication market now consists of three state-owned companies, China Mobile, China Telecom, and China Unicom. The distribution of ICT

[2] Five-year Plan of China: the Five-year Plan of China (中国五年计划), established by the central government of China is a set of foundations and principles for economic growth and social development. It has been a crucial part of China's socialist economy since Mao's leadership and is renewed every five years. The most recent plan (2016-2020) is the 13th, which focuses on the transformation of China's industrial structure.

[3] 以信息化带动工业化，发挥后发优势，实现社会生产力的跨越式发展。

[4] 《国民经济和社会发展第十个五年计划信息化重点专项规划》

infrastructure, although mainly influenced by the market demand, is under the regulation and planning of the central government's informatisation policy. For example, when the central government started the Poverty Alleviation Battle in 2015, the national rollout of the 4G network was part of the project for rural development. Financial incentives were given to telecommunication companies from the central government to encourage a "universal" distribution of 4G networks in remote areas in China (CAICT, 2018).

The government-initiated informatisation has been successful in the development of the Internet industry and infrastructure. The percentage of China's GDP attributed to the digital economy had increased from 15.2 in 2008 to 30.2 per cent by 2016 (CAICT, 2017). The Internet penetration rate in China had increased from 4.6% in 2002 to 61.2% in 2019 (CNNIC, 2019). The State Information Centre of China has an Information Society Index that evaluates the potential of different countries worldwide and different provinces in China. It evaluates the level of informatisation across four dimensions: *building a knowledge economy, forming a network society, digitalising everyday life,* and *providing e-governance.* However, the ranking of Chinese provinces shows that there is a geographical imbalance in informatisation where Eastern China has higher scores in all dimensions of informatisation than Central or Western China. The report also shows that informatisation disparities are wider in the realms of *digitalising everyday life* and *the provision of e-governance* (State Information Centre, 2017) than in the other two dimensions.

With the rapid development of an Internet-related economy under the informatisation plan, China has now come to have a flourishing Internet economy. Technology giants such as Huawei, Alibaba, Tencent, and Bytedance are playing leading roles in the domestic digital market and increasingly also influence the emerging digital market in developing countries. However, as China's 2006-2020 Long-term National

Informatisation Strategies pointed out, the adoption of ICTs within China varies across different industries and social groups. In particular, there are widening gaps between rural and urban ICTs (The State Council Information Office of the People's Republic of China, 2006).

The urban-rural dichotomy has been an important theme in social science research on China. The problem is rooted in the Chinese government's economic and social policies that have prioritised the development of cities over villages. Before China's economic reform, rural agriculture was centred around supporting the manufacturing industry in urban areas, which put heavy burdens on the rural economy for decades. The planned economy has also implemented strict control over rural-to-urban migrations through implementing a household registration policy (the *hukou* system, 户口) which distinguishes between the rural and urban populations. Rural economic, social, and cultural development has also lagged far behind urban development due to a lack of public funding for pensions, healthcare, and education in rural areas.

After China's economic reforms since the 1980s, rural residents are allowed to manage agricultural production within their households and to work in urban areas. Nevertheless, due to the lack of public facilities such as schools and hospitals available for all residents in the major cities in China, the central government has not abolished the *hukou* system and thus restricted the migration of rural population to major cities. Young migrants working in the cities are also unable to enjoy the same social benefits as urban residents. Meanwhile, as Chinese sociologist Liping Sun (1994) found in his empirical studies, the rural-urban divides caused by the *hukou* system have further widened due to the rural-urban income gap that resulted from the marketisation of the economy. The average income in rural China has fallen far below that in urban China. In fact, according to the National Bureau of Statistics of China, the average income per capita in urban

China was 3.21 times higher than rural China in 2012, higher than the urban-to-rural income ratio in 1979. Despite the rapid urbanisation process in recent years, in 2018, in China 41.4% of the total population were still living in villages and small towns. And yet national development policies continue to favour urban over rural development by prioritising economic growth in major cities. While innovation clusters such as the Greater Bay Area (also known as the Pearl River Delta Metropolitan Region) have received government funding for the construction of infrastructure and support for the technology sector, Central and Western China is lagging further behind in attracting ICT talent and investment. As Kyle Jaros argues, the government has "justified state interventions as far-sighted solutions for sustaining development, improving governance, and optimising the spatial distribution of people and resources" (Jaros, 2019, p. 222). However, national informatisation as a development strategy has nevertheless resulted in urban-rural and in coastal-interior gaps in social and technological development.

The widening urban-rural gap has created discontent against the government among the rural population. In recent years, the Chinese government has therefore promoted a national informatisation plan which uses the development of ICT infrastructure (village-to-village electricity, gas, and telecommunication networks) as a stimulus to the rural economy. However, as with the history of collective farming in rural china, top-down informatisation existed in rural China before the adoption of the Internet. Before China's economic reforms gave autonomy to farmers under the Household Responsibility system in 1978, villages in China had implemented a collective economy whereby agricultural production was operated in the units of village teams. Information centres in town or county centres provided farmers with information about choices of fertilisers and seeds. Local governments sometimes invited agricultural specialists to advise on what types of agricultural products are suitable to grow in the local climate.

And information teams were dispatched to teach farmers how to grow the products scientifically.

Rural informatisation through ICTs was first introduced in 2006 under the National Informatisation Strategies (2006-2020). One of the foci of the plan was to develop rural informatisation. Rural informatisation involves the provision of public Internet access, agricultural information, and information proxy services. For example, Hainan Province has set up Internet centres to help villagers find online information, make online payments, or shop online[5]. It also includes the provision of information services about e-commerce, education, vocational training, and healthcare for rural residents. The Chinese central government has played a dominant role in funding the rapid construction of a rural information infrastructure. One project, in particular, exemplified the state's commitment to penetrating ICTs in rural areas. The project, *Cuncun tong*, translated as "to connect every village" (村村通), has aimed to connect rural Chinese areas through the transportation network. It was later used to provide coverage of telecommunication infrastructures to all villages in China. Local governments have been mobilised to collaborate with telecommunication companies to connect rural Chinese regions with the rest of the country. The project has been successful, judging by statistics on Internet coverage rates. The percentage of Chinese villages that have Internet coverage, according to the National Bureau of Statistics of China, reached 96.8% in 2016. In recent years, the central government initiated informatisation plans to increase the information services available to rural users. One plan, for example, aims to reduce poverty using the Internet. The plan will also develop mobile applications that could "satisfy the information needs of rural users in remote areas, covering applications

[5] http://www.xinhuanet.com/tech/2018-06/21/c_1123012682.htm

for social networking, e-commerce, transport, healthcare, and education" (The State Council Information Office of the People's Republic of China, 2016).

Nevertheless, the top-down, government-led rural informatisation initiatives have many limitations. The construction of information technology infrastructure in almost every village in China within a short period requires a massive amount of public funding from both the central and local governments and even leads to collective debts in some villages. As Zhou (2011) found in his fieldwork on China's Paved Road to Every Village (PREV) project in northern China, the lack of sufficient funding for construction projects in rural areas could not be resolved merely through funding from local government. Village officials who tried to implement the government-initiated projects had to seek alternative funding through collective debts which eventually added financial burdens to the villagers. Ting and Yi (2013) found through a case study of rural informatisation in Southern China that the government-initiated development of information services led to issues such as lack of policy continuity and credible measurements. The policy therefore resulted in a gap between what rural residents needed and what the government could provide through the top-down approach of informatisation.

Due to the limitations in government-led ICT development, in recent years, the Chinese government has started to partner with the private sector in the development of the ICT sector in rural China. In 2015, the Chinese Ministry of Commerce published an action plan for the development of rural e-commerce through a public-private collaboration (General Office of the State Council, 2015). It aims to improve the coverage of logistics services and increase the supply of e-commerce talent in rural China. Technology companies, meanwhile, have introduced business models and strategies or promoted the products of online shops opened by rural entrepreneurs. Nevertheless, without teaching the requisite knowledge for information skills, the provision of ICT

hardware has still failed to facilitate the e-commerce sector in rural China, especially in the Central and Western provinces. Researchers have found that ICT facilities in the village centres are often left unused by villager while information services are only available at the town-level and could hardly reach the "last kilometre" to the villages. One Chinese scholar reviewed the current progress of rural informatisation in China and recommended that policymakers should focus more on the provision of practical, reliable, and accurate information services as well as training rural users with digital skills to find the information they need (D. Li, 2009). It is therefore overly enthusiastic to assume that wide Internet coverage through the construction of an information infrastructure will lead to pervasive use of digital technologies for social development.

1.1.2 Grassroots informatisation: The mobile leapfrog

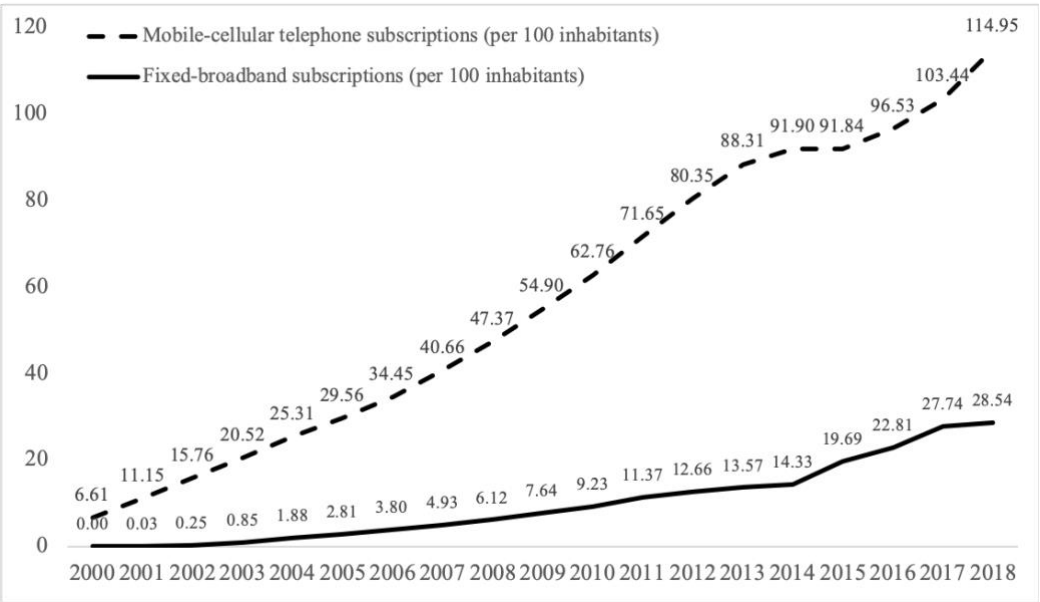


Figure 1. The adoption of mobile-cellular telephones and fixed-broadband subscriptions in China (Data Source: ITU)

Due to the lack of digital skills and broadband access at home, many rural Internet users in China had difficulties getting online before the 2010s. The Chinese government's top-down approach to informatisation has overemphasised the provision of infrastructure

and failed to deliver information services for information have-less users[6]. As a result, there is a growing digital divide between rural and urban China in terms of online information, with an urban online community that becomes increasingly diverse and a rural community that has been under-represented in online culture. In 2019, rural Internet users only accounted for 26.3% of the Chinese Internet population (CNNIC, 2019). National census data also shows that rural Internet users are less active in every type of Internet activity than their rural counterparts (CNNIC, 2015). However, the adoption of mobile Internet in China has also helped to level the uneven distribution of Internet access and disparities in Internet use by providing affordable and convenient access to the rural population through mobile phones. Figure 1 shows the different adoption rates of fixed-broadband and mobile-cellular in China. While there are only 28.54 fixed-broadband users among 100 inhabitants in China in 2018, the proliferation rate of mobile-cellular technologies has reached 114.95 in 100 inhabitants, meaning that some users have more than one mobile device connected through the cellular network. Mobile phones have also narrowed the digital divides between developing and developed countries globally. As is shown in Figure 2, the gap in subscription rates of fixed broadband between developed and developing countries has increased since 2005, but the divide between the global North and South in mobile-cellular telephone adoption has gradually decreased since 2010.

[6] The term "information have-less" users was coined by Jack Qiu (2009). The definition of the term will be discussed in subsequent chapters.

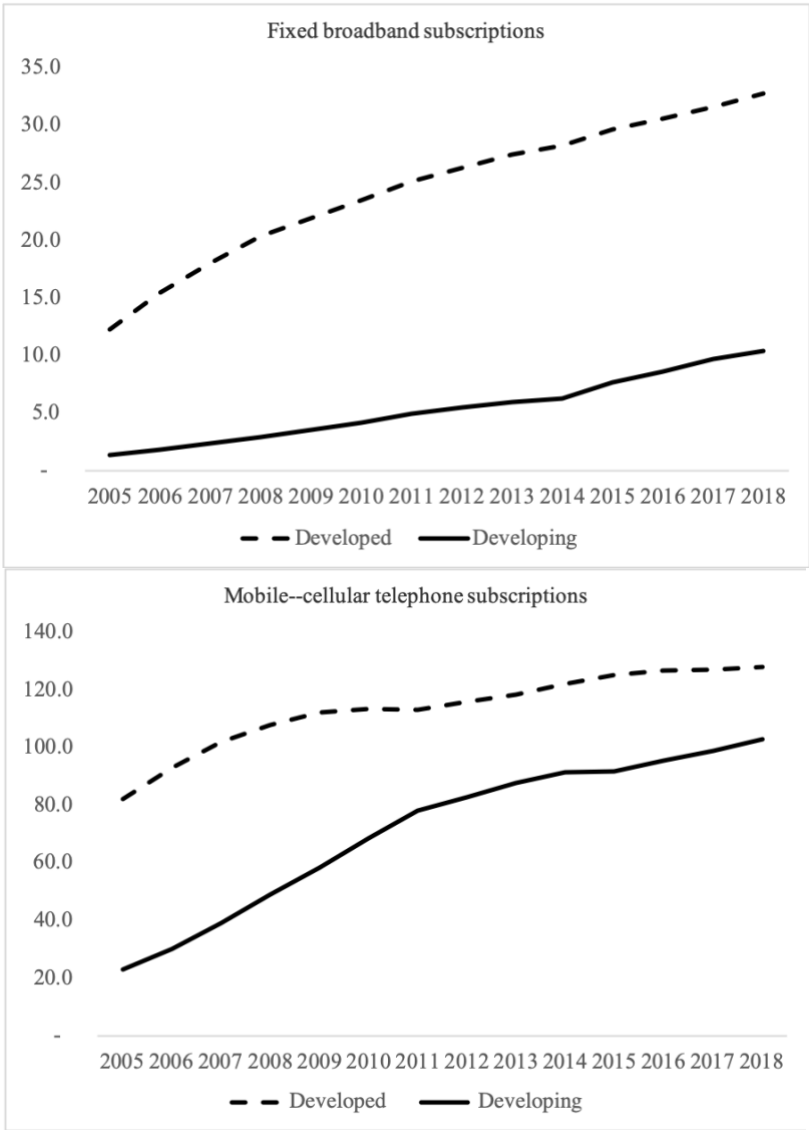


Figure 2. The adoption of fixed broadband and mobile-cellular telephones in developed and developing countries (Data source: ITU)

The increasing affordability of mobile Internet is one of the most important driving forces behind the mobile leap forward in developing countries. A report[7] by the ITU points out that the market liberalisation around the world has had a positive influence on lowing the mobile tariffs in developing countries, leading to an increased affordability of the mobile Internet in countries of the Global South. It has been shown that the majority of countries have offered mobile-cellular prices that constitute less than 5% of the Gross National Income (GNI) per capita, priced at around 21 US Dollars per month at the

[7] https://www.itu.int/en/ITU-D/Statistics/Documents/publications/misr2017/IPB2017_E.pdf

Purchasing Power Parity (PPP). The cost of mobile data in China has also been decreasing rapidly over the years, with three major telecommunication companies in China competing in the domestic market. The Mobile Connectivity Index by GSMA, an association of world mobile operators, measures the affordability of mobile tariffs in different countries. Figure 3 shows a cross-country comparison between UK, US, China and India with the higher the index score, the more affordable the mobile tariffs. Mobile tariffs in China and India used to be more expensive relative to the two countries' average income in 2014, but the relative cost of mobile data in China and India has decreased and was even cheaper than the mobile tariff in the US in 2018.

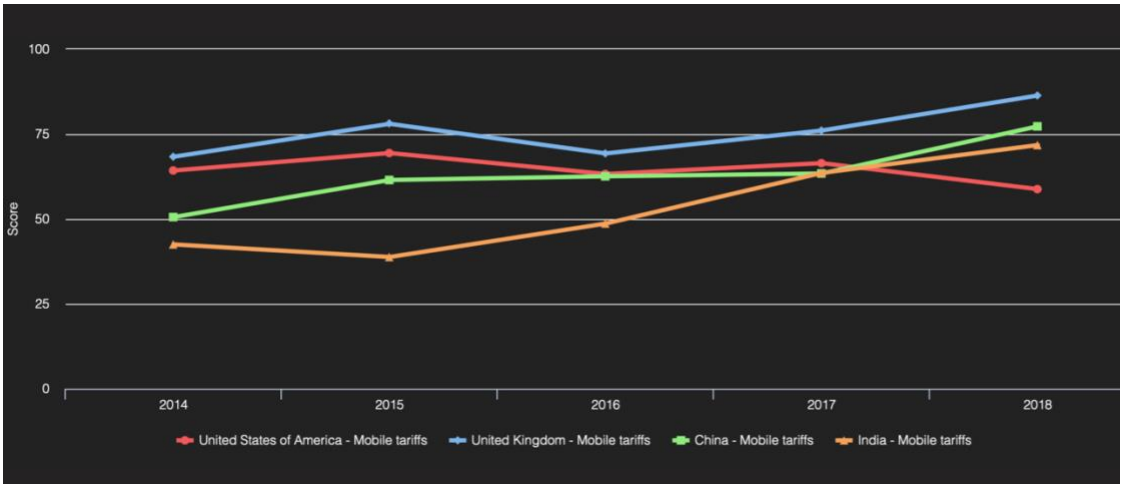


Figure 3. Comparison of mobile tariffs in US, UK, China, and India from 2014 to 2018 (Data Source: GSMA Mobile Connectivity Index)

With decreased mobile data costs and increased 4G connectivity in rural China, mobile devices have become the most popular way to access the Internet in rural areas. In 2014, more than 81.9% of rural netizens[8] used mobile phones to access the Internet (CNNIC, 2015). Different from the top-down informatisation that emphasises government-led training on e-commerce or education, the informatisation arising from grassroots adoption of mobile Internet is more embedded in individuals' everyday life and their patterns of communication and information seeking. A recent CNNIC (2019)

[8] Netizens, in this thesis, refers to Internet users. Information users, however, includes both internet users and non-users.

statistical report shows the average time spent on different types of mobile apps in China. Chinese mobile Internet users spend the longest on mobile social media, which accounts for 14.5% of their time online. Online videos, short-videos, music, and e-reading rank from the 2nd to the 5th popular apps on mobile devices.

Interestingly, self-reported survey data in the report shows a slightly different ranking of popular apps among mobile Internet users than the time usage data. The top-ranking mobile apps, based on self-rated importance in the survey, are mobile social media, search engines, online news, online shopping, and online payments. Thus, Chinese mobile users spent considerable amount of time on social media and the consumption of online culture. Meanwhile, information services such as search engines, mobile news, online shopping and payment platforms are considered as essential tools for users' everyday life. A survey in China shows that more than half of Chinese mobile phone users have reduced their use of PC Internet, especially for social networking, music, gaming, and online videos (CNNIC, 2014).

However, despite the multi-functionality and affordability of mobile devices, many scholars are concerned with the limitations of mobile Internet as compared to PC Internet. They are worried that the dependence on mobile phones as the sole form of Internet access might result in a broadening usage gap between mobile-only users and users of multiple Internet devices. Some research suggests that the information gap between different groups of Internet users can hardly be solved by simply introducing affordable and flexible wireless Internet. For example, Napoli and Obar (2014) argue that the mobile Internet is inferior to desktop or PC Internet in many aspects, including low technological capabilities of devices, different usage patterns and different skill sets needed. They also reviewed empirical research on information seeking on mobile and PC Internet and concluded that "mobile Web usage patterns related to finding and accessing

information are significantly more constrained than PC-based Web usage patterns" (p.328). Still, it is not clear if criticisms of the mobile Internet might underestimate the potential of developing countries in creating online content and services that fit the needs of mobile-only users. However, there is clearly a difference between developed and developing countries in the percentage of the mobile-only population. A ComScore (2017) report shows that most of the developing countries have a huge percentage of Internet users who are mobile-only: for example, India has 70% of mobile-only users and China 22%. The percentage of mobile-only users in developed economies is significantly lower. Mobile-only users only account for 8% of UK netizens[9]. And yet, the growing proportion of mobile-only users in both developing and developed countries also indicates that there is a maturing mobile market. In online activities related to news and information, users spend on average 59% of total digital minutes using mobile devices. The ComScore report also shows that some types of information are more likely to be consumed on mobile devices; for example, on-the-go content such as weather, lifestyle, personal development, and job searches. A more worrisome sign, as shown in the ComScore report, is the concentration of leading apps in the local and global mobile market, as 95% of users' mobile app time is spent on the ten most-used apps. With an increasing percentage of users choosing mobile devices as their first choice of information seeking platform, perhaps future research needs to examine the disparities within the mobile-only user group and the diversity of mobile apps as everyday information sources.

1.2 The Information ecology of the Chinese Internet

The top-down government plans of informatisation and grassroots adoption of the mobile Internet have created a thriving digital market in China. Internet giants such as

[9] The OxIS survey in 2019 shows that the percentage of Mobile-only users in UK has increased to 15% (2019).

Tencent, Alibaba, Baidu, JD, NetEase and recently Meituan and ByteDance are becoming leading technology companies in shaping the Chinese Internet marketplace. Internet products and services created by these companies form a digital information ecology of the Chinese Internet where information is searched, shared, and created by more than hundreds of millions of Chinese netizens. Many China scholars have studied the changing media ecology in China with the rise of the Internet. Research has suggested that the government's dominant role in broadcasting official news through mainstream media has been challenged with what Yang called "centrifugal or counter-hegemonic impulses" online (Yang, 2013, p. 341).

Nevertheless, the media ecology is only part of the information ecology of the Chinese Internet. In addition to news content generated from state-owned media agencies and counter-hegemonic views shared by political dissents, the information ecology in China also consists of information on everyday topics, created and shared by companies, professionals and experts, bloggers, and ordinary Internet users. To understand the impact of digital technologies on everyday information seeking, we need to broaden our research focus from traditional media channels to a wide range of online information platforms, including social media, news apps, online video sharing platforms, and search engines. Before we can start to analyse Chinese users' everyday information seeking practices, we need to answer the following questions: What are the popular information platforms in China? Who are the major information providers? And, what roles do the Chinese government and technology companies play in creating information ecology in China?

1.2.1 The rise of digital platforms

Social media: From social networking to information seeking.

Chinese users spend the longest time online on social media platforms. The development of social media platforms in China has gone through a shift from being

mainly interpersonal instant messaging services, then social networking services, and more recently mobile social media applications. In the late 1990s, QQ, developed by Tencent company, was one of the first Instant Messaging (IM) services in China. Information sharing in the early days of social media in China was limited to interpersonal or small-group level, and the primary function of social media was to maintain social networks through individual or group chats. Around the 2000s, the rise of Web 2.0 enabled interactive web designs and allowed users to contribute content on social media platforms. During this period, China saw the popularity of social networking services (SNS) such as online BBS forums (for example, Tianya), Baidu Tieba (a forum developed by Baidu company), and Qzone (a social networking website based on QQ). These websites became popular first among university students and later among the early adopters of the PC Internet in urban China (Yang, 2009a). Social media at this stage transformed from being interpersonal communication tools to becoming platforms that facilitate small group discussions. BBS, for example, was used by Chinese netizens to share news articles and exchange ideas and has played important roles in challenging official media about "hotpot" (or controversial) incidents. In 2009, the launch of Sina Weibo (micro-blogging) turned social networking services from interpersonal communication to public broadcasting tools. Weibo enabled users to follow updates from celebrities, company and media accounts and create multi-media tweets that could potentially reach millions of users on the platform. Within a few years of its first launch, Weibo became one of the most important sources of news and everyday information for Chinese users. Weibo also attracted Chinese local and central government departments to use the platform for the sharing of government information and the monitoring of public discussion on policies and social incidents (R. Han, 2012). Nevertheless, despite the success of Weibo in urban China, it remains popular mainly among younger

generations, with users aged above 41 years old only accounting for 5% of total users (Sina Weibo, 2019). Since its release in 2011, WeChat, a mobile social media application developed by Tencent, has become the most successful social media platform in China.

The design of WeChat was tailored to be suitable for smartphone screen use. The first version of WeChat aimed to support perpetual contact with a simple and user-friendly interface. Within the first few years of its launch, WeChat added new social networking functions such as voice or video calls, discovering nearby friends, and "moments", which allows users to share updates on their timelines. However, it is when WeChat started to add functions beyond communication that it became a Swiss-Army-Knife app for everyday life. For example, the development of financial functions such as WeChat Pay allows users to pay or receive money by scanning QR codes. Informational functions such as Public Accounts enable users to subscribe to traditional media accounts or independent blogs to personalize their information flow. By the end of 2017, WeChat had become the most popular social media platform, adopted by more than 87.3% of Chinese Internet users (CNNIC, 2018) and it had more than 938 million monthly active users[10]. It is thus an example of a versatile and multi-functional app that combines interpersonal communication, mass media broadcasting, and information seeking and sharing functions (Yujie Chen, Mao, & Qiu, 2018). WeChat has become more than a text messaging app and it is embedded in many everyday life routines, including but not limited to shopping, news reading, paying bills, and personal finance management.

Compared to previous social networking platforms in China, such as BBS or Weibo, one feature that sets WeChat apart from these services is that users' daily updates on WeChat are visible only to mutually-added friends. Thus, it is less public and more personal than Weibo, for example. However, the information seeking and sharing

[10] https://www.tencent.com/zh-cn/system.html

functions such as Tencent News, Public Accounts and article search on WeChat have provide a daily information flow for users. A report from QuestMobile shows that more than 80% of WeChat users have subscribed to Public Accounts, with urban users more likely to subscribe than rural users. The most popular topic users read on Public Accounts are hobbies, lifestyle, and politics[11]. WeChat also plays a major role in circulating updated information on social issues during crises (Y Chen, Liang, & Cai, 2018; Gan, 2017). In recent years, there has been an increasing number of heated debates on WeChat after the viral spread of articles about issues such as the eviction of migrant workers[12], investigations into abuses in a Beijing kindergarten[13], and the outrage over the vaccine scandal[14]. WeChat is also an important informational tool for elderly users. A study showed that while older generation users benefit from receiving diverse information sources and viewpoints on WeChat, they are also severely constrained due to their lack of digital skills and limited knowledge of mobile devices (Guo, 2017).

[11] http://www.sohu.com/a/305492961_260616
[12] https://www.theguardian.com/world/2017/nov/27/china-ruthless-campaign-evict-beijings-migrant-workers-condemned
[13] https://www.nytimes.com/2017/11/24/world/asia/beijing-kindergarten-abuse.html
[14] https://edition.cnn.com/2018/07/31/asia/vaccine-protest-scandal-china-intl/index.html

News apps: Algorithmic recommendation systems.



Figure 4. A screenshot of Sina Web Portal on Mar 29, 2003. The red text box in middle right section displays headlines of international and national news (Image Source: the Wayback Machine by Internet Archive)

The history of Chinese online news started from news channels on Chinese Web Portals in the late 1990s. Sina, NetEase, and Sohu were among the first websites that integrated online news into the design of portal sites, where lists of breaking news were displayed alongside directory links to different websites (search engines, online forums, or online shopping platforms). Figure 4 shows a screenshot of Sina Web Portal in 2003. Tencent also used pop-up windows to "push" online news for QQ users. Due to the timeliness of news updates on front pages, the four websites soon became popular news sources online. The competition in the online news market intensified when the biggest search engine in China, Baidu, in 2003 released a news platform that uses algorithms to generate news content.

With the widespread adoption of smartphones in China, Internet companies since the 2010s have developed mobile news apps for mobile operating systems such as Android and iOS (R. Zhang, 2012). However, in 2005, the government imposed a

regulation on Internet news services which distinguished news websites managed by official news agencies and by commercial websites. Online news websites operated by Chinese Internet companies, according to the regulation, could only "re-publish" news reports from official news agencies and are not allowed to conduct investigations and edit news information (State Council Information Office & Ministry of Industry and Information Technology of the Chinese government, 2005). Under the strict regulation of news content, online news channels on commercial websites only provide original news reports on sports, entertainment, and technology, avoiding reporting news on state affairs and social policies. However, Chinese scholars have found that this regulation has led to an over-concentration of online news on entertainment and a lack of high-quality news coverage on social policies (Q. Zhou, 2012).

With the increasing adoption of smartphones in China, Chinese technology companies began to develop mobile news apps since 2010. There are currently two types of news apps in the Chinese Internet market: news apps that deliver professionally generated content (news apps developed by mainstream media) and news apps that use algorithms to generate content automatically. Toutiao news app, a mobile application developed by ByteDance, is the pioneer in applying algorithmic recommendation systems in mobile news services. According to the company's official website, Toutiao is a "personalised information recommendation engine" (*gexinghua zixun tuijian yinqing,* 个性化资讯推荐引擎). The company's CEO, Yiming Zhang, mentioned in a public speech that the recommendation system is based on hundreds of characteristics, including users' behaviours in the news app (clicking, stopping, scrolling, liking, commenting and sharing behaviours), users' environment (geographical location, time, Internet access, weather, and national holidays), and users' social media data (friend networks and public

messages)[15]. News sources on Toutiao include not only mainstream media but also independent media accounts (Toutiao Accounts) opened by companies or individuals.

Toutiao news has been ranked the most popular news app in China[16] and similar algorithmic recommendation systems are now adopted by other Internet companies and official media to replace human editors[17]. However, an empirical study that collected 77 Toutiao users' news feeds on the app showed many limitations of the algorithmic recommendation system on Toutiao (Q. Wang, 2017). The study suggests that most of the news articles that more than half of the participants received are local news, indicating that geographical location is an important criterion of the recommendation system. The study also finds that the social news recommended by the Toutiao news app frequently use words such as murder, rape and accidents. Toutiao news related to nationalism, such as Japan, India, and Trump, are read frequently by its users (Peng, 2018). News apps are also becoming more visual. Companies that have developed news apps have provided a multi-media display of news event to increase users' time spent within the apps, which is a key criterion for the bidding for advertisements by companies. In 2017, short video news accounted for 56.2% of all news consumption on the Toutiao news app[18]. A report on news apps usage showed that users of news apps who watch videos tend to spend a longer time within the app and have more frequent sessions (QuestMobile, 2018).

Short video platforms: When two Chinas meet.

With increasing mobile Internet speed and decrease of mobile tariffs, short video sharing platforms such as Douyin, Xigua, or Kuai have become essential information

[15] https://www.geekpark.net/news/212152
[16] http://www.199it.com/archives/789582.html
[17] Internet companies in China have also started adopting news writing bots to generate news content on financial and sports news. For example, Xiaoming bot by ByteDance, Dreamwriter by Tencent, DT gaowang by Yicai magazine (developed by Alibaba), Writing-bot by Baidu, and Kuaibi Xiaoxin by Xinhua News Agency.
[18] https://www.useit.com.cn/thread-16398-1-1.html

channels for lifestyle, health, entertaining and education. For example, Douyin, also known as TikTok in the international market, is a social video app developed by ByteDance. Since its release in 2016, it has seen exponential growth in the number of users and the amount of video content generated by users on the platform. By the spring of 2018, Douyin or TikTok had become the most popular iOS app and had more than 45 million downloads around the world, surpassing the downloads of Facebook, Instagram, and YouTube. However, in China, the most significant impact of apps like TikTok is being felt by rural users where online video platforms are revolutionising everyday life in the villages.

First, short video platforms have played a central role in bringing inexperienced users from rural communities online. Perhaps the most important reason is the fact that they prefer video rather than text. Compared to text, video content is much easier to comprehend, especially among users who have less experience with the Internet, such as those who live in the rural parts of the country. For many rural users, online video has lowered the education and literacy barriers that had previously prevented them from participating in typical Internet activities, such as reading news articles. They can now watch news videos, often clips from central or local TV news broadcasts that are shared on social media. They can also join the lively conversations that spring up around these videos, as users from the same rural community interact with one another in the comments section. Online video also offers an essential source of information for acquiring new skills, especially for female villagers who are learning how to knit, dance, and cook. Video apps implement sophisticated recommendation systems to tailor personalized content for their users, and this is often how inexperienced Internet users in rural China find content.

Second, rural users are not only consumers of these videos; they also contribute to the generation of video content on the platform. To help users make videos, apps like Douyin or Kuai have embedded tools such as stickers, filters, transitions effects, and background music. These tools enable users with no specialised training to make well-produced videos relatively quickly. However, when video content generated by rural users is delivered to urban elite users, there is a clash between urban and rural cultures and values. In 2016, Kuai, a short video platform popular among rural users, was criticized by a blog named “Dr X”. The author found a cruel, vulgar, and impoverished rural society on the platform. Rural users, he said, who were desperate to get attention from the community and receive monetary gifts from fans would perform absurd and dangerous acts such as eating glass or raw meat. However, short video platforms also create opportunities for mutual understanding between rural and urban users. For example, Huanong Brothers, two young Chinese males from rural China, had, in 2018, become among the most popular social media influencers. Having worked in urban China for a few years, they returned to the village and started a small business of raising and selling bamboo rats, a type of rodents welcomed in local dishes in Jiangxi province. On Xigua Video, Huanong Brothers documented their everyday life of raising, cleaning, and cooking bamboo rats. With over 500 million views and 2 million followers, Huanong Brothers’ videos went viral on the Chinese Internet and soon their online success had transformed to offline income when hundreds of visitors came to their farm, attracted by the natural way of life depicted in their videos. As more urban and rural users use these apps, and the number of videos from both sides increases exponentially, the two societies are getting to know different ways of life. And while urban and rural audiences still have different preferences when it comes to trending topics, rural videos can become popular among urban users nostalgic for what they perceive to be a simpler life closer to the

natural environment. Online video platforms offer an online space where the two Chinas meet. However, we need empirical studies to understand the role of emerging short-video platforms in Chinese information ecology and how rural and urban users differ in seeking information on these platforms.

Search engines: Baidu's trust crisis.

Chinese users' online information seeking is shaped by search engines such as Baidu. A ranking of Chinese websites by Alexa shows that Baidu is ranked the most popular website in China. As an important gateway to online information, search engines direct users to information sources. As Schroeder summarises, "whereas other media and information sources provide the content of our attention, Google (or Baidu in China) focuses it" (Schroeder, 2014, p. 153). The first search engines in China were Baidu and Google. Baidu was founded and launched in China in 1999. In 2000, Google launched a Simplified Chinese version of Google.com and officially launched in mainland China in 2006. The two engines competed in China until 2010, when Google announced that the company would pull out from the Chinese market due to a hacking attack and censorship by the Chinese government (Schmidt & Rosenberg, 2014). Since Google left China, the Chinese search engine market has been dominated by Baidu (as shown in Figure 5 and Figure 6). Over the years, Baidu has developed not only search apps on mobile devices, but also tried to expand its services to online forums, online news, and Q&A forums.

However, like Google, online marketing from paid advertisement accounts for the main source of revenues of Baidu. In 2008, the Chinese official news medium, CCTV, exposed Baidu's shady paid listings business model. Websites that sell fake medicines could easily bypass background checks with the help of Baidu sales representatives after paying for paid listings. The report also revealed that NGOs that refused to pay for search rankings were "blocked" by Baidu and disappeared from search results. Despite

criticisms from official media and the general public, Baidu has continued its business model of paid listings. Baidu also provoked outrage across the country when, in 2014, Zexi Wei, a university student, died from receiving an experimental cancer treatment after finding the hospital from a promoted result on Baidu[19]. Following Wei's death, Baidu was held responsible for promoting false medical information and investigated by the Cyberspace Administration of China. Chinese regulators required Baidu to use visible markers to signify advertisements and reduce paid listings to 30% of each results page. However, a series of media investigation following Wei's death have demonstrated to Chinese Internet users how search results were re-ordered and distorted using paid listings. Since then, Baidu has faced a crisis of trust among Chinese users. In 2019, a Chinese scholar and social media opinion leader, Kecheng Fang, published an article titled "the death of search engine Baidu" on his WeChat Public Account[20]. The article compared search results on topics including economics, politics, entertainment, technology, transport, and personal development, and found that top-ranked results are links to Baidu's websites (Q&A forums, Baidu accounts, or Baidu's encyclopaedia). Discussions about the exclusive ecology of Baidu search engine has raised the public's concern over the monopoly of Baidu in the search market.

[19] http://special.caixin.com/event_0412/
[20] https://www.huxiu.com/article/282406.html

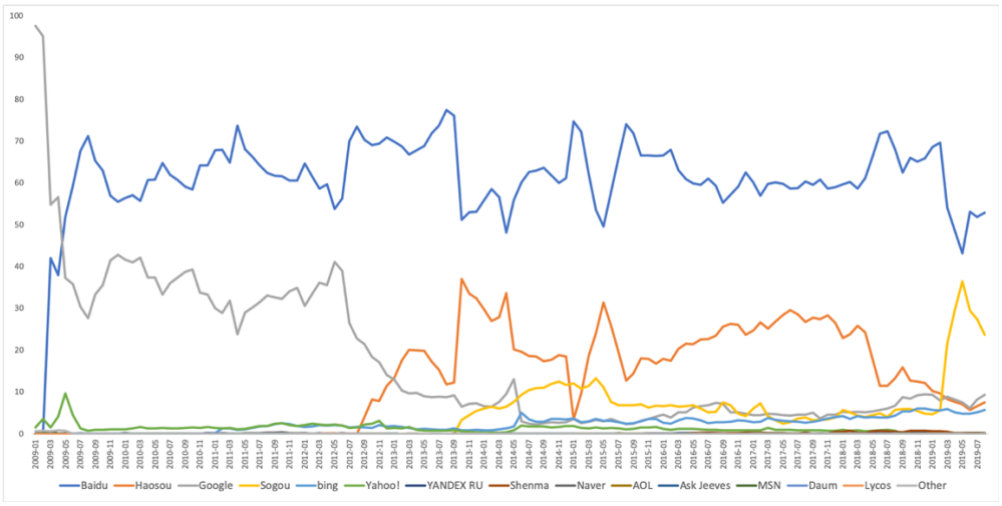


Figure 5. PC search engine market share in China between Jan 2009 to Aug 2019 (Data Source: StatCounter GlobalStats)

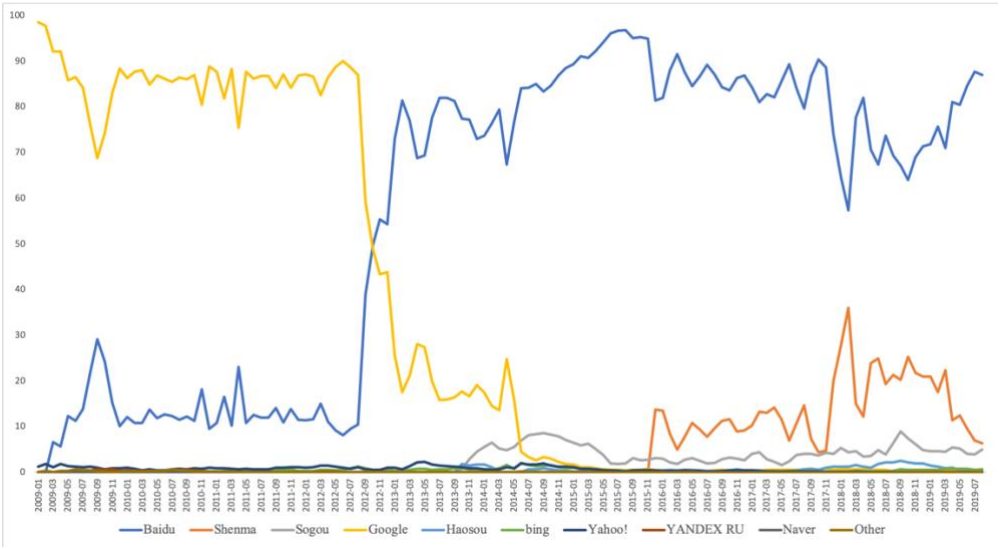


Figure 6. Mobile search engine market share in China between Jan 2009 to Aug 2019 (Data Source: StatCounter GlobalStats)

In the book *The Googlisation of Everything*, the author warns that "the problem with the Googlisation of everything is that we count on Google too much. We trust it too much. We have blind faith in its ability to solve grand problems with invisible technology" (Vaidhynathan, 2011, p. 210). However, the crisis of Baidu in China is opposite to that of Google: Baidu, as the biggest search engine in China, has gradually lost its credibility as a neutral gatekeeper of online information. And yet, the rise of mobile Internet has enabled new search functions such as image search and voice search. New search engine

apps such as Shenma Search (jointly developed by Alibaba and UC) is challenging Baidu's dominance in gatekeeping online information on the Chinese Internet.

1.2.2 Taming the tides: Chinese government's information strategies in digital era

While Internet platforms such as Weibo, WeChat, mobile news, and short video platforms constantly attract users' attention, independent media and bloggers have become increasingly influential in dominating public opinion on the Internet. Opinion leaders on new media platforms have challenged the official discourses, for example, about social policies. For example, since 2006, the municipal government of Beijing has defined migrant workers in waste recycling, hairdressing, and construction industries as "low-end labour" (*Diduan Renkou*, 低端人口) and aimed to control the number of the migrant population in Beijing[21]. In 2017, a fire in a housing block where many migrant workers live in Beijing killed nineteen people and caused eight injuries. The Beijing government started a 40-day campaign to "beautify" the city and close down "shanty areas"[22]. However, the campaign forced thousands of migrant workers to leave their properties and eventually leave the city. In contrast with the government's explanation of the campaign as a dispersion of the population and an upgrading of the service industry, Internet users in China were outraged by the unjust treatment of migrant workers and fiercely criticised the Beijing government's use of "low-end labour" to describe the marginalised population. Despite censorship on WeChat, public discourse around the topic has continued to grow on various digital platforms. Under pressure from public opinion, the Beijing government finally agreed to compensate the dismissed migrant

[21] See the article (http://npc.people.com.cn/GB/14957/53049/4819652.html) published on the official website of the people.com. Media reports traced the use of "low-end labour" in the 11th Five-Year Plan in Beijing. However, the paragraph on low-end industry has been removed from the document (http://www.gov.cn/test/2006-02/07/content_180521.htm).
[22] http://finance.sina.com.cn/roll/2017-11-22/doc-ifynwhww6010957.shtml

workers[23]. This Beijing incident is one example of the influence of digital platforms in counterbalancing official media. However, seeing the potential of online media to shape dissenting opinion to Chinese official ideology, "Chinese government agencies and official media institutions have boosted their online presence and activity in a vigorous bid to 'occupy the online frontier'"(Yang, 2015, p. 4). In the following section, I will give an overview of three approaches which the Chinese government has adopted to improve its presence in the information ecology of the Internet.

From media convergence to XueXiQiangGuo: Shaping ideology in everyday life.

In Aug 2013, Chinese President Xi Jinping urged official media to "take control over the initiatives on the battle for 'public opinion'" when young generations in China seek information mainly from the Internet and rarely watch or read mainstream news[24]. Since the release of the official guidelines on media convergence for traditional and new media, official media agencies and newspapers in China have further digitalised media products and services by developing mobile apps, opening accounts on WeChat or mobile news apps, and updating news clips on short video platforms. News apps developed by official media are still ranked as less influential in the mobile market when compared with news apps developed by Internet companies. Nevertheless, traditional media such as Xinhua News Agency, People's Daily, and CCTV have seen increased visibility on digital media platforms (Figure 7 shows CCTV's account on the short video sharing platform). Government departments and agencies are also encouraged to open social media accounts.

[23] http://www.guancha.cn/society/2017_12_07_438212.shtml
[24] http://www.cac.gov.cn/2014-08/09/c_1115324460.htm



Figure 7. CCTV account on Douyin, the short video platform

Meanwhile, the Chinese government has tried to maintain its influence on the everyday life of Internet users by developing a mobile app for everyday learning and entertaining. *Xuexi Qiangguo*, literally translated as "learning to strengthen the nation", for example, is a mobile app developed by the Publicity Department of the Communist Party of China in 2019. *Xuexi Qiangguo* ranked the 4th in the category of "education apps" in the Apple store in China. Billions of the members of Chinese Communist Party have been encouraged to download the app and they can compete with each other for how many hours they have spent in learning on the app or what scores they get from taking quizzes about official ideology (socialism with Chinese characteristics). And yet the app is about more than publicising political ideology. It also has channels on MOOCs (Massive Open Online Courses), Figure 8 shows a screenshot of a course on social science research method in the app. Science and Technology, Traditional Chinese art (literature, music, and architecture), and TV dramas. Interestingly, this underhanded learning approach led by the Party faced a rebellion among tech-savvy party members.

Free tools[25] were developed and shared on GitHub to help Chinese users to hack the "learning scores" on the app. Thus, the effectiveness of Chinese government' top-down approach to win back the dominance of online opinion remains limited.



Figure 8. Screenshot of a website page of Xuexi Qiangguo, which offers a MOOC course on social science research methods.

Fighting misinformation: When the government fights against rumours.

Following Brexit in the UK and the US Presidential Election of Trump, there has been a major debate in social science disciplines about misinformation and the Internet. In the Western context, misinformation is linked with the concept of "post-truth" (Higgins, 2016). The concept, used in Western media, often refers to the disappearance of public consensus on the truthfulness of political beliefs and the decreased credibility of expert opinions. Another research focus is misinformation circulated through propaganda on social media or the use of bots to subvert the democratic process. In the Chinese context, misinformation often refers to rumours on the Internet. The spread of rumours has caused social unrest and challenged the authority of the government in China. In 2011, following the Fukushima Daiichi nuclear disaster in Japan, a rumour that claimed that iodised salt could prevent nuclear radiation was spread on Chinese online

[25] https://github.com/fuck-xuexiqiangguo/Fuck-XueXiQiangGuo

forums, leading to the stockpiling of salt across the country[26]. While the lack of science education and science journalism have led to the persistent spread of rumours on Chinese Internet, the adoption of mobile social media platforms and short video platforms have accelerated the spread of misinformation and have generated video-formatted rumours. Unlike Western countries such as the US and the UK where anti-misinformation campaigns involve the media and the general public, the battle against rumours in China is led mainly by the government together with the cooperation and technical support from technology companies.

The government has tried to stop the spread of online rumours from the source by implementing a real-name registration policy and imposing legal punishment on the creators of rumours. The Chinese Supreme People's Protectorate specified that Internet rumours that are "viewed more than 5000 times or forwarded more than 500 times" are serious illegal acts. However, this penalty did not stop the circulation of rumours. Thus since 2016, the Cyber Security Law requires that Chinese Internet service providers must ask for users' real identity information[27]. Online forums such as Zhihu (a Question and Answer forum) that previously allowed users to post anonymously have now begun to require users to register their identities before answering questions or sending messages on the platform. In 2018, the Central Cyberspace Affairs Commission released an anti-rumour platform (*Piyao Pingtai,* 辟谣平台), aiming to provide official rebuttals of rumours using the resources from official media, medical professionals and academia, and applying both human and algorithmic rumour detection. And yet, again, the influence of the anti-rumour platform is limited. As Huang (2015) pointed out in his experiment on the effect of government rebuttals for Internet rumours, the counter-message is more

[26] http://www.xinhuanet.com/politics/2011jrht200/
[27] See clause No.24: http://www.xinhuanet.com//politics/2016-11/07/c_1119867015_2.htm

effective if the rebuttals come from information sources that are independent of the government. Meanwhile, the visibility of rumours is often higher than anti-rumour facts and evidence, resulting in a reoccurrence of rumours, especially about health and food safety, on Chinese social media.

1.3 The study of the grassroots Internet in everyday life

1.3.1 Research objectives

The Chinese government has the ultimate power to steer the progress of the Chinese information society, from the distribution of information infrastructure, provision of information services, to more recently, intervention in the information ecology on the Internet. However, in recent years, the government's dominance in shaping what types of information Internet users have access to and controlling the spread of misinformation has been challenged with the rise of the Internet. Ample evidence has suggested that, as the Chinese Internet becomes increasingly embedded in everyday life, the relationship between the government, the Internet industry, and Internet users is more complicated than control *vs.* rebellion or censorship *vs.* circumvention. The diversity within the Chinese online information ecology and the differences among Chinese Internet users requires an in-depth examination of the functioning of the Internet in Chinese society from the perspective of everyday practices.

Previous research on the Internet in China has mainly explored the role of the government in controlling the flow of information and how certain groups, especially among the middle-class, resist the government's censorship by means of mobilising online or offline. However, little is known about how, in recent years, ordinary Chinese users seek, process, and share information in their everyday practices. And yet studying the Internet in everyday life contexts can reveal the potentials and risks of digital technologies in shaping how Chinese Internet users use online information to make sense

of their wellbeing, relationships, and environment. The thesis will provide a comprehensive empirical account of how the Internet influences information practices in the everyday context in China. By comparing rural users with urban working-class users, I will demonstrate the different experiences of the digital transformation in the two Chinas and whether the Internet has narrowed or widened the rural-urban divides in China. In studying digital disturbances such as misinformation and information overload, I will showcase how the role of digital technologies in everyday information seeking can create stress and anxiety among users, and how Chinese users design new strategies to cope with these digital disturbances. Qualitative and Quantitative data collected from extensive fieldwork in China will be used to understand changes in contemporary China through the lens of online information seeking in everyday life. Findings from the research will provide new perspectives not only for social science scholarship but also provide insights for technology developers and policymakers to design information services that can assist users' everyday information seeking.

1.3.2 Outline of the thesis

The thesis consists of seven chapters, with two background chapters, one chapter on methodology, three results chapters, and a concluding chapter. Chapter 1 has provided an overview of the driving forces behind China's booming Internet society and discussed the role of government-led top-down informatisation and grassroots adoption of leapfrogging mobile technologies in the process. I also described the Internet ecology that consists of different digital platforms, including social media, news apps, short video sharing platforms and search engines. The government has been trying to strengthen its dominance as an information provider in the online sphere by facilitating how official media agencies converge into online media and occupy the attention space of Party members, for example by means of making certain learning applications mandatory.

Meanwhile, the government attempt to prevent the spread of misinformation on the Internet has had little effect despite using both human and algorithmic rumour detection mechanisms.

Chapter 2 provides a literature review related to the thesis topic. It summarises how information seeking practices have been studied in information science, in research on everyday use of ICTs in social science of the Internet, and in scholarly work on digital inequalities from sociology. The chapter compares how different social science disciplines understand the role of ICTs in information seeking in everyday life. While each discipline contributes theories or empirical evidence on this topic, I find that there is a lack of interdisciplinary research on how information seeking practices vary across different social groups. There is also a lack of empirical studies on the role of new digital technologies such as algorithmic recommendation systems in human information seeking practices. The thesis aims to address these gaps in the literature by using a mixed-methods approach.

In Chapter 3, I describe in detail how data in the thesis was collected. I document the process of negotiating access to each field - a mountain village and a factory - and discuss my experience as a researcher working in the field sites. The chapter also provides background on the rural and urban field sites and how data was collected through participatory observations, elite interviews, and official documents. I also discuss how the mixed-methods approach contributes to a comprehensive understanding of everyday information seeking practices. Further, I examine how quantitative data such as surveys and qualitative data such as structured interviews and focus group studies can be combined in the research design, data collection, and data analysis. The chapter ends with discussions of research ethics in the study, explaining how I protected the anonymity and privacy of research participants.

Chapter 4, 5, and 6 are three result chapters, each addressing a separate research question in the project. Chapter 4 focuses on digital divides between rural and urban China. I triangulate survey and interview data to examine what socio-economic factors can account for the disparities in the access and use of ICTs in China. More importantly, I shift the focus from technology *access* to *after-access* to understand the social mechanisms behind the usage divides.

Chapter 5 examines the role of the Internet in information seeking practices within different everyday contexts. Using quantitative data, I first provide a categorisation of information needs in everyday life in contemporary Chinese society, and then, within different contexts, I analyse using qualitative data to understand how the Internet facilitates or gives rise to challenges in users' information seeking. The chapter ends with a comparison of the different information needs between rural and urban users, pointing out the potential mismatch between what information has been provided to rural users and what information they really need.

Chapter 6 examines the disruptive influence of digital technologies on everyday information seeking in China. I start with a quantitative analysis of the factors that contribute to the dependence on and trust in the Internet, as well as identifying which social groups face challenges in identifying Internet advertisements and online rumours. The chapter analyses why and how Chinese users are affected by online rumours, and how technology design might lead to an increase of misinformation produced on mobile news and social media. I then examine users' dilemmas in receiving redundant online information and yet still experiencing a lack of information. I also look into the reasons for information anxiety expressed by many Internet users. The chapter ends with a discussion of how Chinese Internet users cope with misinformation, information overload, and the lack of information when they use human and algorithmic proxies.

Chapter 7 summarises the key findings of the thesis, explaining how the study of everyday information seeking can help to understand the role of the Internet in Chinese society. I point to the mismatch between the government's informatisation policies and what Chinese Internet users need in daily life, as well as the disparities in online information seeking among different social groups. I also extend the findings in this thesis to the wider study of ICTs in other developing countries, discussing how the everyday use of digital technologies contributes to the development of information societies in the Global South. More importantly, I highlight the importance of user-centric research design in understanding the role of digital technologies for individual, social, and economic development. While digital technologies have created new channels of information seeking and sharing, the research has shown that researchers, policymakers, and technology companies need to consider the needs of the left-behind, disadvantaged, and marginalised Internet users. I also point out the disruptive consequences of digital technologies in draining users' attention with low-quality information and spreading rumours.

Chapter 2 Literature Review

Over the past few decades, many scholars have contributed to the study of the internet in China. These include the role of the Internet in maintaining social networks (McDonald, 2016; X. Wang, 2016), revolutionising labour markets (J. L. Qiu, 2016), and mobilising social movements (King, Pan, & Roberts, 2013). However, little research has focused on the role of the Internet on everyday information seeking practices in China. In this chapter, I will first start with reviewing models and theoretical frameworks on information behaviours and daily information practices. Models of human information seeking practices provide theoretical frameworks for understanding the embeddedness of digital information technologies in everyday contexts. In the second part of the chapter, I will then review empirical studies on the adoption and use of ICTs in everyday life. In particular, I will discuss how domestication theory can provide a framework for studying everyday uses of the Internet. In the third part of the literature review, I will summarise empirical studies about digital divides or information divides and explore whether different adoption and use of ICTs results in a new form of social divides. The chapter will provide a review of three fields across different social science disciplines, including research about information seeking practices in information science, technology adoption and use in the social science understanding of the Internet, and digital inequality in sociology and communication science. The combination of theories and empirical studies across different social science fields will provide a comprehensive picture of everyday information practices in the digital era and will show gaps in the field.

2.1 Information seeking practices in the context of everyday life

How do users search for information to meet their general or context-specific information needs? What are the factors that influence success or failure in seeking information in everyday life? These are questions that have often been asked and explored

by information scientists who are interested in understanding information behaviours from a user-centric perspective.

Studies of communication behaviours focus on how messages are delivered from senders to receivers. This topic overlaps with the research on information seeking behaviours. Communication channels are defined as information sources, and noises or disruptions in the communication process are interpreted as misinformation (such as rumours) or disinformation. Compared to communication studies, information seeking research puts more emphasis on the individual or environmental factors associated with individual information seekers (message receivers or audiences in communication studies) (Wilson, 1999). Applied to the study of ICTs, information seeking research provides insights into the interaction between users and digital technologies by focusing on users' contexts and the social environment of their information seeking practices, including intervening factors or social or cognitive barriers in the process. As Wilson emphasises, information scholars need "an examination of the information sources and systems used by the information seeker to an exploration of the role of information in the user's everyday life in his work organisation or social setting" (Wilson, 2006, p. 666)

2.1.1 Models of information seeking

Many social science disciplines are interested in studying the flow and exchange of information. For example, economists are interested in exploring how market information influences economic behaviours, communication scholars are interested in understanding the role of media in broadcasting information to the public, and those in organisation studies are interested in how information spreads within social groups. Nevertheless, most of the social science research on human information practices primarily focuses on the sharing or exchange of information rather than the seeking and processing of information. Some studies of information seeking practices in work and

everyday life contexts have nevertheless provided a theoretical lens to understanding the interaction between users and information sources. These researchers also suggest models that take into account the social, cultural, and technological environment in which users work and live.

Wilson (1981, 1997, 1999, 2006) proposed a model of information needs and information seeking to understand the interconnections among information users' needs, information seeking behaviours, and successes or failures in information seeking. He argues that users' information needs are situated at the personal level, influenced by their physiological, affective, and cognitive states, and can also be contextualised within users' social roles and their social, economic, political, and technological environments. Wilson's information seeking model includes both active searching and information acquisition as well as passive attention and passive search. He also points to the importance of adding the stress and coping strategies of information users in information seeking models.

Brenda Dervin's (1998) sense-making model is both a theoretical framework and a "methodological approach" to information seeking behaviours (Dervin, 1999, p. 728). Emphasising the understanding of how users think, feel and want, she focuses on the complexities of user experiences in encountering problem-solving situations, and how the information seeking process helps make sense of the problems in such contexts and bridges the gaps in knowledge. Instead of blaming information users for not being able to use information systems efficiently, Dervin recommends a broadening of the concept of the information seeking process from the interaction between users and information system to understanding the barriers users encounter in information seeking. This can help researchers understand not only the use of the existing information system, but also illuminates alternative information strategies that users apply to bridge gaps in an

information seeking context. As Dervin highlights, "(Sense-making) opens up to examine the ways in which information helps rather than assuming, as most studies have, that help is inherent in information" (Dervin, 1999, p. 745).

While sense-making helps scholars to understand the gap-bridging process in information seeking, one underlying assumption of the theory is that users are aware of the problem-solving situations they have encountered. However, in real-life information seeking practices, users might need information not for problem-solving but for other purposes, such as looking for information to confirm their beliefs about social issues. Or again, in some cases, users seek information rather passively, through information monitoring, without having particular problematic situations in mind. Furthermore, although Dervin acknowledges the importance of the social environment for sense-making, her theoretical framework tends to focus mainly on individuals' emotional or cognitive processes. With little attention paid to the role of social networks or the community within which the individual lives, it makes the framework difficult to apply in combination with sociological theories of social stratification. Nevertheless, Dervin's sense-making approach encourages information research to value concrete details of users' everyday lives that will contribute to understanding of information seeking, including their frustrations and satisfactions, commonalities and exceptions, barriers and solutions.

Based on empirical studies of information seeking practices, theoretical models were developed to summarise different stages in information seeking (Ellis, 1993) and to describe search processes from the users' perspective (Kuhlthau, 1993; Kuhlthau, Heinström, & Todd, 2008). Some models emphasise users' emotions during the information seeking process: as Kuhlthau explains, her focus is on users' emotional

change from a feeling of uncertainty to confidence, “they (users) are seeking meaning rather than merely collecting information” (Kuhlthau, 2016, p. 79).

Despite efforts to conceptualise human information seeking behaviours with different theoretical models (see Table 1 for a summary of information seeking models), it is often difficult to break these down into testable hypotheses that yield correlational or causal relationships between psychological, organisational, or social factors, information needs, and information sources (Järvelin & Wilson, 2003). To compensate for the lack of testable hypotheses in information models, Järvelin proposes to first study human information behaviour through a bottom-up approach as a pre-theoretical stage and test observed phenomena through the top-down approach such as experiments or simulations (Järvelin, 2016). Ingwersen and Jävelin (2005) also include algorithmic information sources such as information retrieval systems in their model of information seeking. The combination of information seeking and information retrieval (IR) research has added both human and algorithmic actors in information indexing (or ways of prioritising or organising information), which has implications for the study of information seeking practices in the digital era. While IR systems improve the efficiency in locating a piece of information from a large database, the authors argue that the algorithms are “designed on the basis of topical relevance only” (p.10) and lack the understanding of users’ needs.

Table 1. Summary table of information seeking models

Author	Name of the model	Key points
T.D. Wilson	Information needs and information behaviour	Information needs as the foundation of information seeking behaviour; Type of information seeking: passive attention, passive search, active search, ongoing search;
Brenda Dervin	Sense-making	Users seek information to bridge the gap in problem-solving situations; Examining details such as emotions, needs, and wishes of users in sense-making processes.
David Ellis	Information seeking patterns	Starting → extracting → chaining → differentiating
Carol Kuhlthau	Information Search Process (ISP)	Information search process stages: initiation, selection, exploration, formulation, collection, presentation; Unexpected uncertainty and anxiety during the process; Emphasising cognitive, affective and physical dimensions of information seeking.
Peter Ingwersen Kalervo Järvelin	Integrated Information seeking and Retrieval (IS&R)	Information seeker embedded in a social, organisational and cultural context; Both human and algorithms could become information indexers to provide information; Include the Human-IT interaction in the framework.

2.1.2 Encountering information and serendipity

With an increasing diversity of information channels available on the Internet, users sometimes encounter useful information without purposefully seeking it. Information scholars have called this kind of discovery of information "information encountering" (p. 25), which occurs when users bump into information in their daily routines (Erdelez, 1999). The experience of information encountering is also termed as serendipity, which defines both the condition and the strategy of the knowledge creation process when users' mental efforts do not lie in constant monitoring of information sources. However, unlike information encountering, serendipity could "go beyond accidental" and could be "actively sought" (Foster & Ford, 2003, p. 336); that is, users might look to serendipitous sources to provide them with information.

Compared to other information seeking practices, whereby locating information is the purpose of the information activity, information encountering is often the by-product of other everyday activities (Fisher, Landry, & Naumer, 2007). However, there

are different types of information users when it comes to the experience of information encountering, with some more aware of information acquisition through information encountering than others. Research has shown that those information users who are active in purposive information seeking are also active in information encountering. Users who rely on passive monitoring of information in information seeking are also less motivated in information encountering (Pálsdóttir, 2010). Users can benefit from having higher sensitivity in information encountering and increasing the diversity of information channels, mainly through making unexpected connections between existing information sources such as persons, events, locations, or subjects on one side and users' informational or non-informational needs on the other (Makri & Blandford, 2012a, 2012b). Researchers have also shown that the user has to be open-minded towards new information channels and be willing to accept new ideas in order to benefit from information encountering (Foster & Ford, 2003).

Digital platforms differ in their potential to facilitate information encountering. Researchers have compared digital environments for their role in supporting serendipity and found that platforms that are *trigger-rich, enable connections,* and *lead to the unexpected* have higher potentials to support information encountering (McCay-Peet, Toms, & Kelloway, 2015). Social media outperform other digital environments in increasing users' chances of information encountering. Some social media embed the following features in the platform design: *reachability to a wider audience, fast information dissemination, personalisation and information feeding system, timeliness of updates, documentation of knowledge and experience, and retrievability* (Panahi, Watson, & Partridge, 2015). Many other studies have shown the complexities of information encountering or user experiences of serendipity. Nevertheless, there is a lack of studies that compare how different types of information users, with various strategies in

information encountering and differentiated levels of digital skills, are influenced by this passive approach to information acquisition.

2.1.3 Information seeking in everyday life contexts

As mentioned by many information scholars, the study of information seeking behaviours is highly contextual. Thus, researchers have highlighted the necessity to examine information behaviours within different contexts. Ingwersen and Järvelin (2005) emphasise the "situational nature of information and on assuming persons' work tasks or cultural interests, and information needs based on them" (p.2). They also argue that differences in information contexts influence the choice of information sources. Therefore, they recommended evaluating the merits of an information model on information seeking behaviours by whether or not "an information actor (is) immersed in his or her situation and information environment" (p.14). However, most of the current research on information seeking practices has focused on professional or work-related contexts rather than everyday life contexts such as health or leisure. Few information seeking scholars extend their focus from the academic and professional settings to everyday life and have produced theoretical frameworks for studying information seeking in daily life.

The main exception is Savolainen (1995) who first introduced the theoretical framework of everyday life information seeking (ELIS) for the study of human information behaviours in nonwork-related contexts such as healthcare or hobbies. Compared to information seeking in the occupational or professional setting, everyday life information seeking is "less systematic and more intuitive" (A Spink & Cole, 2001, p. 303). Drawing from Bourdieu's sociological theory of *habitus*, which refers to the skills, habits, and knowledge accumulated from experiences in individual's lifeworld, Savolainen constructed the framework of everyday life information seeking on the basis

of "way of life". Way of life refers to "the basic context in which problems of nonwork information seeking will be reviewed" and includes both "objective and subjective elements" that constitute everyday life (Savolainen, 1995, p. 262). Individuals' information seeking is influenced by both their social status and cultural capital and their ways of life, which are, in turn, shaped by personal values and beliefs.

Savolainen also distinguishes the seeking of orienting information as against practical information. While seeking practical information aims to find solutions to problems, orienting information provides the background to the problems and situations. However, the two types of information are interchangeable: orienting information describes a more passive exposure to information, but it constitutes a large part of everyday information seeking scenarios. When comparing the information seeking practices of middle-class as against working-class users, Savolainen found that workers seem to depend more on immediately available information sources than the middle-class users, which he considers problematic because information accessibility does not necessarily translate into information quality. McKenzie (2003) has highlighted the importance of studying non-active or non-purposeful information seeking as a significant type of everyday information practices. She summarised four phases of information practices in everyday life information seeking: *active seeking contact or asking questions*, *active scanning or browsing information sources*, *non-directed monitoring and information encountering in unintended places or contexts*, and *information seeking by proxy with the help of a gatekeeper*. Compared to Savolainen's model, McKenzie gives equal importance to active and non-active information seeking and therefore broadens the concept.

Empirical studies of information seeking practices are often embedded in a specific context in everyday life, for example, in music (Laplante & Downie, 2011),

parenting (Loudon, Buchanan, & Ruthven, 2016), child development (Given et al., 2016), education (Liu, 2010), fiction books (Ooi & Liew, 2011), or healthcare (Yeoman, 2010). Hektor (2001), conducted one of the early empirical studies on everyday use of the Internet which also ranged across various contexts and he suggested a categorisation of seven information seeking contexts depending on individuals' "life-activities" (p. 282), including *caring for oneself*, *caring for others*, *household care*, *reflection and recreation*, *transportation*, *procuring and preparing food*, and *gainful employment*. Such a categorisation of information seeking practices helps to tie information research with the users' lifeworld, which in turn helps to understand the social implications of technologies.

2.1.4 Everyday life information seeking (ELIS) used in empirical research

Table 2 provides a summary of empirical studies using the ELIS framework. Previous research on everyday life information seeking has found that with the adoption of ICTs, the Internet or mobile phones have become an essential information resource (Agosto & Hughes-Hassell, 2005; Savolainen, 1997). Information from offline social networks still plays an important role in assisting information users to solve day-to-day problems (Huotari & Chatman, 2001; Loudon et al., 2016). However, new platforms such as social networking sites (SNS) or online forums help users to establish new social connections or maintain existing social ties on the Internet. They help users to cross the boundaries between offline and online social networks and to find information from sources beyond users' immediate social circle (Eynon & Malmberg, 2012). Researchers have found that SNS platforms such as Facebook are viewed by users as more than a tool for social networking but also as channels for seeking information to meet everyday information needs (Sin & Kim, 2013). As Spink and Cole (2001) have argued, the Internet has an interactive potential and can bring hybrid information sources to a broader audience across diverse social sectors.

It is also worth noting the influence of digital technologies on facilitating everyday information practices and the diverse ways that digital technologies are used by various social groups. Further, with the increasing prevalence of algorithmic recommendation systems, we need a reflexive analysis of information seeking practices on emerging digital platforms (Davenport, 2010) which connects how algorithms shape information with how users understand this shaping process. Therefore there is an increasing need for "empirical research efforts to analyse how specific communities use various conceptual, cultural, and technical tools to access printed and digital documents and to evaluate and create knowledge"(Tuominen, Savolainen, & Talja, 2005, p. 342).

. Summary table of empirical research on everyday life information seeking (ELIS)

Title	Author	Year	Group	Method	Data type	Findings	Notes
Everyday life information seeking: Approaching information seeking in the context of "Way of life"	Reijo Savolainen	1995	Teachers and industrial workers	Interviews (N1 = 11, N2 = 11)	Qualitative	1.Putting ELIS in individual's "way of life" – social status, social capital, values, and media system; 2.Comparing middle-class and working-class information users: 1) different media preferences; 2) different dependence on immediately accessible information sources; 3. Calling for longitudinal research on ELIS.	Focus on non-work-related information seeking such as healthcare and hobbies.
A model of information practices in accounts of everyday-life information seeking	Pamela J. McKenzie	2003	Canadian women pregnant with Twins	Interviews (N = 19)	Qualitative	Using a two-dimensional model of information practices that consists of four modes of information practice: active seeking, active scanning, non-directed monitoring, and by proxy	Broadening the types of information seeking practices, which includes non-direct information acquisition.
People, places, and questions: An investigation of the everyday life information seeking behaviours of urban young adults	Denise E. Agosto, Sandra Hughes-Hassell	2005	Teens aged 14-17	Written activity logs and semi-structured group interviews (N = 27)	Qualitative	1. Heavy preference for people as information sources; 2. Schoolwork, time-related queries, and social life as the most common and most significant areas of ELIS.	
Using everyday life information seeking to explain organizational behaviour	Maija-Leena Huotari, Elfreda Chatman	2001	Top management and other sectors within the university in Finland	Semi-structured interviews (N = 14)	Qualitative	1. Applying small-world theory to explain organizational behaviour; 2. Linking theories such as social types, insiders and outsiders, worldview, social norms, information behaviours, and trust.	Using a social network perspective to understand information seeking behaviours in everyday contexts; "A promising area of future research concerns the

							fundamental role that trust, and social norms play in the creation of social values." (p. 361)

Table 2. Summary table of empirical research on everyday life information seeking (ELIS), continued

International students' everyday life information seeking: The informational value of social networking sites	Sei-Ching Joanna Sin, Kyung-Sun Kim	2013	International students in US	Survey analysis (N = 180)	Quantitative	1. Majority of respondents frequently use SNS for ELIS; 2. SNS emerged as the only positive predictor of perceived usefulness of acquired information in meeting daily needs.	Use of SNS for information seeking in a cross-cultural adjustment process
Introduction to the special issue: Everyday life information seeking research	Amanda Spink, Charles Cole	2001	-	-	Review	1. Understanding ELIS from diverse cultural and social situation perspectives; 2. Development of generalisable process models and hold across situations; 3. Integration of ELIS theories and models within a broader human information behaviour context.	Internet has a potential of being an interactive and hybrid information flow channel
Gaining access to everyday life information seeking	Robert F. Carey, Lynne E.F. McKechnie, Pamela J. McKenzie	2001	Pregnant women; Members of a self-help support group; Preschool children	-	Review	Gaining access to the field site in ELIS studies.	Reflection of research experiences of conducting ELIS
The utilitarian and hedonic outcomes of music information seeking in everyday life	Audrey Laplante, J. Stephen Downie	2011	18-29 years old younger adults	Interviews (N= 15)	Qualitative	Acquisition of music and the acquisition of information about music contributed to satisfaction.	Context-specific: music

Table 2. Summary table of empirical research on everyday life information seeking (ELIS), continued

Conceptions of the Internet in everyday life information seeking	Reijo Savolainen, Jarkko Kari	2004	Information users in Finland	Interview (N = 19)	Qualitative	1. Conceptions of information sources are socially and culturally conditioned constructs by which people make sense of their information environment; 2. Most interviewees faced difficulties in trying to provide elaborate definitions for the Internet.	Conceptions of the Internet as information source
The everyday life information seeking behaviours of first-time mothers	Katherine Loudon, Steven Buchanan and Ian Ruthven	2015	First-time mothers	Participant observation Group interviews (N = 22)	Qualitative	1. Identified information needs of first-time mothers; 2. Analysed the reasons for barriers in information seeking.	"Beyond the shared reality of common experiences and emotional bonds, trust and fear of judgement are key factors influencing mothers' engagements with information sources" P.43
Applying McKenzie's model of information practices in everyday life information seeking in the context of the menopause transition	Alison Yeoman	2010	Participants (patients, staff, and women from the same geographical area) from the menopause clinic	In-depth semi-structured interviews (N =35)	Qualitative	Four themes: making sense of the situation, interpretative repertoires of the menopause, receiving and providing advice, information and support, challenges in encounters with information and support.	Context-specific: health
Social Media and Problematic Everyday Life Information seeking Outcomes: Differences Across Use Frequency, Gender, and Problem-Solving Styles	Sei-Ching Joanna Sin	2016	Undergraduate students in the US between 20 and 24 years old	Online survey (N = 438)	Qualitative	Gender differences in dealing with conflicting information: Females more likely than males to be affected by conflicting information.	Different outcomes of using social media for information seeking in everyday life context

Table 2. Summary table of empirical research on everyday life information seeking (ELIS), continued

Enthusiastic, realistic and critical: discourses of Internet use in the context of everyday life information seeking	Reijo Savolainen	2004	People who are interested in developing themselves by means of free-time study.	Interviews (N = 18)	Qualitative	Three interpretative repertoires were identified: Enthusiastic, realistic, and critical; Central to the critical repertoire is the critical view on the low amount of relevant information available in the Internet.	Source preferences
Selecting fiction as part of everyday life information seeking	Kamy Ooi, Chern Li Liew	2009	Adult fiction readers who are members of book clubs	Interview (N = 12)	Qualitative	Selection of fiction books is influenced by personal characteristics and circumstances and sources from everyday life such as family, friends, book club and mass media.	Context-specific: reading
Watching young children "play" with information technology: Everyday life information seeking in the home	Lisa M. Given, Denise Cantrell Winkler, Rebekah Willson, Christina Davidson, Susan Danby, Karen Thorpe	2016	Australian preschool children aged 3-5	Exploratory observation study (N = 15)	Qualitative	Artistic play; Sociodramatic play; Early literacy and numeracy.	Context-specific: child development
Confessional methods and everyday life information seeking	Elisabeth Davenport	2010	-	-	Review	Tension between realism and nominalism; Alternatives to confessional approach in ELIS research, 1) Information practices-discourse analysis and conversational analysis as a counter movement; 2) Web analysis; 3) Reflexive analysis of platforms, analysis of information ethics.	Review of ELIS methods

Note: Journal articles reviewed in this table were collected using the database: Web of Science Social Science Citation Index (SSCI). All results contain "everyday life information seeking" in the article title. The search query was: TITLE: (everyday life information seeking).

2.1.5 Information needs and information seeking in everyday life in China

Information needs.

Zhang and Yu (2013) reviewed empirical research on the information needs of the Chinese rural population and highlighted that rural users in China have various information needs ranging from information about agricultural technology to market information, income generation information, and policy information. They also pointed to a lack of research focusing on the everyday information needs of rural Chinese users, such as health information or consumer information. Offline information sources such as interpersonal communication, media, and agricultural officers of the government were found by many empirical studies to be the main channels of information acquisition for rural users before the Internet was widely adopted in rural China. A 2006 survey of information sources among rural users showed that relatives and friends, government promotion and TV were the most important information channels in rural areas (Hou, Tan, & Feng, 2006). Empirical research published in Chinese academic journals has provided more recent studies of everyday information seeking and information needs in China[28].

Many empirical studies published in Chinese academic journals focus on the information seeking and information needs in marginalised communities, especially those in rural areas. A 2004 study with around 300 rural residents in 35 villages in Central and Western China found that families with higher income levels are more likely than families with middle to lower incomes to have a diversified range of information sources. Their choice of information channels includes traditional media, offline contact with village elites, government officials, and the Internet (Tan, Wang, & Xie, 2004). Another

[28] I used the CNKI (中国知网) database to find academic articles published in Chinese academic journals.

2009 survey study on information sources and information needs of farmers in 411 counties found that the primary information source for agricultural technologies is through personal exploration and personal experiences, followed by information sharing among relatives and friends. The Internet had not become a source of information on farming technologies. The study also found that when the head of a household[29] (*Huzhu,* 户主) leaves the family to work in urban areas, the family's information sources for agricultural technologies become more conservative. They are more likely to rely on traditional information sources such as face-to-face communication than other families in the village (L. Zhang, Chen, & Zhan, 2009). Chinese information scholars have also examined information seeking practices among low-income families in urban areas. Wang (2004) argues that "due to the lack of information skills, even the middle-class users in urban areas might be 'digitally illiterate' and will become a 'vulnerable group' in the digital era" (p.34). She divided the informationally vulnerable groups into different categories and analysed their information needs. Information users who suffered from disabilities need information on employment, health, and social policies; elderly users need information about emotional support, health, medicine, and entertainment; migrant workers need information about working opportunities, education and training, entertainment, and social networks. A recent mixed methods study on the second-generation migrant workers who are born in urban China but registered as part of the rural population also shows that the information most needed by young migrant workers are vocational training and working opportunities (H. Li, 2011).

[29] A head of a household is registered on the residence card in China. The senior male family member is normally the head of the household.

Everyday Life Information Seeking (ELIS).

Savolainen's ELIS theoretical framework has been frequently applied in user information behaviour research since the 2010s. Table 2 summarises research published on Chinese journals using the framework. Xiao (2011; 2012) introduced ELIS and Chatman's information diffusion theory to Chinese academia. Empirical research on everyday life information seeking in China mainly focuses on marginalised communities such as elderly users (X. Li et al., 2013), migrant workers, urban low-income residents (He & Xiao, 2013; Xiao & He, 2011), and rural users (Z. Han & Lin, 2016). In recent years, a few Chinese scholars have also studied the role of new digital platforms on information seeking in everyday life (Y. Han, Shen, Yuan, & Liu, 2018; Z. Wei, 2014). Wu's (2013) survey with users of Sina Weibo, a popular microblogging service in China, found that the majority of surveyed users follow families and friends they know offline on digital platforms. Only 16.49% of surveyed respondents had used the search function on the microblogging platform to find the topics in which they are interested. Despite political scientists' interest in the role of Weibo in China for social movements and political discussions, users' interest in everyday topics such as health and diet are much higher (83.51%) than political topics (48.45%). A survey of WeChat users also found that the convenience of WeChat for information seeking is one of the most important reasons why people adopted the mobile social application (Q. Zhang & Liu, 2015).

A review of ELIS articles published in Chinese academic journals suggests that there is a methodological difference between ELIS studies conducted by Chinese scholars and Western scholars. Most of the empirical studies published on English-language academic journals apply qualitative methods while many Chinese studies have used survey methods. Compared to the Western scholarly community of ELIS, Chinese ELIS scholars also pay more attention to vulnerable groups and marginalised communities but

lack empirical research on working-class or middle-class information users in urban areas. However, empirical studies on ELIS conducted by Chinese scholars are also too generalised in terms of information seeking contexts and lack in-depth examination of specific types of everyday information such as health, education, or entertainment.

Table 2. Summary table of empirical research on everyday life information seeking (ELIS)

Title	Author	Year	Group	Method	Data Type	Findings	Notes
An Empirical Study of Micro-Bloggers' Everyday Life Information Seeking Behaviors and the Influencing Factors	Minqi Wu	2013	Sina Weibo users	Survey (N = 194)	Quantitative	1.Sina Microblog is the primary source of information for 77.85% of respondents; 2. Compared to 96.39% or surveyed users follow families or friends they know offline on Sina Microblog, only 16.49% of surveyed respondents use the search function on the Sina Microblog; 3. Topics related to everyday life such as health and diet ranked second most popular from a list of Sina Microblog content, followed by popular topics recommended by the platform.	ELIS using social media
Empirical Research on Everyday Life Information Seeking Behavior of Urban Low-income Residents——A Case Study of Urban Low-income Residents in the Haizhu District of Guangzhou City	Yongying Xiao; Lanman He	2011	Low-income residents in urban area (Guangzhou Province)	Interview (N = 50)	Qualitative	1. Medical care, education, and health are the most important information categories for low-income users in Guangzhou; 2. TV is the most important information source for the group; 3. Most interviewees have low digital skills and need children or friends to find information online.	Social group specific: low-income users
Theoretical Study of Everyday Life Information Seeking Behavior: Elfreda A.Chatman	Yongying Xiao	2011	-	-	Literature review	Introducing Chatman's theoretical framework.	Review
Study of We Chat Users' Everyday Life Information Seeking Behaviors	Qingqing Zhang; Jiayin Liu	2015	WeChat users	Survey (N = 250)	Qualitative	The convenience of information seeking function on WeChat ranks as the second important reason for users to adopt WeChat, following the convenience of voice chat.	ELIS on WeChat

Table 3. Summary table of empirical research on everyday life information seeking (ELIS), continued

Review of Research on Everyday Life Information Seeking Abroad:2001-2010	Yongying Xiao; Lanman He	2012	-	-	Literature review	Reviewing ELIS empirical research.	Review
Research on Everyday Life Information Seeking Behavior of Urban Low-income Residents——A Case Study of Urban Low-income Residents in the Haizhu District of Guangzhou	Lanman He; Yongying Xiao	2013	Low-income residents in urban area (Guangzhou Province)	Survey (N=188)	Quantitative	1. Health, social policy and price information are the three most important information categories among survey respondents; 2. More than 81.9% of respondents consider TV as their most important information source; 3. More than half of the respondents have computers at home but only 8% of the respondents know how to use PC Internet.	Social group specific: low-income users
Research Progress on Everyday Life Information Seeking	Yi Han; Peng Li	2012	-	-	Literature Review	Reviewing ELISE empirical research.	Review
An Empirical Study of Everyday Life Information Seeking Behavior of Peasants from the Social Capital Perspective: Taking Jiangsu Province as Example	Zhengbiao Han; Yansheng Lin	2016	Farmers (Jiangsu Province)	Survey (N = 344)	Quantitative	Trust in social networks and willingness to share information with friends are positively associated with efficiency in information seeking.	Social group specific: farmers
Research on Behavior Modes and Influencing Factors of University Students' Everyday Life Information Seeking on Mobile Internet	Wei Zou	2014	University Students	Survey (N = 145)	Quantitative	The most popular mobile Internet activities are reading news, online chat, and online search; Slow Internet speed, unfamiliarity with digital technologies, and superficial information on the Internet are the most important barriers to information seeking on mobile Internet.	ELIS using mobile devices

Table 3. Summary table of empirical research on everyday life information seeking (ELIS), continued

Relationship Between Everyday Life Information Seeking Behavior and Quality of Life of the Elderly with Different Pension Modes	Li *et al*.	2013	Elderly residents in urban areas	Survey (N = 3568)	Quantitative	Elderly users' information seeking practice is positively associated with the quality of life.	Social group specific: elderly users
Utilization Characteristics of Interpersonal Relationships in Everyday Life Information Seeking ——Case studies of College Students in Chongqing	Yi Han; Shen Dongyan; Qing Yuan; Yanxiao Liu	2018	University students	Survey (N = 281) Interview (N = 12)	Mixed methods	1. The most important information needs among university students are entertainment, food, and learning techniques; 2. 90% of students use QQ to seek information from social networks, followed by phone calls and WeChat.	Social group specific: university students

Note: Journal articles reviewed in this table were collected using the database: CNKI, China Academic Journals Full-text Database. All results contain "everyday life information seeking" in the article title.

2.2 Digital transformations: ICTs in everyday life

Since the early adoption of the Internet for civilian use, social scientists have proposed different theories to describe and explain the adoption and diffusion of information technologies in contemporary society. Rogers' (2003) book *Diffusion of Innovations* provided a model of the diffusion process of innovations that has been frequently used to summarise the adoption process of digital technologies. The model includes users' information seeking in different steps, from receiving knowledge of innovation, to the decision of whether or not to adopt the technology, to implementing the technology[30]. As the adoption of the Internet has diffused from elites to middle-class and working-class users, researchers noticed the significant changes brought by digital technologies to individuals' everyday lives. Internet scholars since the 2000s have called for a different perspective to studying the Internet, "not as a special system but as routinely incorporated into everyday life" (Wellman & Haythornthwaite, 2002, p. 6). To date, scholars from different social science disciplines have contributed to the study of ICTs in everyday life from various perspectives. For example, communication scholars are interested in how the Internet provides new ways of connectivity, transforms channels of mass communication, and reconstructs political power (Castells, 2013). Social anthropologists have found the Internet a virtual field site and they have explored the diversity and complexity of social life online (Hine, 2015; Miller, 2016). Scholars who study developing countries examine the mundaneity and embeddedness of the Internet in users' everyday lives in the Global South (Arora, 2019; Jeffrey & Doron, 2013).

The mobile phone, with its portability and affordability, has further blurred the boundary between online and offline communication and information seeking. It is not

[30] The stages include knowledge, persuasion, decision, implementation, and confirmation.

only used in daily coordination with families and friends (James Everett Katz & Aakhus, 2002), but also play an indispensable role in assisting everyday information seeking, as reviewed in the previous section. The versatility of mobile phones has become taken-for-granted by users and become deeply embedded in everyday practice (Ling, 2012). The connectedness of mobile Internet also redefines what constitutes the private and public realms by enabling users to switch freely across different models of connectedness (Schroeder, 2010) and across social circles at different scales (Ito, 2005).

2.2.1 Domestication of ICTs: Theoretical framework and empirical research

Domestication theory was developed by social science scholars to understand how digital technologies have become "tamed", moving from professional and elite uses to gradually become integral parts of domestic life (Leslie Haddon, 2004, p. 4). The theory examines how digital technologies fit into people's everyday lives and assesses the negative or positive impacts of ICTs. What is particularly valuable in this theoretical framework is that it offers both a summary of the process of ICT adoption as well as the consequences of adopting digital technologies in daily practices. Domestication theory provides a holistic account of how users consume technologies in the contexts of everyday life. It theorises the process by which information and communication technologies, including material and non-material aspects of objects and non-material are tamed and reshaped by users. As Berker, Hartmann, Punie and Ward have summarised, "domestication research suggests that only when the novelty of new technologies has worn off; when they are taken for granted by users in their everyday-life context that the real potential for change is visible" (Berker, Hartmann, Punie, & Ward, 2005, p. 14).

Domestication theory originated from studies conducted around the 1990s on new communication and information technologies in the household, including TV, computers, and telephones. Early researchers already noticed the multifaceted implications of ICTs

for individuals and households. The domestication process includes both how individuals and households "include media and media-related activities into their own projects of fixing their identities in time and space" but also ICTs' "mediation of the public and the private sphere" and "their mediation of the global and the local" (Silverstone, 1991, p. 146). Focusing on the intertwined relationship between private and public life and technology use, Silverstone and Hirsch (1992) summarise the four elements of domestication of technologies in a household: appropriation, objectification, incorporation and conversion. The appropriation stage involves the consumption of ICT products or services. The objectification stage is how technology is displayed within the domestic environment. However, as ICTs become increasingly portable and embedded in daily routines outside the home, this stage of domestication needs to be refined, for example, to include when and where the technology is used instead of the place of technologies at home. The incorporation stage describes the process whereby the technologies are integrated as part of daily routines. The final conversion stage is when the technologies transcend the boundary of the personal or the household and become symbols of an individual's status in the society.

Many empirical studies have used the domestication theory as a theoretical framework for the study of ICT adoption and use. Domestication studies were predominantly qualitative and with research focusing on households as research units (Hirsch, 1992). One type of research, in particular, studied the domestication of the Internet in disadvantaged families in the Netherlands and in Ireland. This research found that the results of domestication processes vary with users' abilities to access diverse information sources (Hynes & Rommes, 2005). Empirical research also suggests that different stages of domestication process could be non-linear, with some stages overlapping with the others (Ward, 2005). Recent studies of the domestication of ICTs

recognise the role of individual users, instead of households, in taming technologies and giving meanings to artefacts. Empirical research on emerging ICTs has refined domestication theory to reflect how individual users incorporate technologies into everyday information and communication practices in the use of mobile applications (de Reuver, Nikou, & Bouwman, 2016) or mobile Internet (Donner, 2015; James E. Katz & Sugiyama, 2016). Scholars have also applied domestication theory to study the adoption of ICTs in non-Western countries. For example, Lim looked at how Chinese middle-class households usage of the Internet challenged traditional family values (Lim, 2005). McDonald and Oreglia both used domestication theory in their ethnographic study of rural households: They showed the active roles of migrant workers in helping their families domesticate the mobile Internet (Oreglia, 2013) and how different family members shape their own uses of the Internet for individualised functions (McDonald, 2015).

Domestication theory looks both at users' environment in which ICTs are adopted and adapted and also at how technologies reshape users' information consumption in everyday life. However, as scholars have pointed out (Berker et al., 2005), with the widespread use of ubiquitous computing technologies such as mobile phones and mobile applications, ICTs will gradually fade into the background of everyday life. This is particularly true of everyday online information seeking practices where the personalisation and recommendation systems no longer require users' active seeking or searching for information. Against this background, we need a new interpretation and conceptualisation of domestication theory to address the emerging questions related to ICTs in everyday life. How does domestication theory apply to the embedded and everyday use of ICTs for information seeking as the boundaries between the private and public or the global and local almost disappear? Perhaps this question can be addressed

by extending the definition of appropriation, objectification, incorporation and conversion to a perspective that includes information seeking. While most empirical studies have focused on ICT devices such as computers or mobile phones, I propose to extend the research focus to the domestication of emerging information technologies in everyday life. Users start by consuming online information in daily routines (appropriation) before integrating Internet-based information sources as part of their everyday information intake (objectification). Next, Internet users incorporate various online information sources into a personalised diet of information (incorporation) and eventually the combination of certain Internet information choices, which require the mobilisation of individuals' financial or social resources, in turn, become part of one's social status (conversion). This adaptation of domestication theory adds the perpetual connectedness and embeddedness of mobile Internet. It also provides a theoretical framework to study the adoption and use of the Internet for information seeking in everyday contexts. Meanwhile, domestication theory would also benefit from more diverse methods, using both qualitative data such as interviews or ethnography but also adding quantitative approaches such as surveys. In my research, I have adapted the framework of domestication theory in the design of survey questions to understand users' information seeking practices from the appropriation of the Internet, level of engagement in different online activities, incorporation of the Internet in everyday information seeking, all the way to the social consequences (confidence, experience, and barriers) of online information seeking.

2.2.2 Search engines in everyday life

Compared to the study of everyday use of the Internet in general, there are very few empirical studies have explored the use of search engines in everyday contexts. The few exceptions include a longitudinal study of search queries from 1997 to 2001 which

showed a fascinating picture of the change of search interests among users. With the decreasing importance of queries related to entertainment and pornography, there was an increasing search interest in information related to commerce and employment (Amanda Spink, Jansen, Wolfram, & Saracevic, 2002). Using a triangulation of search activity diary, observation, and in-depth interviews, Rieh (2004) conducted a qualitative study on user behaviours on search engines that showed that search engines are used as a directory website to topic-specific sites. Users search for the websites on a specific topic first in the search engine to locate the site for the topic and then search for information within the topic-specific website. The study also showed that the search engine uses at home are different from workplace uses: Users tend to search for a more diverse range of queries at home.

Information retrieval studies have used search logs to understand information seeking practices on search engines. A study conducted by researchers at Google compared the use of mobile and PC search and found that mobile search users mainly searched for "quick answer" type queries and were more likely to satisfy their information needs by the search results (J. Li, Huffman, & Tokuda, 2009). Another study showed that the majority of search queries on Google and Yahoo among users in the Netherlands, for example, were about art, entertainment, and sport, with only one of the top ten queries about society. The same study found that users in some countries such as Germany, Russia, and Ireland, have a more diverse range of search queries than users in other countries (Segev & Ahituv, 2010). A study by Waller examined the transaction logs of Australian users of Google and found that the top queries entered in the search engine are names of specific websites such as Facebook, YouTube or eBay, which echoes the findings of Rieh's research. More than half of the searches in Waller's study were about

popular culture and e-commerce, followed by 15% of queries on cultural practices. Queries about government and policies accounted for less than 2% of web searches.

Waller's study demonstrates that the use of search engines is deeply embedded in everyday life practices. Sundin et al. (2017) analysed qualitative data collected from focus groups and showed that search engines are becoming embedded in everyday lives to the extent that the practice of searching becomes almost invisible to users. This "mundane-ification" of search has also changed the relationship between information users and search engines: Users have higher trust of the algorithms to help them assess the quality of search results and rely on the ranking order as a criteria of information quality (Sundin, Haider, Andersson, Carlsson, & Kjellberg, 2017, p. 224). The search engine has also become an important source of information for users in developing countries. An interviewee from Paul's study in India used Google to find causes and diagnoses of her child's infection after having difficulties in understanding the doctor's prescription in a consultation (Paul, 2015).

Very few empirical studies have examined the role of search engines in everyday life contexts among Chinese users. Jiang (2014) and Fuchs (2015) both examined the popular search engine Baidu in China from a political economy perspective. Some empirical studies published in Chinese academic journals have used quantitative methods such as mobile logging software or transaction log analysis to study the daily use of search engines in China. A study of 30 university students documented 15 days of mobile phone applications usage with the mobile logging application AWARE (D. Wu, Liang, & Tang, 2017). The study shows that cross-application search on the mobile phone is very common, with more than half of mobile search using two mobile apps (52%). Searching within one mobile app only accounts for 17.52% of all search logs. The study also suggests that users spent the longest time on the mobile Internet on online browsing

and searching, followed by mobile shopping. Among all the information needs, users spent the longest time looking for health-related information on mobile search. Another empirical study collected 283 million Chinese users' logs in May 2009 and provided many detailed findings on the search behaviours of Chinese search engine users (Cen, Liu, Zhang, Ru, & Ma, 2010). The authors found that more than half of users revise the search query after their first search, indicating dissatisfaction with the initial search result. Only 11.9% of searchers use the recommended search queries provided by the search engine. Interestingly, the researchers found that very few (2.96%) searches use interrogative pronouns such as "why" and "what" to ask questions in the search engine. More than half of users make their first click of the search result within 5 seconds after the search query. However, I have found that most of the empirical studies on user behaviours on search engines in China are published in Chinese and also lack comparisons with Western users.

2.2.3 Algorithmic recommendation systems and "filter bubbles"

Algorithmic recommendation systems are an emerging area of research in everyday uses of the Internet. Nowadays, an increasing number of mobile applications, including e-commerce platforms, mobile news, online music and video sharing platforms, are feeding users with recommendations generated by calculating users' browsing history or demographic characteristics. On the one hand, this transformation of customised news world has brought personalised information directly to the users and has reduced their time spent on seeking news. On the other hand, recommendation systems which depend on user behaviour and network data might amplify the "filter bubble" effect leading to the polarisation of public opinion (Sustein, 2007). While many communication and political science scholars have focused on the influence of media exposure and the echo chamber effect using social network analysis methods (Moller, Trilling, Helberger, & van

Es, 2018), few empirical studies have looked at the influence of recommendation systems on everyday life.

Some empirical studies have pointed to an optimistic future of algorithmic recommendation systems in information seeking. An experiment on music application users found that the recommendation system increased the commonality among users and broadened users' music interests but the authors found no evidence of a fragmentation of users' networks (Hosanagar, Fleder, Lee, & Buja, 2014). A long-term study looked at how mainstream media agencies have implemented personalisation system in delivering news content to their audience (Kunert & Thurman, 2019). The study showed a balance of users' autonomy and AI-assisted news reading experience whereby users are provided with reading choices from editor-picked content or receiving personalised news content. Another study collected the Google accounts of 168 users and used their accounts to search for news during the 2016 US Presidential Election on Google (Nechushtai & Lewis, 2019). The study found that the search results of news about the election for conservative and liberal users were almost identical, rejecting the commonly held assumption that the personalisation function on search engines will lead to the fragmentation of media information. A mixed-methods study published in 2019 used both mobile logging software and qualitative interviews to explore the impact of recommendation systems on mobile news consumption (Van Damme, Martens, Van Leuven, Vanden Abeele, & De Marez, 2019). The findings suggest that peer recommendations of news through social media offer less diversity in topics than algorithmic recommendation systems and that some skilled users start to personalise the algorithmic recommendation system on their social media.

2.3 Digital inequalities in access, use, and information seeking

While information seeking models provide an abstract description of human information processes, information scientists often focus more on how information is sought than on how the information is processed or consumed by users. In other words, these models cannot reveal the social implications of seeking information. Part of the problem lies in the over-emphasis on users' psychological and emotional processes during the information seeking practices, which, as Wilson has rightly pointed out, "is not directly observable" (Wilson, 1997, p. 567). However, one way to evaluate the consequences of information seeking is to evaluate it from a different perspective; namely, how the different approaches to and the resources and competencies in information seeking practices are shaped by and influenced by users' social status. In this vein, scholars who developed or used domestication theory have also linked the theory to Bourdieu's concept of social and cultural capital and situate the domestication of ICTs in existing social structures (L. Haddon, 2007). Both information and communication scholars have been studying the topic of digital divides or digital inequalities since the early 2000s. Over the years, digital divide researchers have examined the various dimensions of digital inequality, including the demographic, socio-economic, and technical factors behind the divides. In this section, I will review some of the influential work on digital divides and discuss how the research on digital inequalities will have theoretical implications for the study of information seeking practices.

2.3.1 Digital divides research

Early research about digital divides noticed the problem of different adoption levels of ICTs between urban and rural users and started to question the utopian view that the digital revolution will benefit every member of the society (Lentz & Oden, 2001; Parker, 2000; Rideout, 2000). Many survey studies conducted in the 2000s suggested that

older users are less likely to have access to the Internet (Loges & Jung, 2001) and mobile phones (Rice & Katz, 2003). Using national survey data collected from 1995 and 1998, Hindman (2000) showed that the adoption of ICTs is more strongly associated with socio-economic and demographic factors (age, education, gender, and income level) than metropolitan/non-metropolitan residence.

As more empirical studies showed the complex mechanisms behind digital divides, scholars such as Selwyn (2004) and Hilbert (2011) refined the concept of digital divides. They included not only access and use of ICT hardware such as PC or mobile phones but also engagement in software such as information and services. Donner (2015) systematically analysed the use of mobile internet in developing countries. He suggested that the features and functions of the mobile Internet both fuel the penetration of internet access and yet pose new challenges for digital inclusion. He proposed an "after access lens" to consider the increasing divergence in internet devices, quality of the connection, affordability of connectedness, and digital skills. Recent empirical research that was conducted to study beyond the "first-level digital disparities" in access has examined "second-level digital inequalities" in the use of the Internet (Robinson et al., 2015, p. 570). For example, van Deursen and van Dijk (2011) made how users participated in different types of online activities into a dimension of digital divides. Using Confirmatory Factor Analysis (CFA) on survey data related to Internet usage activities, they identified seven types of uses: information, news, personal development, commercial transactions, leisure, social interaction, and gaming. They found that age and gender are the most important factors accounting for differences in Internet usage activities. Using the Internet as an information source might have a positive influence on individual's social status: A survey study of US Internet users showed that the informational use of the

Internet is most strongly associated with higher socio-economic status (L. Wei & Hindman, 2011).

Many scholars have criticised the dichotomous division of information rich and information poor. Instead, they have suggested that digital divides are "hierarchical rather than dichotomous" (Selwyn, 2004, p. 348) or recommended the use of "a continuum of digital inclusion" (Livingstone & Helsper, 2007, p. 684). Some researchers have studied factors that are associated with users' various motivations for using the Internet and their different levels of digital skills. Davis and Eynon's (2018) research with young people's technology practices identified different types of users: non-conformists, PC gamers, academic conservatives, pragmatists, and leisurists. Van Deursen and van Dijk, in contrast, defined four types of digital skills: operational, formal, information, and strategic skills. Interestingly, they found that the elderly performs worse than young users in using operational and formal skills but are not significantly different from the younger generations in information and strategic skills, holding other variables constant. It is also worrying that only operational Internet skills grow as users have increased Internet experience. As an increasing number of online tasks require more skills beyond the basic operational skills, the lack of the other three types of skills, which do not necessarily increase as users spend more years online, could result in digital disadvantages. As the authors warned, "while originally the digital divide could be 'easily' addressed by providing physical access (to ICTs), this now seems to be much harder when content-related internet skills are considered" (A. van Deursen & van Dijk, 2011, p. 909).

2.3.2 Information divides

Information scholars have contributed to the theory development related to digital divides by studying how different social groups seek and share information. Elfreda Chatman has focused on the information world and information seeking behaviours of

the working-class and impoverished information users. Driven by her research interest in the relationship between economic poverty and information poverty, Chatman applied theories from the sociology of knowledge to understand the difference between insiders and outsiders, the impact of information secrecy, deception, and lack of trust in prohibiting the sharing of information. Chatman (1999) also borrowed the sociologist Robert Merton's distinction of cosmopolitan and local to distinguish users who are interested in the wider informational environment beyond the community and users who narrow their information focus on their immediate surroundings. Thus one of the important contirbutions of Chatman's theory of information poverty is her combination of information seeking research with sociology. For example, she argues that "information poverty is partially associated with class distinction", She also explored the impact of social networks on information poverty and found that the insiders of an impoverished community suffer from a lack of information because the outsiders' withholding of "privileged access to information"(Elfreda A. Chatman, 1996, p. 197). Chatman summarised the information seeking experiences of the poor as that "they live in an impoverished information world" and that information sources in this world is limited in "new possibilities" and their "perceptions about reality are not adequate, trustworthy, and reliable"(Elfreda A Chatman, 1991, p. 440).

Meanwhile, the huge amount of information content and information sources available on the Internet creates new challenges for inexperienced users who need to navigate the Internet for information seeking. Empirical research on the use of digital technologies for information seeking has found that socioeconomic and demographic variables such as gender are associated with the outcomes of information seeking practices (Sin, 2016). Savolainen and Kari studied how information users conceptualised the Internet and found that many users have difficulties in defining the Internet, with

some of them viewing the Internet as indefinite and information sources "poorly organised"(Savolainen & Kari, 2004, p. 225). Difficulties in acquiring relevant information needed also leads to a critical repertoire view of the Internet among users who are interested in information seeking for personal development purposes, leading to a negative and reserved viewpoint on the Internet (Savolainen, 2004).

One of the barriers reported in many empirical studies is the difficulty among some users to cope with anxiety and disorientation from receiving too much information (Loudon et al., 2016). Hargittai and Neuman's (2012) research on information overload found that while most of the users do not feel overwhelmed by the amount of online information, they are disappointed by the quality of some online information sources such as social media.

2.3.3 Digital divide research in China

Previous research on ICTs in China has shown digital divides among different social groups in China. Instead of using the dichotomous distinction of information haves and have-nots, Cartier, Castells and Qiu (2005) defined some socially vulnerable populations in urban China such as migrant workers and laid-off workers as information have-less users. Information have-less users only have access to inexpensive low-end devices and use basic functions on mobile phones. Qiu's book on have-less users in urban China shows both the opportunities and limitations of working-class ICTs. More important than the cheap gadgets, he argues, are "the inferior market positions and the general lack of social power" among the have-less users to "better their life chances" using ICTs (J. L. Qiu, 2009, p. 235). Also based on fieldwork in urban China, Cara Wallis' (2013) book focuses on the use of mobile phones among female migrant workers in the service industry. While mobile phones help female migrant workers to enhance social connections with their families and friends, their mobile phone usage, however, is

prohibited in workplaces. The use of mobile devices is also limited to basic functions such as making phone calls due to the lack of literacy skills and digital competency among female workers. Oreglia studied the adoption and use of ICTs in rural and urban China and the role of migrant workers in giving mobile phones as gifts to their families in the village (Oreglia, 2015). She found that in rural China, ICTs are mainly used for leisure and maintaining social connections, not for information seeking about markets and farming techniques (Oreglia, 2013). Her rich ethnographic research also documented how rural users adopt ICTs in everyday practices as, for example, when rural residents picked up new skills on mobile phones or used online information to facilitate personal development (Oreglia, 2014).

Several empirical studies have studied digital divides or information inequality in China. A macro-level study in China found that digital divides had been widening until the arrival of mobile Internet in the mid-2000s when digital divides among Chinese provinces started to narrow (Loo & Ngan, 2012). Murphy (2010) looked into the shrinking of digital divides in China and found that local governments played important roles in providing training sessions for civil servants and setting up information centres that serve local farmer's agricultural needs. School education on digital skills has also helped to bridge the digital gap between rural and urban areas. Yet studies have shown that the adoption of Internet services is associated with rural or urban residence and other demographic factors such as age, education, and gender (Zhu & Chen, 2013). Most research on digital divides has been based on a Bourdieusian theoretical framework, viewing ICT use as a form of cultural capital. Schroeder (2015) analysed digital divides in China from a Weberian perspective which views digital divides in China resulting from information control by the party elites. And yet the adoption of ICTs by the grassroots in China, as he argues, has created "strong possibilities for using new technologies that have

not yet been bounded by government control - though they are increasingly subject to market pressure" (p.2828).

Liangzhi Yu (2010) conducted a series of empirical studies on information poverty and information inequality in China, using interviews and diaries of information practices. She defined three dimensions of information inequality: 1) information resource bases – the range of choices individuals have to seek information, 2) information practices – the process of individual's information seeking, and 3) information assets – individual's information resources that have economic value. She considered information poor users as disadvantaged in all three dimensions. In terms of information practices, Yu found that the practices of the information poor are confined to local level and they only receive information through incidental encountering.

Thus, digital divides involve not only the basic adoption and use of ICT devices but also users' engagement in various Internet activities and everyday information seeking. Previous research on digital divides provides empirical evidence of the influence of socio-economic, demographic, technical, and informational factors related to digital disparities. Nevertheless, most of the empirical studies about digital divides lack in-depth and mixed methods analysis about the consequences of different information sources and practices. The challenge as well as the opportunity in contributing to theorising digital divides is to bridge individual-level domestication of information technologies and the social consequences at the macro-level. As Yu (2011) has pointed out in her review of theories on information inequality, we need theories that can bring together individual and society, or agency and structure, to develop an inter-disciplinary understanding of digital divides.

2.4 Summary of literature review

In this chapter, I have reviewed theories and empirical studies in three areas related to everyday information seeking on the Internet: 1) everyday information needs and information seeking models, 2) domestication theory and studies of everyday uses of search engines or algorithmic recommendation systems, and 3) digital divides or inequality. Figure 9 provides a diagram of the three areas covered by the literature review.

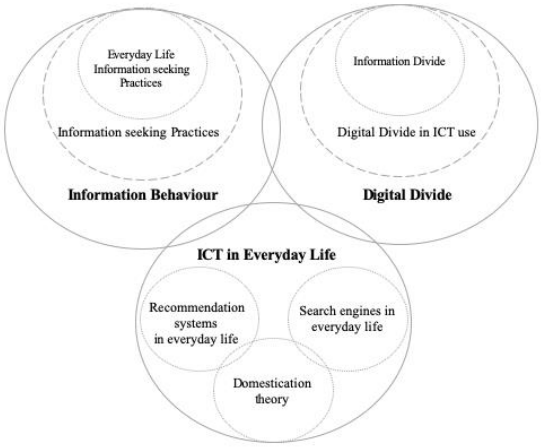


Figure 9. Diagram of the three research areas of the literature review

A group of information scholars have shifted the research focus from information systems to information users and the social environment around the users. The development of different information models provides a holistic perspective in understanding the information seeking process within the users' own lifeworld. Meanwhile, information theories on serendipity and information encountering take the unpurposeful acquisition of information into account and these theories have implications for studying information practices in the online environment. One of the most important developments in the theory of information seeking is the study of everyday information seeking practices (ELIS), which focuses on non-work-related everyday contexts of information seeking. By using the ELIS framework in different everyday contexts, information seeking studies reveal how information seeking practices constitute users' way of life and vary across different social groups. Empirical research on information

seeking and information needs has focused predominantly on marginalised populations such as migrant workers and rural residents. Nevertheless, there is a growing area of research in China using ELIS as a theoretical framework for empirical studies, but very few of these studies use qualitative methods such as in-depth interviews or ethnography.

Domestication theory studies the process of adoption and adaptation of digital technologies within households by scrutinising how ICTs fit into everyday life contexts and examines the influence of ICTs on the household and on society. However, domestication theory was first introduced before the rise of portable mobile devices. Hence the process of objectification - how ICTs are displayed and incorporated within the household - needs to be refined to be applicable to the new digital environment. Also, as ICTs nowadays become ever more personal and private, we also need to shift domestication theory from the unit of households to individuals. Most importantly, domestication theory provides us with a framework for studying the process of the adoption and use of the Internet for information seeking process and how ICTs fit into everyday information routines. While empirical research has applied domestication theory to the study of emerging ICTs such as mobile apps, there is a gap in the literature that examines everyday uses of search engines and recommendation systems, and how algorithmic gatekeepers influence everyday information seeking.

Discussions centred on digital divides started in the early days of the Internet in the 2000s. Researchers found that different adoption and uses of digital technologies were associated with pre-existing social stratification. In recent years, the focus of digital divides research has shifted from first-level divides such as adoption and access to second-level divides in usage and participation. However, despite some empirical studies about information poverty, very little empirical research has examined digital divides in the divergent use of the Internet for information seeking. Digital divide research in China

in particular has mainly focused on adoption and use divides and lacks mixed-methods empirical studies of digital divides in everyday information seeking practices.

The literature review of the three areas has demonstrated two divisions within the scholarly community. On the one hand, I find a divided scholar community due to disciplinary barriers. Researchers from one area rarely discuss the theories or empirical studies from the other two areas, although all three research areas share some theories (Bourdieu's theory of *habitus*) and there is common research interest in ICTs and similar research methods (ethnographic research or surveys). The lack of cross-referencing to the other areas is due to the boundaries between different social science disciplines. I believe, however, that breaking the boundaries of disciplines will contribute to theory development. For example, digital divide research can compare different use of ICTs at various stages of domestication processes, from appropriation, objectification, incorporation to conversion. Everyday information contexts highlighted in ELIS models can potentially guide digital divide researchers to study variances and disparities in ICT use within different information categories.

On the other hand, there is also a division in the scholarly community due to linguistic barriers. As reviewed in this chapter, empirical research published in Chinese in Chinese academic journals have contributed new evidence and different perspectives to the field, and yet they are inaccessible to the Western academia due to the use of a different language. The Chinese Internet is witnessing a period of rapid development and follows a different trajectory to other countries, and an increasing amount of empirical research on the Chinese Internet is now published only in Chinese. This chapter is only a small step towards connecting the divisions within the academic communities. More systematic reviews and comparisons of research published in Chinese and English on ICTs in everyday life will be needed in the future.

My research on information seeking practices in everyday life contexts in China will therefore try to fill the gaps in the literature in the three research fields that been mentioned and bridge the divisions among scholarly communities. First, I will study information seeking practices embedded in an individual's lifeworld and social environment, bridging the research on structure and agency in information research. Second, I will expand the theoretical framework of domestication theory in exploring ICT adoption and use in information seeking in everyday life contexts, particularly to mobile uses. Finally, based on the previous digital divide literature, I will compare different uses of the Internet for information seeking and examine the divides in the routine, mundane, and everyday uses of the Internet. The combination of literatures from information seeking, domestication theory, and digital divides research will provide the theoretical frameworks for understanding the interactions between information users, technologies and society and will shed light on understanding the social significance of digital technologies on contemporary Chinese society.

2.5 Research questions

As the Internet becomes an integral part of everyday life, its multi-faceted nature poses challenges for a holistic understanding of the role of the Internet. Based on the review of previous literature, we need more empirical studies on the variances of information practices and the influence and social consequences of ICTs on information practices. This study approaches this topic by exploring how people in various situations and with different levels of familiarity with the Internet make use of it in their everyday lives. Using the perspective of everyday information seeking practices can help researchers to understand the impact of digital technologies at the grassroots level. This research aims to understand the divides, varieties of contexts, and specificities of information practices in Chinese society against the background of the pervasive use of

the Internet as a crucial everyday information source. The research will aim to answer the following three questions (see Figure 10 for a diagram of the research questions):

Research Question 1: Do rural and urban residents in China access, adopt and use the Internet differently?

Despite the rural-urban gap in telecommunication infrastructures, mobile Internet has facilitated grassroots adoption among the marginalised population in China. However, studies on the digital divide have identified new dimensions of digital inequalities beyond the adoption of ICTs. In this thesis, I aim to answer if there are rural-urban disparities in the adoption, use, and domestication of the Internet for everyday information seeking practices in China. While studies on digital divides suggested that demographic variables such as age and gender are associated with different dimensions of ICT use, empirical research conducted among Chinese grassroots users demonstrates that socio-economic factors such as having migrant experience accounts for digital advantages. It is therefore important to understand what are the main socio-economic or demographic variables that account for digital divides in China. As the Internet becomes an essential information source in daily life, an individual's competency to seek online information is crucial for everyday problem-solving. Meanwhile, information scholars found that the lack of sophistication in using the Internet for information seeking has resulted in information poverty. The thesis tries to identify the left-behind information users in the digital era and explore the social and technical mechanisms behind information (dis)advantages.

Research Question 2: How do digital technologies change the information seeking practices in different information contexts in everyday life?

Information scholars have categorised users' lifeworld to understand information practices in everyday life in Western academia. However, there needs to be a systematic examination of the categories of everyday information needs among Chinese rural and

urban users. This thesis will focus on how digital media platforms change the ways people seek everyday information across various information categories. Digital platforms such as social media, search engines, and news recommendation systems are important online sources for everyday information seeking. However, previous research has predominantly focused on the adoption, rather than user experiences and feedback on these platforms. The thesis will discuss what digital platforms are considered as necessary and trustworthy information sources by rural and urban users in China. A comparison of online information sources and users' everyday information needs will help identify what types of everyday information are needed, particularly by marginalised population such as rural or old generation users, but not readily available online.

Research Question 3: Have digital technologies caused disruptions in information seeking practices in everyday lives?

Domestication theory suggests that as ICTs become embedded in everyday practices, users also adapt and reshape digital technologies as part of their daily routines. Research question 3 looks at the social consequences of digital technologies for everyday information seeking. Previous studies have suggested the disruptive influence of digital technologies such as recommendation systems in amplifying the filter bubble effect or decreasing the diversity of information diet. Meanwhile, researchers have also found that users with lower levels of digital skills are more likely to experience the lack of information sources on the Internet. In this thesis, I will investigate if online platforms have increased users' choices of information sources for everyday information seeking practices and if inexperienced or new Internet users experience the lack of information while adopting the Internet. Paradoxically, empirical research also suggests users' feeling of information overload in the digital era. Thus, the thesis will aim to reveal the reasons behind the co-existence of information overload and the lack of information sources on

the Internet. Many studies have found that information have-less users experience disorientation while using digital media for information seeking. The thesis will address the issues of misinformation and the spread of rumours in everyday information seeking by identifying the common types and formats of online rumours that users receive, as well as comparing online and offline fact-checking information sources. More importantly, I will compare users' experiences of digital disruptions in rural and urban China and see if there is an information divide in how users cope with information overload and misinformation. Literature review on information proxies shows that both human agencies and new ICTs could assist information have-less users in everyday information seeking. I will explore the strategies that non-users or inexperienced Internet users in China have adopted to cope with the digital disruptions and compare the different roles of human and algorithmic information proxies.

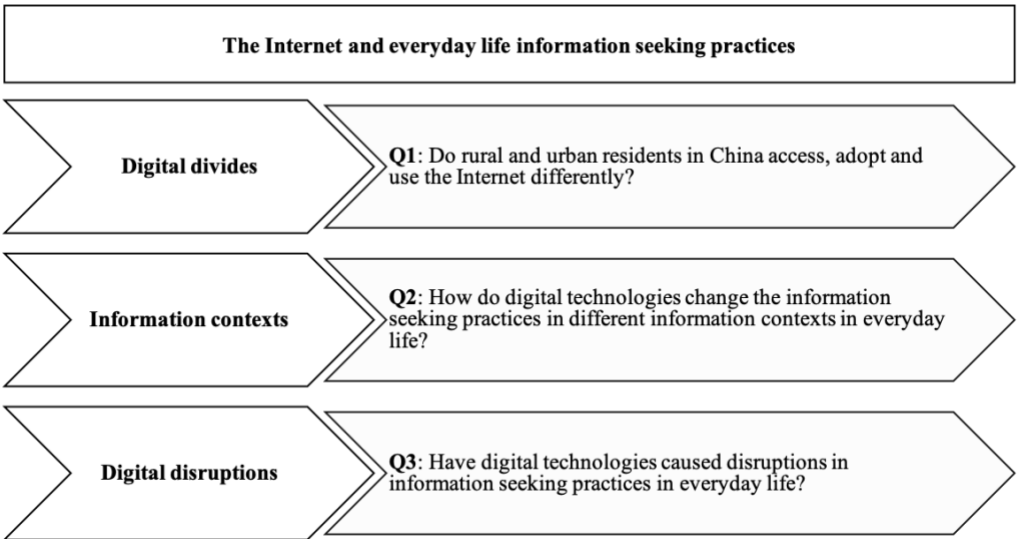


Figure 10. Diagram of research questions

Chapter 3 Method

In this chapter, I will first discuss the rationales for conducting fieldwork in more than one community and will describe the historical, social, economic, and technology background of two chosen field sites: Fossil Village and Western Factory. I will then discuss the main challenges that I encountered as well as some useful strategies that I have used to negotiate access and to establish relationships with gatekeepers and informants in both field sites. The second part of this chapter consists of discussions of the mixed methods design, with descriptions of data collection and analysis process.

3.1 Multisite fieldwork: Rural and industrial communities in Central China

Publicly accessible user data has inspired new approaches to study human information seeking behaviours, helping researchers to identify trends and patterns in human behaviours from large-scale search logs (Cothey, 2002; Ellery et al., 2013) or user-generated content (Bond et al., 2012; Gao, Abel, Houben, & Yu, 2012). However, as the Internet is increasingly embedded and embodied in everyday practices (Hine, 2015), the boundary between the online and offline world becomes less distinct. Users' interactions with the Internet are often influenced by other factors such as offline events, information from social networks, or news reports from traditional media. It is essential for social science researchers to incorporate "small data" that is collected offline to provide a comprehensive understanding of the ongoing digital revolution (Lazer, Kennedy, King, & Vespignani, 2014).

Meanwhile, large-scale social media data may have population biases that lead to underrepresentation of certain social groups, particularly the marginalised communities (Ruths & Pfeffer, 2014) which still accounts for a high percentage of Chinese Internet users. Exploring information practices in everyday life through long-term fieldwork in the local communities is therefore essential for understanding the social, economic, and

cultural environments in which Chinese Internet users live and work. The 15-month fieldwork was divided into three parts: before entering the field sites and starting data collection in two field sites, I spent one month in the summer of 2016 and four months in 2017 in the county centre, Happy Valley, to familiarise myself to the culture, language, and economic life of the area. The first part of fieldwork was conducted in Fossil Village between the spring and autumn of 2017, and the second fieldwork undertaken in Western Factory from late 2017 to the late spring of 2018[31].

Since the economic reform (*gaige kaifang*, 改革开放) in 1978, Chinese society has undergone a rapid process of socio-economic changes including market privatisation, agricultural de-collectivisation, and relaxed restrictions on rural-to-urban migration (Selden & Perry, 2003). The increasing labour and capital flows from coastal cities and towns in Eastern China to interior villages in Middle and Western China have in recent years facilitated the diffusion of information and communication technologies such as smartphones and the Internet. Empirical study shows that migrant workers who live in urban China use ICTs stay connected with families and friends and have also been exposed to diversified entertainment information online (Jack Linchuan Qiu, 2008). When travelling back to their hometowns in rural China, migrant workers play key roles in introducing technology goods and services to villagers. Research in rural China found the "sent-down" Internet brought by migrant workers from urban areas (Oreglia, 2015). The digital divide between rural and urban China and the process of ICT diffusion between two societies poses a methodological challenge for researchers. When designing a project to study adoption and use of ICTs in China, choosing a single field site will inevitably limit the scope of the research to one group of the Chinese population and fail to study the dynamic process of Chinese digital revolution.

[31] Names of the village and the factory are pseudonyms to protect the identity of informants in the study.

Multisite fieldwork has long been advocated in interdisciplinary studies that employ ethnographic approaches. Drawing on data from multiple sites, it "moves out from the single sites and local situations of conventional ethnographic research designs to examine the circulation of cultural meanings, objects, and identities in diffuse time-space." (Marcus, 1995, p. 14). Having multiple field sites enables comparisons between different social groups. Nevertheless, this is not the same as the comparative study of independent field sites, which often entails collaborative work between different ethnographers. Multisite fieldwork is distinct from other comparative studies by having interlinks between different sites either through following "a network composed of fixed and moving points including spaces, people, and objects" (Burrell, 2009, p. 9) or through consistent focus on the same social issue (Hannerz, 2003). To avoid a partial representation of Chinese grassroots informatisation, I conducted fieldwork in two communities, one in rural and another in urban China, each consisting of different demographics and in various stages of ICT development. Table 3 provides background information about two field sites. Field sites in this project were selected strategically to ensure that the two communities are connected by the movement of individuals, the exchange of materials, and the flow of information. Two communities also present strong variations in socioeconomic and technology development, enabling the use of comparative approach in this project. The village is the hometown for many factory workers, and it is one of the places where the main industry is the factory production of polytunnel-grown raw mushrooms.

Ethnographic research on the technology impact on Chinese society has focused extensively on the prosperous coastal part of China, and often overlooks the representative role of Central China (McDonald, 2015; X. Wang, 2016). This project addresses the gap in empirical work on Central China ICT development by choosing both

sites in a county in Henan, a middle province of China (see Figure 11 the location of Henan Province). I choose Henan Province for two reasons. One concern is with its representativeness and another with the feasibility of this research. First, Henan represents a typical Chinese province due to its large population of more than 95 million people and its location in Central China, bridging between the remote west and the developed East. Situated in Central China, the economic development of Henan follows behind the prosperous eastern provinces in the coastal area, and yet is more advanced than inland provinces in Western China. According to the National Bureau of Statistics of China, Henan is the third most populated province in China, with a total population of more than 95 million. It also has the largest percentage of rural residents (51.5), 9.3 percentage point higher than the national average (42.2). However, compared to coastal provinces, Henan lacks convenient transportation for international export and depends heavily on industrial and agriculture industry. Henan ranked in the middle among all provinces in consumption per capita, with on average 16,043 RMB per year. ICT development in Henan is surprisingly slow: The Internet penetration rate in China was 53.2% in 2017, but Henan ranked the fourth lowest province with only 43.4% of its population using the Internet (CNNIC, 2017). This province demonstrates Chinese urban, rural, as well as suburban environments that are at different stages of development in contemporary Chinese society. Second, I selected Henan rather than other Central Chinese provinces because of my familiarity with the local accent and social environment. Although I did not grow up in Henan Province and have only visited the county for a short period in several Chinese traditional New Year festivals, Henan is my father's hometown and birthplace. For Chinese families, this indicates my family roots. I heard about new developments in the region from my relatives and always paid particular attention to news about Henan Province. I acknowledge this bond with my field sites

because this research topic requires surveying, tracking, and close observing of peoples' daily life unobtrusively. The Henan accent I have adopted from my paternal relatives, and my family connections with Henan residents helped me to overcome research barriers caused by an unfamiliar accent (Mandarin) or the authoritative role of the researcher. With my knowledge of local history and familiarity with its dialect, I was less likely to study the country with a completely fresh view. However, as Maanen suggested, natives of a community could examine "familiar places" by trying to "make them strange" (Van Maanen, 2011, p. 127). I compared my observations of Central China with experiences in Eastern and Western China, where I lived for over 20 years, and with Western countries, where I studied for several years, which helps me to become a "professional stranger" (Agar, 2008), who revisits the county with a sense of detachment.

3.1.1 Happy Valley county: China's urbanisation at county level

The scholarly community often prioritises first-tier cities when studying urbanisation in China. However, for many Chinese rural residents, counties, small or middle-sized cities that are closer to their hometowns and have relaxed restrictions on household registration (*hukou,* 户口) are becoming the first destinations for settling down as urban residents and living urban lifestyles (X.-R. Wang, Hui, Choguill, & Jia, 2015). Happy Valley, with a total population of more than 450,000, mirrors the urbanisation, industrialisation, and modernisation process in 1537 counties in China[32].

Walking through the Happy Valley county centre, any visitors would be first surprised by how metropolitan the county looks (see Figure 12). A closer look at each facet of everyday life in the county suggests the influence of ICT technologies. When I

[32] Chinese urban area consists of cities (*shi,* 市) and counties (*xian,* 县 or *jianzhizhen,* 建制镇). On March 2018, National Development and Reform Commission of China published an announcement of major tasks in promoting "New-type Urbanization", which emphasises the important roles of counties (*xian,* 县) and towns (*zhen,* 镇) in accommodating newly urbanised populations.

visited my aunts in Happy Valley in 2008, most of the local families lived in one- to two-floored dwelling houses that have small yards for parking bikes or drying cloth. The narrowest part of the street could only squeeze through one passenger per time. Nowadays, many Happy Valley residents have moved to high-rise apartment buildings that are between 10-20 floors high, equipped with public playgrounds, underground parking lots and even security guards wearing black uniforms and standing at the front entrance. Residential communities developed and maintained by provincial and national real estate companies have well adapted to digital technologies. Property managers initiate group chats on WeChat, post proposals for facility improvement, collect feedback on services provided, and run elections for resident representatives. Cashless mobile payment is prevalent in the county: even bicycle repair shops accept WeChat Pay (see Figure 13). Modes of transportation have changed too. Only a few years ago, families in Happy Valley commuted for work and school by bikes, electric scooters, and motorcycles. Cars were considered luxurious and symbols of wealth or high political status. Now, most middle-class families could afford cars and pickup trucks or SUVs in rural areas. It is not surprising to see traffic jams on main streets in Happy Valley every day and to hear locals complaining of how they missed the days when everyone was riding a bike. Buses run across the county centre every 10-15 minutes and are extremely popular among the elderlies and students, who enjoy the free or discounted bus tickets. Visitors might be amazed by how tech-savvy Happy Valley's residents are: when big cities in China adopted the bike sharing business models, Happy Valley was one of the first counties to install electronic-bike sharing systems (see Figure 14). With a deposit of 2,000 RMB, users can ride the MobileCat scooter for free for half an hour and pay 10 RMB for every extra 10 minutes afterwards.

Not everyone enjoys the recent digital development in Happy Valley. Right across the government 10-floor building, there sits a massive LED screen and a speaker; both could be seen and heard clearly by the crowds walking, dancing, and playing at the public spaces on the People's square. The screen has been used to show local news and official announcements most of the time, but since 2015, displays in public places have been used to shows names (and pictures sometimes) of "dishonest persons subject to enforcement"(*shixin beizhixingren,* 失信被执行人), who have the financial ability to do so but fail to pay large amounts of debt. Restaurants in Happy Valley are less crowded during lunch and dinner time than before, as online platforms such as Meituan (美团) or Dianping (点评) offer food delivery services to local customers. The local TV station has also adapted the Internet in broadcasting news reports and announcing notices such as time and location of power cuts.

Table 3. Background information of two field sites

Research Site	Fossil Village	Western Factory
Population	1025	2105
Major industry	Agriculture	Manufacturing
Basic unit	Production team	Department
Distance to county centre	37.8 km	5.1 km

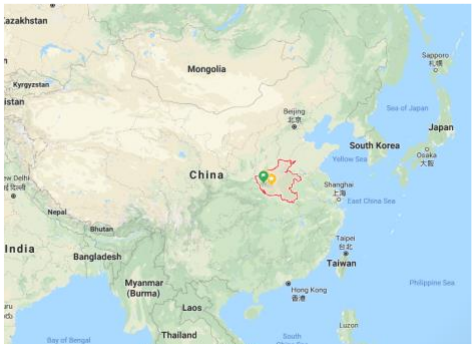


Figure 11. Location of Henan Province in China (Yellow label indicates the location of Fossil Village; Green label shows the location of Western Factory and Happy Valley county)



Figure 12. Picture of Happy Valley county centre



Figure 13. Mobile payment QR code in a local bicycle repair shop



Figure 14. Electronic bike sharing system (Picture source: Happy Valley official WeChat)

3.1.2 Fossil Village

Fossil Village, the first field site, is located at the bottom of Fossil Mountain and is affiliated to Dragon Town, 27 kilometres southwest from the Happy Valley county centre. I randomly chose Fossil Village as my field site from a list of 159 villages in Dragon Town. I was later told by the Party secretary of Dragon Town Mr Wang that Fossil Village was commended by the Central Guidance Commission for Building Spiritual Civilisation of the Communist Party of China (*quanguo wenmingcun,* 全国文明村) for its outstanding achievements in infrastructure construction and booming tourism business. Fossil Village has 242 households, 1025 residents, covering 9.6 square kilometres. Like many other Chinese villages, families in Fossil Village are divided into five village production teams (*shengchanxiaozu,* 生产小组) for registration and management purposes, namely North Slope, East Farm, Stove Valley, Fossil Group, and South Mountain. There is only one primary school in Fossil Village, which is located in the backyard of the office of the village committee. The school has four classes from first to fourth grade and two pre-school classes. The new school building was reconstructed around 2010 and recruits students from the other two neighbouring villages. However, villagers are extremely disappointed about the quality of education in Fossil primary village: although local government has allocated a budget for hiring six full-time teachers, only two teachers in the school are working full-time. The rest of the full-time teachers are reluctant to teach in the mountain village and instead, young villagers have been hired to work part-time at the school. One of the part-time replacement teachers told me that she was only paid one-third of the salary of her full-time colleagues. She also felt guilty about not being able to teach the children well because she only has a high school degree.

Life in Fossil Village was difficult before the 80s, when the village was disconnected from the rest of the county, hidden in the Fossil Mountains. There was an

old saying among the elderlies that best describes transportation in Fossil Village in the early days, “Walking in the sandstorms in the sunny days; struggling in the marshland in the raining days.” (天晴扬灰路, 下雨水泥路) At the beginning of the new millennium, Henan government promoted the “Transport and Facilities to Every Village” (*cuncuntong*, 村村通) project, bringing a two-lane cement road to the doorsteps of Fossil Villagers (see Figure 15). However, travelling between Fossil Village and the county centre is still inconvenient, especially during the rainy seasons when landslides often block the only speedway that connects the village to the outside world. During a weekend by the end of July 2017, I, along with several desperate villagers who needed to go back to work or school in the county, was stuck in the village due to a landslide that happened on the way to Fossil Village. There was no power cut or Internet breakdowns. But still, young villagers gathered together in the grocery shop in front of the village Party office, sharing news and updates they received on WeChat from experienced drivers who waited at the spot of the landslide for road maintenance team to clear fallen rocks and mud.



Figure 15. Photo of the road to Fossil Village. Villagers dry the Shiitake mushroom on the surface of the road



Figure 16. Photo of the inside of the mushroom tents in Fossil Village

Shiitake and agritourism.

Household income in Fossil Village traditionally came from agricultural production, including growing wheat, sweet potatoes, and corn. Villagers who live by the Fossil Mountain sometimes pick up wild-growing medicinal herbs such as *Tianma* (天

麻) in the forest in exchange for pocket money. From 2000 to 2015, Fossil Village has witnessed two tremendous changes in its economy: agritourism and mushrooms. Village leaders introduced the models of agritourism to the rural economy since Fossil Village is close to a sightseeing spot, Dragon Valley, and could be the accommodation centre for tourist groups. Tourism flourished in 2013, with 140 families joining in the business, adding 5,000 RMB net profit to each household. Growing mushrooms has been another new source of income. Since 2007, apart from growing conventional crops, farmers in Fossil Village, along with other farmers in the Dragon Town, started growing one genus of mushroom called the "Shiitake" (*xianggu* 香菇 or *huagu* 花菇 in Chinese), a most-liked ingredient in East Asian cuisine. Thanks to the warm and moist climate in Dragon Town, it produces one of China's best-quality Shiitake mushrooms, making the mushroom business its pillar industry. The profit from mushrooms is only 2 to 3 RMB per package, which is a bag of substrates that consist of wood shavings and mushroom spawns. Each household grows and maintains 5000 to 10000 packages of mushrooms, making an annual profit of 10000 to 30000 RMB each year. To Fossil Villagers who live close to the road, the benefit from mushrooms growing is less than that from tourism: during the busiest season for tourism, for example, on Labour Day festival or National Day festival, families that own family-run restaurants could make 5000 RMB within a weekend, and without the sunburns and muscle pains from hard labours in mushroom tents (see Figure 16 for a photo of the tents).

The history behind Fossil Village's mushroom business reflects the role of Chinese local government in people's economic life in rural areas. Mushroom growing materials and techniques were first introduced to Fossil Village by the government of Dragon Town and Happy Valley county more than a decade ago as a part of an economic plan to increase household income in mountain areas. Initially, mushroom spores were

given to each production team in Fossil Village for free. The county government also sent agricultural experts to teach villagers how to grow mushrooms from tree logs or from packages that contain a mixture of spores and woodchips. However, most of the villagers considered growing mushrooms to be time-consuming and of low profit back then, and only a few young villagers volunteered to try growing less than 500 packages of shiitake. Later, it turned out that mushrooms were far more profitable an agricultural product than most of the crops, vegetables or fruits, and soon it became a business that significantly improved the life quality in Fossil Village. In 2017, the mushroom production increased to 1,300,000 packages in total, with over 5000 packages on average for each household in the village. Villagers made great efforts to improve the output of mushroom growing: All villagers, including kids and seniors, have learned the mushroom growing process by heart. During early spring, each family prepares substrates with mushroom spawns and woodchips, which gradually becomes a collective activity in which all villagers participate and contribute. The county government has played a "paternalist" role in the village economy, making choices on behalf of the villagers (Mulvad, 2018). Similar agriculture-related policies were implemented in Fossil Village when the county government introduced kiwi fruit growing to mountain villages in the neighbourhood, and when Dragon Town government encouraged farmers to open online stores and sell agricultural products on e-commerce platforms by organising workshops and training programs. In Chinese villages in Central provinces such as Fossil Village, rural residents and local government have asymmetric information when it comes to market information of agricultural goods: Farmers, who are often isolated from the outside world, have less updated details on domestic and international markets. While the invisible hand of the market is influencing day-to-day agricultural activities in the village, the Chinese local

government is actively seeking to regulate and guide the rural economy through government-initiated agricultural projects.

However, residents in Fossil Village were undergoing a period of economic decline when I visited them. Since 2013, the tourism industry in the village has suffered more than a year of gloom. Villagers attributed the fall of tourism to the economic crisis and the anti-corruption movement: "The former factor makes almost everyone too poor to travel, and the latter makes those who work for the government too afraid to travel," says an owner of a family inn, Xiao. Before President Xi Jinping started the national anti-corruption campaign in 2012, most of the tourists dining or living in Fossil Village were either employees of state-owned companies or officers at the county government. Some of them reimbursed the travelling expenses using the companies' or the government's accounts, spending hundreds or even sometimes thousands on each meal. In August 2017, the number of tourist groups to Fossil Village increased from one or two groups per month to several groups per day. Nevertheless, the increase in profits was not shared equally among the villagers. Hotels that survived from the tourism slump are those run by businessmen who are not local and have strong connections with tourist agencies or local authorities. Because of the declining agritourism business, many young couples in the village are now taking part-time jobs to work in Happy Valley county or neighbouring cities.

ICT development and e-commerce.

Possession of digital devices like mobile phones or pagers were once indications of wealth and high social status, and only those who worked and lived in urban areas in the Happy Valley or neighbouring cities could afford them. It is documented in the village annals that the development of Information and Communication Technologies (ICTs) accelerated in the early 2000s, thanks to wider coverage of broadband and mobile Internet.

Fossil Village in 2015 had 59 personal computers and 1031 mobile phones in total. These numbers still underestimate the ICT penetration in Fossil Village because, during my fieldwork, most villagers I interviewed had at least one mobile phone and more than one-third of families I visited had desktop computers at home. Televisions have become entertainment and information devices for children and elderly persons in the village. Long gone are the days when families sat together in front of the TV at 7 pm to watch the official news on China's central news station, CCTV. But interestingly, young and middle-aged villagers still joined their kids or parents at 7:30 pm for weather broadcasting. "More like a ritual for us farmers," says Xiao's wife, Hua. Fossil Villagers are incredibly generous with their family Wi-Fi: I was surprised to find that everyone in the village seems to know the Wi-Fi password of the grocery shop, where local villagers chat, play poker or Majiang, and exchange gossip after meals. Mobile Wi-Fi-hacking software that is popular in urban China is useless in Fossil Village, as most of the Fossil Villagers would not mind sharing the password of their home Wi-Fi with neighbours. By the end of my fieldwork in Fossil Village, after visiting more than two-thirds of the households, my phone also saved passwords of each visited family and could stay connected on Wi-Fi on every corner of Fossil Village.

While the Fossil Villagers have widely adopted computers and mobile phones, leaders in the villages, namely secretary, vice-secretary, security officer, accountant, militia officer, never use computers that are equipped with the office for villagers' committees. The secretary of villagers' committees, Mr Li told me, "we (the leaders of the village) are entering our old ages. Just as the whole year's work depends on a good start in spring, the perfect time for learning ICTs has passed for us." The militia officer, Mr Quan, showed me around their new office and desk-top computers, honestly admitting that "installing computers in a village committees' office is useless, except for decorating

the room." On my first visit to their office, leaders of Fossil Village were busy discussing official documents sent down from the superior government at the Dragon Town. Files were printed and brought back to the village by Mr Li, and all official responses to the documents are hand-written. A small group of young people, however, seized the great opportunity of reinvestment during the downturn of tourism and joined the increasingly popular e-commerce business. In 2016, an ambitious businessman, Feng, who had grown up in Fossil Village and earned his first major sums of money from e-commerce, organised the first Alibaba online business skill workshop in the newly built building of villagers' committee. Several dozens of villagers participated in the workshop, but only two or three of them were able to manage the online business till the year I visited Fossil Village. The transition from a mushroom farmer to an online mushroom retailer was painful. But it was also rewarding for those who persisted in learning and trying to open online channels for selling agricultural products. With average monthly profits of more than 100,000 RMB from e-commerce, Feng became the rising star of Fossil Village and moved his family to the richest neighbourhood in Happy Valley county, living in the apartment facing directly towards the People's square and the new County office building. Grace, a young female entrepreneur who started her e-commerce business on Facebook, eBay, and Ali Express, has managed to sell mushrooms to Europe, the US, and the Middle East.

Living, tutoring and socialising in Fossil Village.

Many ethnographers who studied China described their difficulties in entering the rural field site due to both internal and external barriers. Interpreting the local dialect and idiom poses the first challenge for researchers whose native language is not Chinese. The process of applying for permission from the government is time-consuming and can often undermine the independence of academic research. I was able to overcome the linguistic

barriers by trying first to speak the local language in Happy Valley county. In the first three months of fieldwork, I lived in the county centre, started to pick up Henan accent, and built up a dictionary of local vocabulary and expressions around digital technologies. For example, instead of saying "using" (*yong, 用*) mobile phone, many rural residents use the term "drilling on (*kou, 抠*) mobile phone", which conveys the meaning of closely examining to describe their mobile phone use. Similarly, for many middle-aged or elderly mobile phone users, they "play" (*wan,* 玩) rather than "use" (*yong,* 用) WeChat. Using such terms that sound more familiar to the locals made informants in my study willing to share with me their everyday experience, instead of being intimidated by my identity as a doctorate researcher from a foreign research institution.

On the other hand, fieldworkers who conduct long-term research in Chinese villages have often experienced monitoring and supervisions from the local government. When I approached the local government to obtain permissions for studying in a village in the county, I was fortunate enough to meet officials who are open-minded and have a background in information science through family connections. On my first day in Dragon Town, I was introduced by my father's high school classmate to a senior officer, Secretory Wang, who is a middle-aged man with an ambitious plan for developing ICTs and teaching IT skills in rural areas. Wang graduated from an engineering college in Xi'an, one of the most international cities in Central China, and he is an enthusiastic advocate of social science and policy research in understanding rural society. I met Wang at 8 am on a Monday morning. Nervous about how he would react to my long-term fieldwork, I described the objectives, aims, and motivations of my fieldwork, and asked for his permission to provide lists of villages in Dragon Town to choose my field site randomly. I prepared for soft refusal and diplomatic wording from Want. But to my surprise, Wang was very supportive of the research project and even asked questions

about sampling techniques and qualitative methods in social sciences. Gaining full support from the Dragon Town government was guaranteed with one requirement: Wang asked me to give a seminar on academic research on ICT for development and the application of information technologies in local governance. I first thought the lecture was informal, but it turned out that it was compulsory for all government officers aged below 35. The audience was curious about my research topic but did not pry into details of my fieldwork, and I was able to meet many young civil servants on the event who later helped me to contact key informants in Fossil Villages or provided me with government reports on the economy of Dragon Town.

In addition to speaking the local language and establishing a mutually learning relationship with the local government, I found volunteering in local NGOs the most efficient way of expanding my connections in Happy Valley county. During the period of my fieldwork, I became an active member in a local charity called Happy Valley Charitable Association (*aixin gongyi xiehui*, 爱心公益协会), a non-government charity that organises fund-raising events to support families in extreme poverty. Initially, I only participated in activities to help deliver groceries and charitable money to families living in mountain areas in the county, which helped me to visit all towns and villages in Happy Valley. I participated in most of the activities and met the leaders of the association, who later introduced me to the headmaster of the middle school in Dragon Town. A few weeks later, I organised the first tutoring programs in Dragon Town middle school, which involves holding seminars and individual Q&A sessions to help local students with school subjects such as Chinese, math and English. Volunteering in local charity was not part of my plan for getting access to Fossil Village and could sometimes become overwhelming for me, but it led me to know more contacts in Dragon Town and even getting to know students whose families lived in Fossil Village. Meanwhile, in a small

community where news travels fast, my volunteering work in the charity quickly reached Fossil Village through young people who work or live in Dragon Town, which later helped me to establish the identity both as a researcher and as an active member of the local community.

Trust building process with Fossil Villagers took more than introductions by key informants like Feng, Grace, or the head of the village or Dragon Town. The method of collecting data, with its Latin origin meaning of "something was given", requires reciprocity, or what Clifford (1980) termed as the "ethnographer-informant exchange" (p.527). While studying the Internet as an information source for residents in the village, I was always approached by informants and interviewees as a proxy to solve their technical or informational problems. To avoid intervening in users' information practices before interviews, I asked the question "Do you need any information on everyday life or information technologies from me?" at the very end of each interview. Answers to this question were always yes, with broader enquiries such as how to identify and handle rumours to specific questions like how to unmute the phone or how to enlarge text size on WeChat. Some exchanges for information were more challenging and time-consuming for me: I was asked by several parents in the village to help tutor their kids after school, sitting down with them to answer questions they had from homework. Tutoring elementary-school level Chinese or math was not difficult, but while I spent considerable time with the kids in the village, I began to feel more emotionally attached and responsible for the future of the next generation in Fossil Village. Using friendships with local families as a method to enter the village (Tillmann-Healy, 2003), I understood the everyday lives of villagers through interactions with different generations of family members and extended the research foci to the influence of ICTs on family relationships and domestic life.

3.1.3 Western Factory

Compared to neighbouring counties that rely heavily on agriculture, Happy Valley economic growth is driven predominantly by the manufacturing industry, which accounted for 57.9% of GDP in 2016[33]. Western Factory is one of the corporate champions in Happy Valley and a leading traditional Chinese medicine pharmaceutical manufacturer in Henan Province. The factory is located in the industrial park, 2 kilometres west of the county centre and opposite to the county train station. Medicines manufactured by Western Factory originate from Chinese Traditional Medicine books and recipes and many of the products are over the counter (OTC) drugs, targeting various disorders ranging from indigestion, irregular menstruation, to insomnia. Sales of Western Factory products has rocketed since the early 2000s owing to the official recognition of Chinese Traditional Medicine (CTM) as part of the national medical care system, which combines Western and Chinese treatments (*zhongxiyi jiehe zhiliao,* 中西医结合治疗). Products of Western Factory have also become popular among a growing number of Chinese consumers who prefer a preventative approach to healthcare using plant based CTMs over chemical drugs.

History of Western Factory and industrialisation and urbanisation in small towns.

The history of the Western Factory is a chronicle of China's industrialisation and urbanisation process at the county level and reflects the social, economic, and political transformation in the era of institutional changes since the 1980s. Western Factory, nowadays a privately-owned limited liability company, was once a state-owned pharmaceutical factory. In the 1980s, Song Sr., a veteran in his early 30s, was assigned

[33] Data source: Statistical report on economic growth in 2017, Bureau of Statistics of Happy Valley county.

by the county government as the director of the political cadre and later the deputy manager in Western Factory. During the 1980s and early 1990s, Western Factory flourished during China's opening-up and reform movement with financial investment from investors in southern cities and provinces. Assembly lines started to replace traditional medicine processing tools, and CTM recipes tested by research institutes were used to increase the efficacy of remedies. The destinies of Western Factory, all the workers, and Song Sr. changed in the late 1990s, when the wave of privatisation reached Happy Valley county and Western Factory turned from state-owned to a private-owned enterprise. The transfer of ownership deal in the early 2000s was around 10 million RMB. Within a decade, the company assets reached 1 billion RMB, with the Song family holding more than half of the stake.

The shift from collective to private ownership has not broken the close relationship between local government and the factory: Song's family has actively participated in local, provincial and even national politics, consulting on policies and regulations on manufacturing industries. Nevertheless, in recent years, the Song family has been trying to expand the business to food processing and packaging industry, tourism, and real estate, when facing intense competition for quality and efficacy from CTM pharmaceutical factories in mainland China. On my first day to the factory, Song Jr., the eldest son of the founder, showed me around a modern and well-equipped laboratory building which was built initially for post-doctorate clinical researchers. The building was empty when we visited, and part of it was refurbished into accommodation for guests. Song Jr. sighed when we left the building and locked the front door, "we provided (the scientists) the most advanced labs and the most generous salary but take a look around the mountains surrounding Happy Valley. No young PhD student would want to spend several years here." Like many enterprises in small counties or cities in

China, Western Factory is facing a serious human resources crisis in recruiting technicians and researchers who have advanced skills or scientific research backgrounds.

Everyday life of the working-class in Central China.

Everyday lives of the 2105 employees in Western Factory differ significantly between different departments and positions: those who work in management and maintenance roles such as quality control, IT, government relations, legal affairs, or human resources departments stick to a schedule similar to schools, governments, and hospitals, from 8 to 12 in the morning, and 14 to 18 in the afternoon. In small towns like Happy Valley, parents often pick up children from school during lunchtime, watching them having a meal and taking meals before waking them up for the afternoon's classes. Employees working in management departments enjoy the privileges of taking two-hour lunch breaks to take care of families. The schedule of those who work on the production departments is more gruelling than management departments: workers take shifts, which either starts in the early morning before 7 am or in the late afternoon around 4 pm, with each shift lasting 7 to 9 hours. When the workload is heavy during busy seasons, the lunch or dinner break for workers is only 40 minutes. Workers in production departments do not take regular weekends off like those in management departments: they normally start working at the beginning of the month and work consistently for 15 days and take a break of 4-5 days. "Turning on and off manufacturing machines too regularly could profoundly shorten its service life," Song Jr. explained to me of the irregular working days on production lines. Most of the workers already got used to the working pace in Western Factory, but balancing work and family could be challenging for female workers who are pregnant and feel fatigue from long working hours without enough rest, or who have young children to pick up from schools during lunch breaks. Sadly, female workers,

when they encounter such circumstances, are often more likely than their husbands to quit the relatively stable jobs in Western Factory.

Compared to other factories such as steel manufacturing in the county, Western Factory has a higher percentage of female workers on the assembly line, especially in the department of packaging and quality control. Female employees account for around 44.9% of the total number of employees. Like other factories in the local area, employees are predominantly young or middle-aged, with only 12.3% above 50 years old. Because of the substantial profits in the medical industry, the salary of employees in Western Factory is higher than the average income level in Happy Valley county. Employees working in management and manufacturing roles vary in the way their salaries are calculated: management departments have fixed monthly salaries for different rankings, ranging from 2500 to above 100,000 yuan, while workers at manufacturing departments receive basic monthly salaries of around 2000, plus performance-based bonus. The bonus is calculated monthly, through counting the number of products a worker has manufactured *beyond* the workload to which he or she is assigned. The new salary packages for workers has only recently been applied in Western Factory but become controversial. Some workers who I talked to witness the increased competition among co-workers and excessive workloads. Many of them work overtime after shifts or on the weekends to receive a higher monthly bonus, which resulted in the management team increasing the number of products required for earning the basic salary.

Dining hall and after-meal walks: Entry in the field site.

My first visit to Western Factory stirred up a strong feeling of sadness: my grandfather, before he died in 1998, used to lead a papermaking and packaging factory on the site where the Western Factory administration building stands. My family's connection with the Song family helped me to set up an office for interviews and focus

group studies on my first day in the field site. Having received his master's degree overseas, Song Jr. was also very supportive of my plans for systematic sampling surveys and long-term observations of workers' everyday life, which he agreed as essential ways to truly understand the thoughts and experiences of Chinese working-class. However, after few days of taking walking tours around the factory sites and reading statistics on various departments and groups, I felt distant from the working environment and everyday lives of employees working at Western factories.

The real entrance to the field site took place when one day, instead of eating at a different schedule and on a separate dining area, I joined the long queue of workers who were waiting in front of the dining hall for lunch and began my usual pre-lunch self-introduction and communication with the workers. As mentioned earlier, lunch or dinner break for employees are short: those who work in management departments often have families to take care of, and those working in the manufacturing units need to return to their shifts quickly. Nevertheless, I found the dining hall one of the best locations for making new friends; it is also the most typical place for the everyday routine of workers. Topics such as healthcare, diet, food safety, and sometimes parenting, often emerged from my conversation with informants whom I talked with during lunch, helping me to understand concerns and problems Western Factory employees are facing through informal chats in dining halls. Using the dining hall as my starting point of fieldwork, I was later able to study everyday information practices of factory workers with a "thick description" (Geertz, 1973) of the everyday environment in which this particular social group adopt, adapt, and domesticate ICTs.

For workers sitting or standing along the assembly lines and for management employees who live sedentary lifestyles, after-meal walking is perhaps the only form of exercise during the workdays. As I became lunch friends with many workers, I was

invited to join in this form of daily activity that is popular in the factory. Workers often walk in groups of 3 to 5 and would sometimes stop to chat in larger groups. Interestingly, the walking break is more popular among female employees than males but is enjoyed by both young as well as middle-aged groups. I participated in the walking groups first as a listener and observer, fascinated by the amount of information exchange in the informal settings on the "information ground" (Fisher et al., 2007). Everyday walks after lunch for me as a researcher were first an opportunity to make social connections with workers from different departments. After a few weeks of joining in the informal exercise, my presence on the square seemed less of an abrupt intrusion but more of active participation in the collective activity. Then, I began to observe many meaningful information exchanges among workers during the walking breaks. Topics discussed during the walk could be as trivial as what time a local shoe store closes and could be as complex as learning new digital skillsets for everyday life and work.

3.2 Research ethics in the project

Research plans and ethical issues in the project were reviewed before the fieldwork and data collection by the Central University Research Ethics Committee (CUREC). The pilot survey for this project was circulated during July to September 2016, which received ethical clearance on June 16, 2016 (reference number: SSH OII C1A 16 055). Fieldwork in Fossil Village and Western Factory was conducted between June 2017 to June 2018 after receiving ethical clearance on June 7, 2017 (reference number SSH OII C1A 17 060). Data collection and analysis processes follow the British Sociological Association's ethical guidelines on anonymity, confidentiality and informed consent (British Sociological Association, 2017).

Only people who were above 18 years old and adults were recruited in the project. All respondents in the survey and participants in interviews, focus group studies and

mobile logging studies of this project were informed either orally[34] or through written document about the research objectives, scope of the survey or interview, their rights to reject to or terminate participation, expected time commitment required for participation, financial benefits for contribution, anonymity and confidentiality, the ethics committee's contact information, and my contact information (See Appendix F for translated versions of the consent forms). Written consent was collected for survey participants as the initial question before filling in the questionnaire. Consent for interviews, focus group studies, or mobile logging studies was obtained as the last question after finishing the survey if the survey respondent would be willing to participate in follow-up studies[35].

Personal ICTs have been deeply embedded in personal and private lives. Due to the sensitiveness of data collected on everyday information practices, one critical ethical issue in the project is to ensure the anonymity of informants, survey respondents, and interviewees at every stage of the research project. None of the participants in this research project expressed a willingness to be identified for receiving publicity, and thus all were anonymised through pseudonymisation. Social science research about communities need to handle anonymity more delicately: Respondents might be recognised by readers from the local area if only the village and the factory were anonymised (Wiles, Charles, Crow, & Heath, 2016). The county where the fieldwork took place, which has a population more than 400,000, was given a fictionalised name, Happy Valley, to avoid the two communities studied being identifiable. Images or short videos of information seeking practices on mobile phones were viewed by participants immediately after each interview (Kelly et al., 2013) and processed thoroughly by the researcher to pixelate personal information such as name, location, or account ID.

[34] The consent form was read by the researcher for visually impaired or undereducated participants
[35] Oral consent was collected if the respondents preferred

Anonymity is one crucial way of ensuring confidentiality, and another step is to save research data securely. All contact information, fieldwork notes, and data collected were saved in an encrypted hard drive, to which only the researcher had access. Qualitative data were transcribed verbatim by me, instead of using third-party services. Pseudonyms were assigned in the transcribing process and text or audio files that contain interviewees' real names were shredded directly after transcription.

Another issue is the researcher's moral and emotional concerns in fieldwork such as reciprocity of information between researcher and participants. Reciprocity of information between participants and me through tutoring, volunteering or technical assistance was an efficient way of integrating into the local communities. However, this could also become contaminating without boundary setting (Fetterman, 2010). One of the hardest conversations I had with informants in Fossil Village was to clarify that my role as a part-time tutor did not include "taking children to Happy Valley county for the weekends" and "babysitting them for few days in summer holiday". I did increasingly care about the future education and development of children in the village as if they were my siblings but being overly depended upon by the parents and becoming temporary guardian for their kids were too heavy duties and responsibilities for me. Thanks to the wide use of social media and the Internet, exchange of information and knowledge with respondents could continue after I left both field sites. I was asked several times by informants in the fieldwork, most of whom added me on WeChat, to share more news and stories about my life in the UK on my social media timeline. Researchers who conducted ethnographic studies on online communities recommended have friended research participants to establish symmetrical power relations (Postill & Pink, 2012). I also found exposing personal social media content, including useful links and resources, previous research projects, or pictures of my daily life, a unique way to contribute to the

communities through the virtual exchange of everyday information and remotely answering informants' questions on health care, self-development or interpersonal relationships.

3.3 Mixed methods approach: Triangulation of quantitative and qualitative data

Human information seeking practices have been studied extensively by both quantitative and qualitative approaches. Large-scale surveys, search and mobile log studies and experiments reveal patterns and explain factors of various information behaviours, while in-depth interviews, focus group studies, and participant observations examine the mechanisms and decode decision-making or sensemaking processes. While quantitative data suggests relationships between different socio-economic and technology use variables, qualitative data is particularly useful in explaining why or when the relationships exist (Eisenhardt, 1989). The mixed methods approach has emerged in recent years as a distinctive methodological framework in social science research (Greene, 2008; Tashakkori & Teddlie, 2010). It involves the application of both quantitative and qualitative methods in a single project (Creswell, 2018). The mixed methods approach also requires "connections, integration, or linking" (Creswell, 2015, p. 50) of two perspectives, more than merely collecting two sets of data. Mixing of two methodological traditions, therefore, is reflected in every step of research design, including but not limited to research procedures, sampling methods, data validity, and presentation of results. In this project, I used a mixed methods approach to collect different type of data on everyday information seeking practices. While quantitative data such as survey and mobile logging studies allows between- and in-group comparisons for the study of diverse and dynamic human information behaviours, qualitative data such as interviews, focus group studies and visual documentation contribute to the understanding of motivation and variations behind information seeking practices.

Early researchers using a mixed methods approach have developed different typologies that summarise various frameworks of research designs. Various design frameworks differ in the procedures of quantitative and qualitative methods, and the priority is given to different methodological paradigms. For example, Teddlie and Tashakkori distinguished four types of mixed methods multistrand designs: 1) Concurrent mixed design, in which QUAN and QUAL data are collected and analysed at the same time. However, the individual researcher in the field may find it challenging to balance two simultaneous forms of data collections. 2) Sequential mixed design, with one of the strands following the other, providing supporting evidence or highlighting contradictory findings on the research topic. 3) Conversion mixed design, in which data from one of the strands is transformed into the other, for example, qualitative data is transferred into quantifiable variables. 4) Fully integrated mixed design, which adds more integration and triangulation of two strands compared to sequential mixed design, incorporating mixed design across all steps in research design, from formulating research questions, data sampling, to data reporting (Teddlie & Tashakkori, 2006).

In this project, quantitative and qualitative methods were used sequentially but with a retrospective and dynamic process to achieve a fully integrated mixed design. Table 4 illustrates data collection methods and data handling procedures at every phase in the fieldwork. The same procedure was applied twice in Fossil Village and Western Factory. The integrated mixed design helps to provide multi-strand data for a comprehensive understanding of general patterns and contributing factors in ICT adoption and adaption in everyday life, as well as detailed narratives and documentation of the mundane usage of ICTs in information seeking practices. Users seek everyday information in various forms, including but not limited to text, images, short videos, audios. When conducting qualitative interviews, I collected fieldwork data in all possible

forms to answer the research questions about user practices in everyday information seeking. For example, when one interviewee mentioned online misinformation about pyramid schemes, in addition to documenting the interview in audio file, I asked her to share a screenshot of the WeChat article where she was first exposed to the scheme. I also took a video clip of the interviewee using the Baidu search engine to find online information about news updates of the scheme. Multi-media fieldwork data enables me to collect rich data to describe and explain user experiences in the context of the use of the Internet for information seeking in everyday life.

Table 4. Data collection procedures

Phase	Method	Data handling procedure
Quantitative data collection I	Survey	- Collect face-to-face survey with stratified sample; - Code and input survey data into csv files.
Preliminary quantitative analysis	Statistical analysis	- Summarise demographic statistics and ICT adoption/use statistics; - Identify outliers in the groups; - Highlight social groups that demonstrate distinctive information or Internet practices for comparisons.
Qualitative data collection I	Structured Interviews	- Conduct structured interviews.
Preliminary qualitative analysis	Qualitative analysis of notes/photos/videos	- Find frequently mentioned themes in interviews; - Identify important information brokers in the community.
Qualitative data collection II	Focus group studies	- Conduct focus group studies with several individuals who have different demographic and ICT use characters (Internet experience, gender, social status); - Facilitate in-depth discussion of themes that frequently emerge in previous interviews.
Quantitative data collection II[36]	Mobile logging studies	- Invite participants for interview or focus group studies to download mobile logging software; - Log mobile phone usage data.

3.3.1 Quantitative methods

Survey.

The Chinese Internet has profoundly influenced many facets of everyday life across the county; however, there are few systematic and large-scale surveys on China's Internet adoption and use that are accessible to researchers. Statistical reports on the Chinese Internet industry and Internet use are published annually by CNNIC, updating statistics such as Internet penetration rate, demographic characteristics of Internet users, and the use of different Internet applications. However, for this research, I need more than statistical reports but also data files of surveys on Internet adoption and use.

[36] Please note that due to restrictions on mobile phone usage during working hours, mobile logging studies were only conducted in Fossil Village.

Meanwhile, CNNIC reports do not include survey questions that ask about people's information resources and information seeking practices, which are the main research foci of this project. In both field sites, I started data collection with a randomly sampled, face-to-face survey, to map out the ICT development and information practices in each community.

Sampling technique. I collected a random sample from the total population within each field site. At the first stage, each community was divided into different strata according to either the production teams or factory departments. The use of stratified sampling in this stage is advantageous for grouping individuals who shared similar locations, which makes collecting survey data more efficient. At the second stage, within each stratum, a random sample of individuals was selected to participate in the survey. Methods to randomly select participants in the village and the factory differ slightly and will be discussed in detail.

For the survey on Fossil Village residents. A survey sample of 128 individuals was collected out of 234 households. The sample size was calculated at a confidence level of 90%, and with a marginal error of 5%. The whole village was first divided into five strata based the production teams. And then, within each team, households were labelled with numbers, and a list of households were selected proportional to the size of each stratum using a random number generator. The list of families in each production team was provided by the head of Fossil Village. All contact information was deleted and replaced by numbers before the sampling procedure. Only the names of families that were selected to be surveyed were provided to the researcher after the sampling procedure. I visited all the randomly selected households at their homes or mushroom tents and chose to survey the person whose first name ranked at the beginning list of the alphabet among adults in the household. The person whose name on the list ranked second or third on the

list was chosen if the selected individual in the household was working or studying outside of the village. Instructions and survey questions were read to the respondents by me, with each took between 15 to 30 minutes. By the end of each survey, I asked if the survey respondent was willing to participate in a follow-up interview or focus group study. In the survey on Western Factory employees I collected 228 samples, there are more than 2000 employees working in the factory, but many of them work in Zhengzhou, the capital city of Henan Province, which is beyond the geographical range of Happy Valley county. After eliminating the employees who work in other cities, 1404 employees remained in the sampling framework, which was divided into 39 strata based on different departments. Within each stratum, a list of employees' ID number was provided by Song Jr., owner of the factory, with their names also deleted from the file to ensure the anonymity of unselected employees. I visited each department between shifts or during lunch breaks, finding the randomly selected employees to fill out the survey. It should be noted here that a financial incentive of 10 RMB or a souvenir was given to all the survey participants. Collaborations of the village council and factory owner contributed to the progress of survey collection and helped with contacting all randomly selected members of the two communities.

Survey design and data analysis. The survey in this project includes questions on the following topics: 1) Importance and trust of various information resources online and offline; 2) Importance of different categories of information; 3) Adoption and use of ICTs (including desktop computer and mobile phone); 4) Level of engagement in different Internet activities; 3) Experiences with online Information seeking practices, misinformation, and information overload; 4) Demographic information. Issues such as question design and operationalisation of variables will be discussed in the result chapters to follow. Appendix A shows a diagram of the survey structure and Appendix B shows

the survey questionnaire in Chinese. All survey data is first translated into English and coded in SPSS (Version 25). All data analysis is conducted in R[37].

Mobile logging studies.

The survey is not the only tool for studying users' internet use in information practices. Another method is to track users' information practices while they are using the technology. In fact, researchers have found that self-report survey data about mobile use is often unreliable when compared to log data, which documents the actual use of mobile devices. Research suggests that data from surveys only moderately correlates with log data, indicating a low validity in the survey method (Boase & Ling, 2013).

Aware Framework. To compensate for the over- and under-reporting of mobile use using the survey method, I also collected users' mobile log data in this research. The characterisation of information practices is examined in detail by tracking mobile log data from a group of selected respondents, which generates a quantitative statistical description of users' mobile phone use in information practices. Like survey questions, informational activities on mobile phones can be operationalised into different variables, for example, the number of applications the user opens every day, the average length of time the user spends on one app, and the most frequently used apps among a group of users. These measurements reveal the activity of information practices rather than the content of information practices. A follow-up interview with the users reveals details about the content and context of information search. I showed my respondents their mobile data and discussed in detail with them their use of the mobile internet in informational tasks. The software I used in this research was the Aware Framework, a data collection tool created by a group of computer scientist[38]. The application and

[37] R Core Team (2017). R: A language and environment for statistical computing. R Foundation for Statistical Computing, Vienna, Austria. URL https://www.R-project.org/.
[38] https://awareframework.com/team/

database are both available for researchers. In my fieldwork, I used the software to record daily information practices among a small sample of participants in Fossil Village continuously for at least 7 days. The designer of the app provided a special code for participants to register in the study when downloading the app to their own devices. This code allows the re-identification of respondents from data points in the existing dataset collected by the software. The App is downloaded from Google Play, an application market for Android devices. During the fieldwork in Fossil Village, I first tested the use of mobile logging to collect mobile phone usage data. There were several technical and financial difficulties involved in using the software to collect mobile log data: First, most of the interviewees were cautious about downloading an unfamiliar mobile app on their phones. The majority of interviewees rejected to participate in a mobile logging study, which led to a very small number of participants in this part of the study. Only six interviewees agreed to download the Aware app on their phones. Second, for participants who agreed to join in the study, the software interface was in English, which understandably added to more confusion among the participants. Thirdly, the software requires stable Internet connections on the participants' devices. It also drains the battery on the phone when operating. As a result, only one week of data was successfully collected from the six participants. The sample size in the mobile logging study is too small to conduct statistical tests and thus I mainly used other qualitative methods to study the information seeking process (though the logging data was helpful in providing an added perspective).

Walk-through and demonstrations as alternative methods to mobile logging study.

When carrying out the fieldwork in the factory, conducting mobile logging study was difficult because employees were not allowed to use mobile phones when working.

To understand information seeking practices among the factory employees, alternative methods were used as replacements for the mobile logging study. Dervin suggested that gap-bridging can reveal the users' information behaviours and strategies by focusing on how users establish connections to the information system when necessary (Dervin, 1999). Therefore, one of the alternative methods to study information behaviours is to sit down with the respondents and ask them to demonstrate or to explain their reactions to different information tasks. Another similar method is to ask respondents to reflect on the most recent decision-making points when they look for information assisting decision-making in everyday life. Compared to mobile tracking, a walk-through and asking about decision-making points were both qualitative methods for understanding their information behaviours, but they are different from traditional interviews where questions are designed based on the researcher's information seeking experience, allowing the study of information seeking practice from the respondents' perspectives.

3.3.2 Qualitative methods

In addition to understand general patterns revealed in surveys and mobile tracking applications, I used qualitative approaches to explore the complexities and diversities of ICT use in everyday information practices. Through participation, close observation, structured interviews, and focus group studies, I explored how villagers and factory workers engaged in everyday information practices and how they made sense of information from various information sources. Qualitative methods play important roles in this research: they provided ways to study the internet and information practice in users' social contexts, which enabled me to explore closely how ICTs fit into individuals' mundane and routine lives. Studying information behaviours through qualitative methods also enhanced my relationship with research participants, allowing me to be fully engaged

in the communities and understand the complex social context in which information seeking practices took place (Appendix C shows outline of interviews).

Structured interviews.

Fossil Village. 74 survey respondents were willing to join in the interviews. Based on their representativeness in terms of age, gender, education background, and internet use variables, I selected 25 villages to participate in structured interviews. Each interview lasted 30 to 45 minutes and consisted of 15 topics including but not limited to information needs, Internet experiences, mobile phone experiences, information sources, online news information, social media information, self-development information, shopping and consumption information, health information, misinformation and rumours, information overload, information searches, and the like.

Western Factory. 91 out of 228 survey respondents explicitly expressed their willingness to participate in the followed-up qualitative studies in Western Factory, which means I could have a larger sample for interviews compared to the first phase of my fieldwork. Thanks to the larger pool of the qualitative sample, I slightly adjusted the sampling technique in the qualitative study, by using both descriptive data from the survey and the data saturation criterion to select a sample of survey respondents who were willing to participate in an interview or focus group study. I intentionally chose interviewees who belonged to the different age and gender groups, with differentiated levels of internet skills, and sampled from both managers and workers. To do this, I calculated the mean values for age, gender, internet experience, the confidence of information seeking skills on the internet, and the ratio of managers to workers. Based on the analysis, I chose 30 survey respondents who are representative of different groups according to the variables as mentioned above and invited them to participate in individual interviews.

Focus group studies.

After finishing the first round of interviews in Western Factory, I checked the transcripts of interviews and identified questions that entail more varieties or findings that need further investigation. Four focus group studies, each consisting of participants from different groups, were conducted to check if data saturation has been reached. The combination of both sample descriptive data and saturation as criteria for selecting a sample or qualitative research ensures the data covers diversified groups of individuals as well as that it reaches enough depth for the research topic.

Qualitative data analysis.

All interviews and focus group studies were either audio or video recorded, with the consent of interviewees. Each recording lasted between 30 minutes to 2 hours. All recordings were uploaded to an encrypted hard drive and later transcribed into text formats by me, using a professional transcribing software, F5[39]. I did not outsource the transcription of interview data for two reasons. First, many interviews contain private information, such as age, name, and medical history of participants. Some interviewees also express strong opinions against certain social policies or officials in local government, which are politically sensitive in China. The detailed transcriptions of interviews are valuable resources for comparative or collaborative research in the future (Guest, MacQueen, & Namey, 2014). Transcribed scripts of interviews and focus group studies were then imported in qualitative data analysis software, MAXQDA[40].

I used the thematic analytic strategy to process text, images, and videoclips collected from the interviews and focus group studies (Longhofer, Floersch, & Hoy, 2012). Thematic analysis is "a method for identifying, analysing, and interpreting

[39] https://www.audiotranskription.de/english/f4
[40] VERBI Software, MAXQDA 2018, software, 2017, https://www.maxqda.com.

patterns of meaning ('themes') within qualitative data" (Clarke & Braun, 2016, p. 297). The coding process included two stages: 1) In the first round of coding, I read through all the transcriptions and coded the text for each interview question. The first round of coding also helped to detect new themes that emerged from the interviews, for example, recommendation systems or trust in different information sources. 2) In the second round of coding, I looked into quotations for each interview question and coded underlying themes (for example, motivations, variations, causes, problems, and solutions). The two stages of coding analysis helped to identify patterns in behaviours that could then be used to provide explanations or inform hypotheses for quantitative analysis.

3.4 Summary of the chapter

Everyday information practices are deeply embedded in individuals' daily practices, which means that to study them one needs to observe and interact with the respondents daily and to understand information practices through rich and diverse empirical data. In this project, I spent more than a year living, working and socialising with residents and workers from a Chinese village and a factory, building close relationships with locals and actively engaging in local communities. Fossil Village and Western Factory are two representative communities of Central China, where the Internet has profoundly transformed everyday lives. This project aims to provide a closer examination of how the internet changes everyday information practices and how these changes empower or constrain the information poor and the information have-less among Chinese rural residents and the working-class. Understanding the variances, influences and consequences of the internet and everyday information practices helps to formulate a theory of information practices in the digital era and enriches our understanding of the social dynamics of digital technologies.

Using a mixed methods design that integrates both quantitative and qualitative data at every stage of research, this research project studies comprehensively how the Internet is accepted, accessed, and accommodated in everyday information seeking in China, within various specific information contexts. Each research method has its advantages and disadvantages: While self-reported surveys provide demographic information and pictures of the overall adoption and use of ICTs in everyday life, using surveys alone could not reveal detailed reasons behind digital divides nor individual's rationales for using a specific information source. Qualitative interviews and focus group studies, on the other hand, enable me to understand the mechanisms behind the influence of ICTs on information seeking processes. Meanwhile, mobile logging studies, despite the small sample size, collect data on mobile phone usage, which delivers valuable insights into the behavioural patterns behind an individual's daily interactions with ICTs. Oral walk-through or video demonstration of information seeking processes, both of which were alternative methods for mobile-logging studies, depict through audio or video documentation of information practices how users choose online or offline informational tools, form information seeking queries, identify reliable information resources, and locate results that they find helpful. Quantifying user behaviours through mobile logging or qualitatively documenting information seeking process were conducted as part of the in-depth structured interviews or focus group studies, which provides the social contexts of the information seeking scenarios. The combination of methods from different paradigms has yields findings that would not be revealed with a single method design. Therefore, quantitative and qualitative methods used in this project complement each other to give a comprehensive view of everyday information practices in the digital era.

Chapter 4 The digital divide in the adoption and use of the Internet in everyday life: A Comparative study of rural and urban Central China

In this chapter, I will first use descriptive data analysis to summarise the demographics and map ICT adoptions and use in two communities: Fossil Village and Western Factory. I will then apply multivariate regression analysis using the survey data to answer the research questions concerning digital divides in the adoption and use of the Internet and variations in engagement with different online activities. Qualitative data analysis will help further explore the mechanisms behind digital gaps.

4.1 Descriptive data analysis: Demographics, adoption and use of ICTs

4.1.1 Demographics of rural and urban samples

Table 5 shows the descriptive statistics of demographic variables, including age, gender, marital status, whether one has at least one child, education level, monthly disposable income, whether one has migrant experience, the location of migrant experience, time spent working in larger as migrant workers. Respondents in the urban sample are on average younger than those in the rural sample. Both samples have a higher percentage of female than male participants and mainly consist of married individuals who have at least one child. The majority of rural participants have an education level of Middle school or below, whereas more than half of the urban participants have received education at vocational school or even undergraduate level. It is interesting that monthly disposable income does not statistically differ between rural and urban participants, with an average income of around 2335.45 yuan, higher than China's average per capita disposable income of 1077.67[41]. A higher percentage of rural participants have worked as migrant workers compared to urban participants. More than half of the rural migrant workers have worked in first-tier cities such as Beijing, compared to only 25.64 per cent

[41] http://www.chinadaily.com.cn/business/2017-07/17/content_30140898.htm

among the urban migrants. Rural migrant workers also tend to spend longer time working outside than their urban counterparts.

4.1.2 ICT adoption

Table 6 shows the summary statistics of variables related to the adoption of ICTs among rural and urban residents. The penetration rate of computers and mobile phone devices in the rural sample has reached 47.66 and 96.09 per cent respectively. The adoption of computers, however, is, 94.20 per cent in urban China and all the surveyed urban residents have a mobile phone. There is a higher proportion of mobile-only users, those who depend solely on mobile phones as ICT devices, in rural than in urban China. Two-thirds of the surveyed rural residents have mobile Internet access, compared to 100 per cent among urban residents. Internet users, including PC and mobile Internet, account for 74.22 per cent of surveyed rural residents, whereas all the surveyed urban residents use the Internet. Descriptive data thus suggests that there is an adoption gap between rural and urban China in the adoption of ICT devices and the Internet.

4.1.3 ICT experience and online engagement

I used years of using PC or mobile phone as a measurement of technology experience: Rural PC users are less experienced than urban PC users; however, there is no statistical difference in mobile experience between rural and urban mobile phone users. Online engagement in everyday life is operationalised by time spent online per day in the survey: Rural Internet users spend fewer hours online than their urban counterparts. Among the users of ICT devices (see Figure 17), there are also rural-urban differences in experience in using technologies and online engagement. Relationships between Internet adoption, experience, and engagement will be explored in the next section.

A 5-point Likert Scale was used to measure respondents' engagement in various online activities, with scales ranging from "Never use", "Rarely use", "Occasionally use",

"Frequently use", to "Use every time I am online". Table 7 compares the mean score of engagement in each online activity by rural and urban Internet users and shows the t-test statistics for independence between residence (rural or urban) and online engagement. Figure 18 visualises engagement in online activities using summary statistics for the percentage of different scales. Both the table and the figure show that rural users are less engaged in almost all Internet activities compared to urban Internet users, except for social media and music or live video, in which rural users have higher mean scores.

4.1.4 Summary

In this section, I looked at the descriptive statistics of demographic variables, adoption of ICTs, ICT experience and online engagement. Both samples contain diverse social groups in rural and urban Central China. Mobile phone penetration rate is high in both rural and urban areas; however, rural residents have a lower adoption rate of PC and a higher percentage of mobile-only users. The Internet adoption rate in rural China has reached 74.2%, and the surveyed urban community has 100 per cent of Internet penetration rate. Among the users of ICT devices, there are also rural-urban differences in experience in using technologies and online engagement: rural ICT users are in general less experienced in using technologies and are less engaged in various online activities than urban users. Relationships between demographic variables and Internet adoption, experience, and engagement will be explored in the next section.

Variable Name	Fossil Village (N_1 = 128)			Western Factory (N_2 = 229)			Test for Independence[b]	P-value
	n	Frequency	Percentage	*n*	Frequency	Percentage		
Age[a]	122	Mean = 43.90 SD = 10.30 min = 18 max = 81		213	Mean = 36.57 SD = 8.17 min = 23 max = 59		Independent T-test t-statistics = 6.74, df = 208.44	<.001***
Gender	128			222			Chi-square Test	0.403
Male		63	49.22		99	44.59	$\chi2 = 0.69$, df = 1	
Female		65	50.78		123	55.41		
Marital Status	128			222			Chi-square Test	0.006**
Single		4	3.12		26	11.71	$\chi2 = 7.64$, df = 1	
Married		124	96.88		196	88.29		
Have Child	128			222			Chi-square Test	<.001***
No		3	2.34		36	16.22	$\chi2 = 15.78$, df = 1	
Yes		125	97.66		186	83.78		
Education[42]	128			226			Chi-square Test	<.001***
Middle School (or below)		99	77.34		16	7.08	$\chi2 = 201$, df = 3	
High School		23	17.97		50	22.12		
Vocational School		4	3.12		103	45.58		
Undergraduate (or above)		2	1.56		57	25.22		
Monthly Disposable Income[a]	127	Mean = 2434.02 SD = 1280.012 min = 291 max = 8333		205	Mean = 2274.39 SD = 964.92 min = 0 max = 5000		Independent T-test t-statistics = 1.21, df = 213.95	.228
Migrant Experience	128			221			Chi-square Test	.009**
No		99	77.34		141	63.80	$\chi2 = 6.92$, df = 1	
Yes		29	22.66		80	36.20		
Migrant Location	29			78			Fisher's Exact Test	<.001***
First tier cities (i.e. Beijing)		15	51.72		20	25.64		
Second tier cities (i.e. Xi'an)		1	3.45		31	39.74		
Third tier cities (i.e. Xiangyang)		4	13.79		22	28.21		
Counties (i.e. Happy Valley)		9	31.03		5	6.41		
Migrant Years[a]	29	Mean = 4.55 SD = 4.24 min = 0.25 max = 17		77	Mean = 2.68 SD = 3.23 min = 0.1 max = 15		Independent T-test t-statistics = 2.15, df = 41.37	.037*

[a] Age, Monthly Income, and Migrant Years are continuous variables, which are measured by years, Chinese Yuan, and years respectively.

[42] Education is measured as a categorical variable: 1 = Middle School; 2 = High School; 3 = Vocational School, 4 = Undergraduate (or above)

Table 5. Descriptive statistics of demographic variables in Fossil Village and Western Factory sample

[b] Statistical tests show whether rural/urban residency and each demographic variable are independent or not. Fishers's Exact instead of Chi-square test will be used when expected values in any cell is less than 5. **p<.05, **p<.01, ***p<.001*

Table 6. Descriptive statistics of ICT adoption and experience variables in Fossil Village and Western Factory sample

Variable Name	Fossil Village (N_1 = 128)			Western Factory (N_2 = 229)			Test for Independence[b]	P-value
	n	Frequency	Percentage	*n*	Frequency	Percentage		
Has PC	128			224			Chi-square Test	<.001***
No		67	52.34		13	5.80	$\chi2$ = 100.46, df = 1	
Yes		61	47.66		211	94.20		
Has Mobile Phone	128			226			Fisher's Exact Test	.006**
No		5	3.91		0	0		
Yes		123	96.09		226	100		
Mobile-Only User	80			225			Chi-square Test	<.001***
No		18	22.50		115	51.11	$\chi2$ = 19.64, df = 1	
Yes		62	77.50		110	48.89		
Has Mobile Internet	123			226			Chi-square Test	<.001***
No		41	33.33		0	0	$\chi2$ = 85.36, df = 1	
Yes		82	66.67		226	100		
Has PC Internet	61			211			Fisher's Exact Test	.0384
No		3	4.92		5	2.37		
Yes		58	95.08		206	97.63		
Has Internet	128			227			Chi-square Test	<.001***
No		33	25.78		0	0	$\chi2$ = 64.52, df = 1	
Yes		95	74.22		227	100		
PC Years[a]	57	Mean = 6.18 SD = 3.82 min = 1 max = 22		209	Mean = 8.42 SD = 3.68 min = 0.5 max = 20		Independent T-test t-statistics = -4.1, df = 86	<.001***
Mobile Years[a]	119	Mean = 11.42 SD = 5.05 min = 2.0 max = 27		225	Mean = 11.67 SD = 4.31 min = 0.5 max = 25		Independent T-test t-statistics = -0.46, df = 210	.60
Time Spent Online [a]	80	Mean = 2.23 SD = 1.81 min = 0.17 max = 8		217	Mean = 3.22 SD = 2.56 min = 0.17 max = 14		Independent T-test t-statistics = -3.7, df = 200	<.001***

[a] PC Years, Mobile Years, and Time Spent Online are continuous variables, which are measured by years, Chinese Yuan, and years respectively.
[b] Statistical tests show whether rural/urban residency and each demographic variable are independent or not. Fishers's Exact instead of Chi-square test will be used when expected values in any cell is less than 5. **p<.05, **p<.01, ***p<.001*

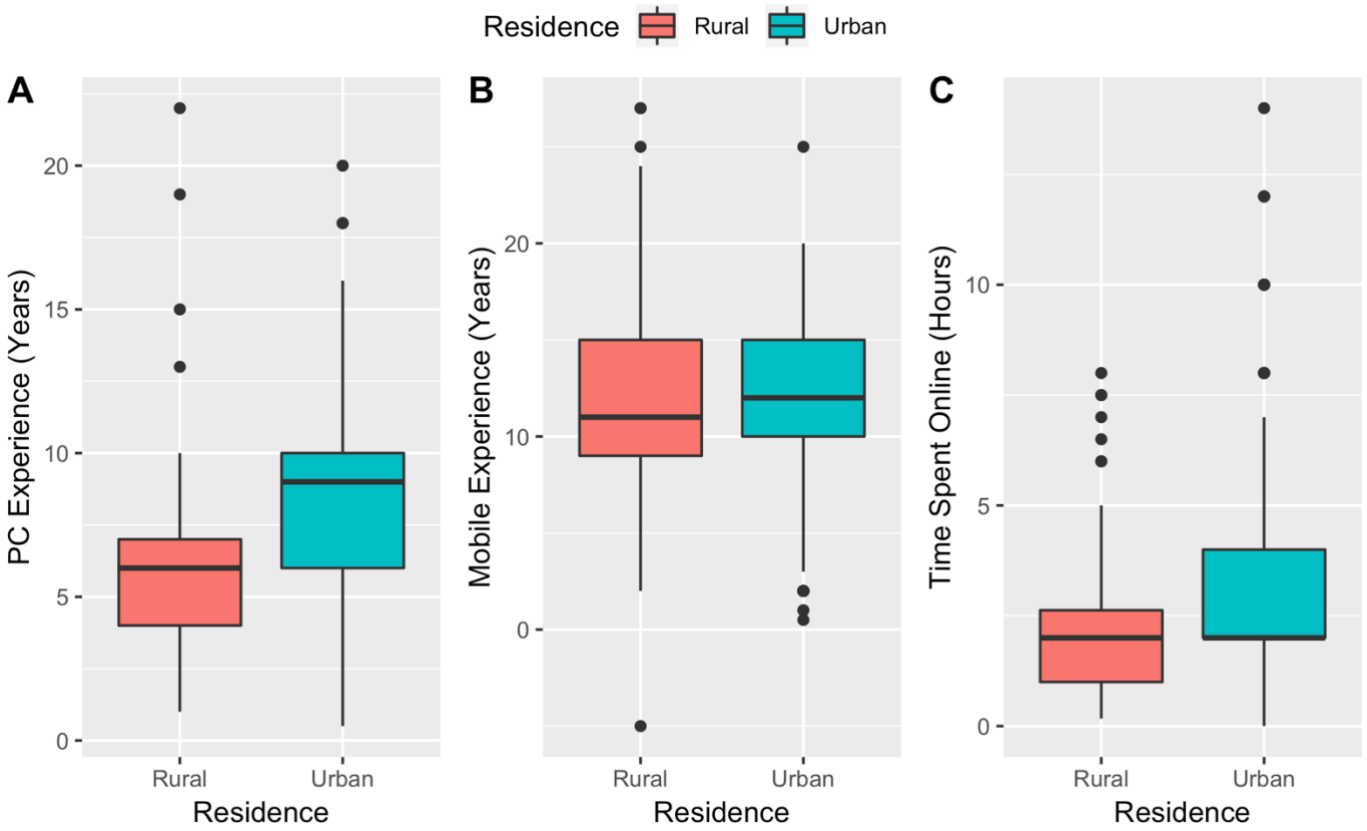


Figure 17. Bar plots of PC experience, mobile experience, and time spent online per day by rural and urban ICT users

Table 7. Descriptive statistics of engagement in various online activities in Fossil Village and Western Factory samples

Variable Name	Fossil Village (N_1 = 128)		Western Factory (N_2 = 229)		T-test statistics	df	P-value
	Mean	SD	Mean	SD			
Internet Activities: Document Processing	1.44	0.79	3.14	1.17	-11.98	295	<.001***
Internet Activities: Voice or Video Calls	3.29	0.93	3.94	0.73	-6.34	297	<.001***
Internet Activities: SMS	3.73	1.02	4.16	0.72	-4.13	297	<.001***
Internet Activities: Emails	1.43	0.85	2.92	1.00	-11.92	293	<.001***
Internet Activities: Games	1.80	1.08	2.32	1.11	-3.57	286	<.001***
Internet Activities: Photos or Video	3.19	0.78	3.31	0.89	-1.12	295	0.27
Internet Activities: Search Engine	2.66	1.22	3.56	1.07	-6.16	290	<.001***
Internet Activities: Social Media	4.31	0.88	4.19	0.86	1.06	296	0.29
Internet Activities: Music or Live Video	3.53	1.02	3.43	0.87	0.76	290	0.45
Internet Activities: Navigation	2.03	1.15	2.89	0.91	-6.72	294	<.001***
Internet Activities: Finance	2.49	1.34	3.69	0.83	-9.28	294	<.001***
Internet Activities: Shopping	2.10	1.30	3.23	0.93	-8.34	296	<.001***
Internet Activities: Ecommerce	1.35	0.97	2.21	1.25	-5.58	293	<.001***
Internet Activities: Ebooks or MOOCs	2.11	1.21	2.76	1.04	-4.55	297	<.001***
Internet Activities: Browsing News [Factory only][a]	.	.	3.96	0.79			

[a] Online news browsing is only included in the urban survey
*$p<.05$
**$p<.01$
***$p<.001$

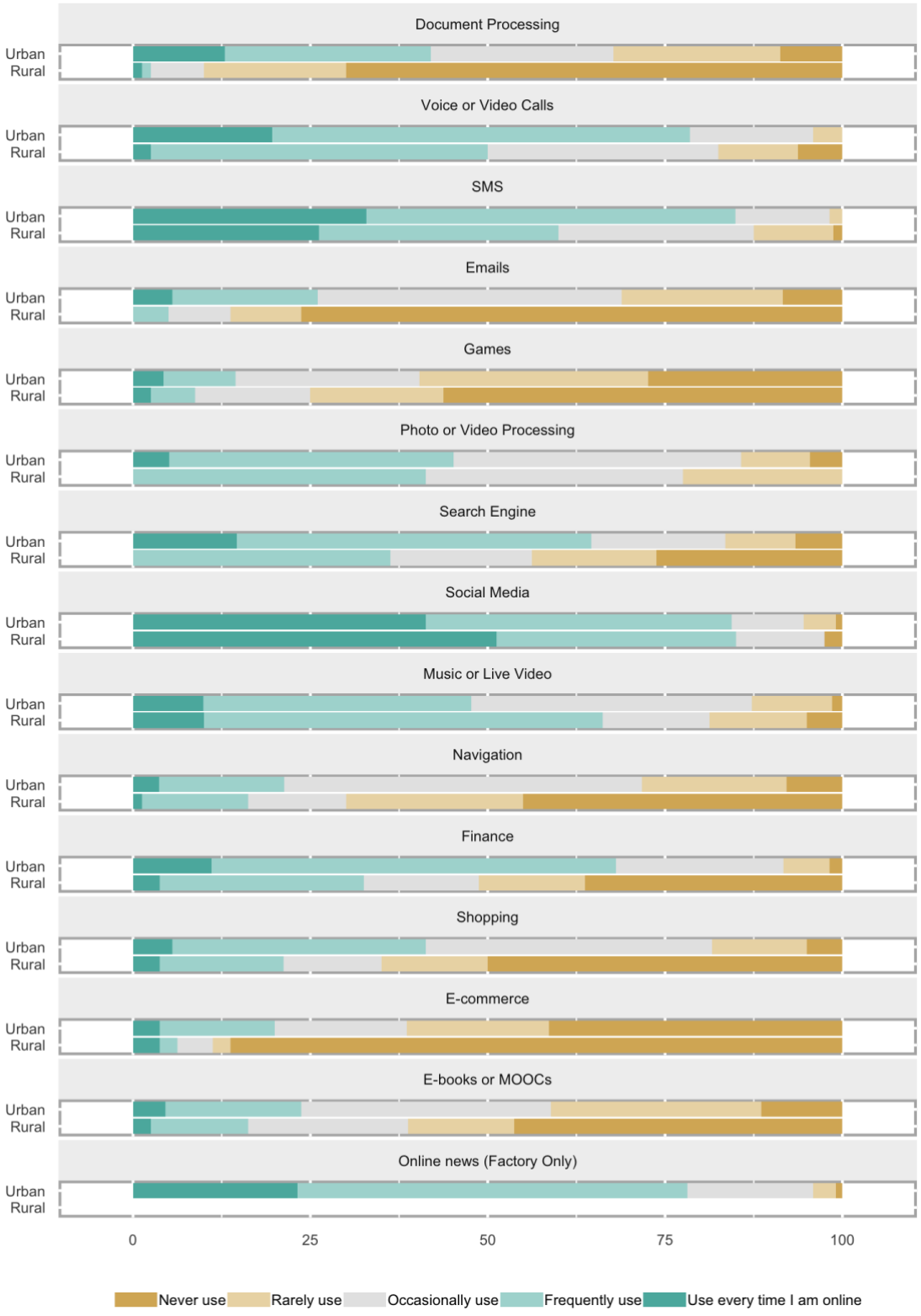


Figure 18. Comparison of online engagement in various Internet activities between rural and urban Internet use

4.2 Access divides: ICT adoption, experience, and engagement

4.2.1 Demographic variance in ICT adoption

Adoption of the Internet and mobile-only users.

A binomial logistic regression was conducted to examine the relationship between demographic variables on the likelihood of the adoption of the Internet, including PC Internet or mobile Internet. Before fitting the binomial logistic regression, a backward stepwise model selection process was used to find the best fitting model based on the Akaike Information Criterion (AIC). Based on the final model (See Table 9), age was found to be linearly related to the logit of the adoption of the Internet. The model that predicts the adoption of the Internet used age as the explanatory variable, $\chi 2(1) = 24.24$, $p < .001$, which explained 27.3% (Nagelkerke R^2) of the variance in Internet adoption. With the increase in age, the likelihood of adopting the Internet decreases.

Previous empirical studies have suggested the rising population of mobile-only users, who rely solely on mobile devices to access the Internet. Some empirical studies suggest that mobile-only users might feel constrained by expensive mobile data, the limited functionalities of the mobile Internet compared to the broadband Internet, and the lack of experience in using capital-enhancing Internet functions such as document processing and management (Donner, 2015). I ran a binomial logistic regression on the likelihood of becoming mobile-only users, with demographic variables as predictors (See Table 10). The backward stepwise model selection process shows the final model for being a mobile-only user contains only one demographic variable, age, as the predictor. It shows that the model predicts whether the user is mobile-only with one's age, $\chi 2(1) = 16.89$, $p < .001$. It explains 27.3% (Nagelkerke R^2) of the variance in being mobile-only. The result suggests that the older generation in Central China are not only more likely to

be non-users of the Internet; among those of them who use the Internet, they are more likely than the younger generation to become "mobile-only users".

Experience of using PC and mobile phone.

Experience of using ICTs is measured both by the number of years using a mobile phone and the number of years using a PC. To find out what demographic variables are associated with ICT experience, I ran two multiple linear regressions with ICT experience variables as outcome variables and demographic variables as predictors. To select the best fitting model, I first used a backward stepwise model selection processes, which starts with all predictors added in the model and removes variables based on the AIC criteria. Two multiple linear regression models were then generated according to the model selection result. The summary of the model of experience of using a mobile phone is shown in Table 11, and the summary of the model of experience of using a PC is shown in Table 11[43].

Experience of using a mobile phone is found to be associated with residence, age and whether the participant has migrant experience in larger cities, $F(8, 296) = 3.74$, $p < .001$. The three demographic variables account for 6.3% of the explained variability in mobile phone experience. Urban residents, the older generation, and those who have worked as migrants in larger cities are more likely to have long experience in using mobile phones, with other demographic variables held constant. Experience of using a PC, on the other hand, is significantly associated with age and education level ($F(8, 226) = 4.66$, $p < .001$). The two explanatory variables account for 11.11% of the variability in PC experience. The older generation and users who have an education level at high

[43] Both regression models are assessed using a scatter plots of fitted values against residuals, which shows random distribution around 0, indicating the assumption of linearity and homoscedasticity have been met. I also used VIF values to check for multicollinearity in predictors, which shows that all VIF values are less than 10 and have mean VIF close to 1, indicating that there is no concern for multilinearity.

school or above are more likely to use PCs for more years, with other demographic variables held constant.

Everyday online engagement.

Everyday online engagement level is operationalised in the survey by the number of hours spent online. A backward stepwise model selection process was used to find the best linear models concerning online engagement, with demographic variables as explanatory variables. Assumptions of linearity and homoscedasticity were met, and independent variables did not show collinearity.

As shown in Table 13, everyday online engagement is associated with education level and age, $F(8, 257) = 4.88$, $p < .001$. The two explanatory variables altogether account for 10.48% of the total explained variability in online enjoinment. Those who have attended vocational school or have an education level above undergraduate spend longer hours online than those who have education below high school. The older Internet users tend to spend shorter hours online than the younger generation, holding other demographic variables constant.

Summary.

In this section, I explored the relationships between demographic variables and the adoption of the Internet, being a mobile-only user, ICT experiences (mobile phone and PC), and everyday online engagement. Logistic and multiple linear regression results suggest that age is the most important demographic factors in predicting the adoption of the Internet and being mobile-only users: older generations are less likely than younger generations to adopt the Internet and more likely to rely solely on mobile devices to access the Internet. Among the mobile phone users, I found that an increase in age, along with having migrant experience and being urban residents, are associated with longer experiences of using mobile phones. This finding echoes Oreglia's empirical study of the

role of migrant workers in bringing ICTs from cities to rural China (Oreglia, 2015). Survey analysis shows that migrant workers are indeed more experienced mobile phone users. Experience of using PCs and everyday online engagement are both associated with age and education level. Age is positively related to PC experience but is negatively associated to online engagement levels. ICT users with higher education level are more likely to have more PC experience and spend longer time online. The regression results also suggest that some demographic variables, such as gender, monthly income are less important factors in ICT adoption, experience, and engagement in Central China. In the next section, I will use qualitative data from independent interviews and focus group studies on explaining how age, education, migrant experience and rural-urban residence influence Internet adoption, experience, and engagement, and exploring why gender and monthly income are less important demographic factors in these processes.

Table 8. Logistic Regression Models for Internet Adoption

	B	**SE**	**z value**	***P***	**Odds Ratio**	**95% CI for Odds Ratios**	
						Lower	**Upper**
Step 1[a]							
Constant	6.08	1.94	3.14	.002**	436.01	6.08	1.94
Age	-0.11	0.04	-2.98	.003**	0.90	-0.11	0.04
Gender Female	0.69	0.51	1.35	.18	1.99	0.69	0.51
Education High School	-0.29	0.74	-0.39	.70	0.75	-0.29	0.74
Education Vocational School	14.19	1857.00	0.01	.99	1450000.00	14.19	1857.00
Education Undergraduate (or above)	14.31	2474.00	0.01	1.00	1640000.00	14.31	2474.00
Monthly Income	0.00	0.00	-0.95	.35	1.00	0.00	0.00
Migrant Worker Yes	1.89	1.12	1.69	.09^	6.64	1.89	1.12
Step 2[b]							
Constant	7.48	1.68	4.46	<.001***	1780.09	7.48	1.68
Age	-0.13	0.03	-3.93	<.001***	0.88	-0.13	0.03

[a] Note. R^2= .226 (Hosmer–Lemeshow), .217 (Cox–Snell), .328 (Nagelkerke). Model $\chi2(7) = 29.546$, $p < .001$.
[b] Note. R^2= .184 (Hosmer–Lemeshow), .18 (Cox–Snell), .273 (Nagelkerke). Model $\chi2(1) = 24.237$, $p < .001$.
*** p<.001; ** p <.01; * p <0.05; ^p< 0.1

Table 9. Logistic Regression Models for Mobile-only Users

	B	SE	z value	*p*	Odds Ratio	95% CI for Odds Ratios	
						Lower	Upper
Step 1 [a]							
Constant	-1.81	2.51	-0.72	.47	0.16	-1.81	2.51
Age	0.08	0.05	1.73	.08^	1.09	0.08	0.05
Gender Female	0.73	0.79	0.93	.36	2.08	0.73	0.79
Education High School	-1.15	0.78	-1.46	.14	0.32	-1.15	0.78
Education Vocational School	-18.53	1927.00	-0.01	.99	0.00	-18.53	1927.00
Education Undergraduate (or above)	-18.58	2797.00	-0.01	1.00	0.00	-18.58	2797.00
MonthlyIncome	0.00	0.00	0.31	.75	1.00	0.00	0.00
MigrantWorker Yes	-0.32	0.84	-0.38	.70	0.73	-0.32	0.84
Step 2 [b]							
Constant	-3.99	1.40	-2.85	.004**	0.02	-3.99	1.40
Age	0.14	0.04	3.61	<.001***	1.15	0.14	0.04

[a] Note. R^2= .374 (Hosmer–Lemeshow), .333(Cox–Snell), .503 (Nagelkerke). Model $\chi 2(7) = 31.53022$, $p < .001$.
[b] Note. R^2= .184 (Hosmer–Lemeshow), .18 (Cox–Snell), .273 (Nagelkerke). Model $\chi 2(1) = 16.88602$, $p < .001$.
*** p<.001; ** p <.01; * p <0.05; ^p< 0.1

Table 10. Multiple Regression Models for Mobile Experience,

	ΔR^2	*B*	*SE B*	*β*	*p*
Step 1	0.071				
(Constant)		6.10	1.79		<.001***
Residence Urban		1.04	0.85	0.11	.22
Age		0.11	0.04	0.22	.002**
Gender Female		-0.71	0.54	-0.08	.18
Education High School		0.48	0.89	0.12	.59
Education Vocational School		0.12	1.06	28.32	.91
Education Undergraduate (or above)		-0.56	1.19	-0.06	.64
Monthly Income		0.00	0.00	0.00	.38
Migrant Worker Yes		1.85	0.59	3.80	.002**
Step 2	0.063				
(Constant)		5.34	1.38		<.001***
Residence Urban		0.98	0.55	0.10	.07^
Age		0.13	0.03	0.27	<.001***
Migrant Worker Yes		2.05	0.54	0.21	<.001***

Model 1: F(3,230) = 9.26, $p < .001$; Model 2: F(8, 296) = 3.74, $p < .001$
*** p<.001; ** p <.01; * p <0.05; ^p< 0.1

Table 11. Multiple Regression Models for PC Experience

	ΔR^2	*B*	*SE B*	*β*	*p*
Step 1	0.11				
(Constant)		0.39	1.83		.83
Residence Urban		1.06	0.83	0.12	.20
Age		0.11	0.04	0.25	.004**
Gender Female		0.76	0.50	0.10	.13
Education High School		2.12	0.89	0.58	.02*
Education Vocational School		3.37	1.04	891.22	.001**
Education Undergraduate (or above)		2.67	1.17	0.34	.02*
Monthly Income		0.00	0.00	0.00	.84
Migrant Worker Yes		0.45	0.54	1.03	.40
Step 2	0.1111				
(Constant)		1.67	1.56		.28
Education High School		2.63	0.71	0.71	<.001***
Education Vocational School		4.19	0.71	9.61	<.001***
Education Undergraduate (or above)		3.25	0.85	0.88	<.001***
Age		0.10	0.03	0.22	.003**

Model 1: F(4, 247) = 8.76, $p < .001$; Model 2: F(8, 226) = 4.66, $p < .001$
*** p<.001; ** p <.01; * p <0.05; ^p< 0.1

Table 12. Multiple Regression Models for Time Spent Online

	ΔR^2	*B*	*SE B*	*β*	*p*
Step 1	0.1083				
(Constant)		4.04	0.96		<.001***
Residence Urban		0.26	0.45	0.05	.56
Age		0.06	0.02	-0.21	.005**
Gender Female		-0.18	0.29	-0.04	.53
Education High School		0.28	0.48	0.13	.56
Education Vocational School		0.47	0.55	216.16	.39
Education Undergraduate (or above)		0.92	0.63	0.19	.14
Monthly Income		0.00	0.00	0.00	.20
Migrant Worker Yes		0.36	0.30	1.35	.23
Step 2	0.1048				
(Constant)		4.54	0.83		<.001***
Education High School		0.39	0.40	0.18	.33
Education Vocational School		0.83	0.38	3.03	.03*
Education Undergraduate (or above)		0.03	0.45	0.53	.0096**
Age		-0.06	0.02	0.22	.001**

Model 1: F(4, 279) = 9.595, $p < .001$; Model 2: F(8, 257) = 4.88, $p < .001$
*** $p<.001$; ** $p<.01$; * $p<0.05$; ^$p< 0.1$

4.2.2 Understanding the social mechanisms behind the access divide

Previous sections have shown that despite the wide penetration and increasing uptake of ICTs in Central China, there are still digital divides in the adoption of the Internet, ICT experiences, and everyday online engagement among different demographic groups. Meanwhile, some demographic variables such as income level and gender, which were documented as important factors for ICT adoption and use in previous fieldwork in China (Wallis, 2013), were not found to be associated with ICT adoption in this research. Data analysis on qualitative interviews and focus group studies reveal the mechanisms behind ICT adoption in rural and urban China, showing how demographic variables such as age, urban residence or migrant experience, and education, influence grassroots technology development.

The Generational gap in ICT adoption.

Survey analysis shows that age is an explanatory factor for all ICT adoption variables. Older generations are less likely to adopt the Internet and more likely to depend on mobile phones as the sole Internet device. Although older generations, in general, have

more extended experience of using both mobile phone and PC, they are less engaged online. The generational gap in ICT adoption was frequently mentioned in the interviews by middle-aged or elderly interviewees.

The main barrier that constrains older adults to access the Internet is the lack of familiarity with *pinyin*, one of the most popular ways of spelling Chinese characters using the alphabet on PC or mobile phone keyboards. Shun, aged 63, is a well-respected village leader. He only recently started using WeChat on his Huawei smartphone in early 2016. He complained about the difficulties in using the Internet due to his poor spelling skills:

> People around my age are undereducated in rural areas. I didn't have the chance to attend school and learned to read by myself. I could only handwrite very few characters (*shouxie*, 手写) on my mobile phone. I know *pinyin* is more efficient than other input, but I don't even know how to pronounce proper mandarin, let alone spelling it on my phone… That's why I don't use the Internet that much, because of my poor spelling and typing skills.

Yue, aged 48, has only attended primary school in Fossil Village. She started using the Internet to avoid "becoming the lagging behind 'antique', who couldn't have interesting conversations with the young generations in the village". Like Shun, she also finds *pinyin* extremely difficult. She also tried voice input but was often misunderstood by her smartphone due to her Henan accent. Nevertheless, Yue told me that the increasingly diversified information format available on the Internet had helped the older generation in rural China to access online information despite their lack of literacy:

> I am a slow reader, but I am good at memorising images and videos. I use music or video apps instead of news apps that are full of texts. Applications nowadays are more user-friendly than a few years ago: They replaced text titles with pictures of singers or dancers, which is so convenient for people like me, who find typing and searching challenging.

By memorising profile pictures of her favourite dancing tutorial video, Yue learned group dancing on her mobile phone. However, her online engagement is still constrained by the lack of knowledge in *pinyin* input. She feels stressful when "opening an app that seems informative" and "seeing the sheer amount of new information in text

format". But she has found out that by using the recommendation system within the applications, which automatically tailors content based on her previous viewing history.

Although Internet adoption in rural China is lower among the older generation, after conducting interviews with those who do not have direct access to mobile or PC Internet, I would not label this group of rural residents as "non-users" of the Internet. Part of the reason why elderly users do not start using the Internet is due to their access to Internet proxies, relatives, friends and neighbours to help them find information, make online purchases, and even download videos on the Internet. 62-year-old Qiang is the father of the most accomplished businessmen in Fossil Village. Qiang helped his son at the local shop. When asked about his barriers in accessing the Internet, he replied, "I tried to learn typing *pinyin* for a while and failed. Now I suddenly feel that since there are so many young people around me, I don't have to learn." Qiang showed me a QR code printed on an A4 paper, which he used for accepting online payment by the customers, "This is my neighbour's WeChat wallet. She helps me to manage with money transfer tasks on the Internet." Qiang's grandson helped him to search for news reports and order products online. Yue also had her Internet proxy when she was new to the Internet. Yue's son, who worked in Happy Valley county, would send her links of online music videos on WeChat, introducing her to online resources beyond social media content.

To sum up, the older generation in rural China face challenges in using a keyboard to spell characters, which often hinders the adoption of the Internet and limits their online engagement. Recent technology development in voice recognition, recommendation systems, and diversified information resources have, however, helped elderly users to overcome the language barrier to ICT adoption. Internet and information proxies, including neighbours and children, play important roles in indirectly connecting the older generation in rural China to the Internet.

ICT diffusion from urban to rural China.

Survey data shows that urban users and rural users who have worked in the cities are more experienced users of mobile phones. any middle-aged interviewees describe the diffusion of ICTs from urban to rural Central China as a digital wave from the cities. For example, Fang, who is often the centre of the social circle in Fossil Village and a keen organiser of poker games, was introduced to the Internet three years ago by her daughter, who worked in Zhengzhou, the capital city of Henan Province. She explained why urban residents are early adopters of ICTs:

> We (rural residents) generally lack education compared to urban residents. It took us a longer time to adapt to new technologies. More importantly, we live in a community that is exclusive and don't have the chance to exchange information, knowledge, and technologies with other people. My daughter works in Zhengzhou. She meets more people and hears about more new information in a day than I could achieve in a year.

Young people who have worked in larger cities are often the proxies for new users of the Internet in rural China. Jing and her husband studied and worked in cities in the neighbouring province. Her husband took computer science classes in the vocational school. She vividly remembered how she skipped classes to go to an Internet bar with her classmates, "my classmates from urban areas have been using QQ for more than four years, but I was the only Internet dummy in the cohort." And now, going back from the urban area and running the family business in Fossil Village, she feels her whole life is spent online. She and her husband helped villagers to buy new phones from online retailers, and also helped fix mobile phones or PCs in their spare time:

> My relatives and neighbours in Fossil Village need information more than technical assistance from me. For example, they often ask me for recommendations on skincare brands. I know for a fact that they don't want to know about my opinion; they want me to look online for opinions of urban customers, who are more experienced than me. I know my opinions are not persuasive or useful for my friends. So, I search on Baidu or Taobao, showing them comments from other customers. When it comes to Internet experience, I think we (rural customers) are still too naïve.

Jing's observations about the rural-urban experience gap are supported by Shun, who frequently travels for work between the village and town centre and has witnessed the ICT development in both rural and urban areas in Happy Valley county:

> Many Internet functions were not accessible in Fossil Village. If you live in Happy Valley county, ordering a bowl of dumplings on the mobile phone takes a click and cash, of course. But here in rural areas, who would be stupid enough to take your order and deliver the food? It's just so remote from everything.

Shun thinks the lack of Internet experience among rural residents is in fact partly due to the lack of accessible Internet service available. Chang saw her family agritourism business grow thanks to the Internet is optimistic about ICT development in rural China:

> We have customers who come to live with us in Fossil Village just because of the so-called "health benefits" of living a rural life. I see a wave in the opposite direction, from rural to urban, advocating a rural lifestyle and rural diet.

Chang's experience reflects an increasing representation of Chinese rural population and rural everyday life on the Internet, which gradually introduces another wave of content generation and information diffusion from rural to urban China. This phenomenon has taken place on the Chinese Internet simultaneously with the urban-to-rural technology diffusion, and both trends suggest the accelerating exchange of technology and information between Chinese rural and urban societies.

PC adoption through formal education.

Education level is found in survey data analysis to be significantly associated with the experience of using PC and online engagement, with other demographic variables held constant. Interviews with participants who have a different education level suggest that the Chinese formal education system plays a crucial role in ICT adoption.

Yanbo, an 18-year-old high school graduate, told me how she adopted a PC after taking IT classes in high school. She attended middle school in Happy Valley county centre where IT classes are compulsory for all students. Before learning to use a PC,

Yanbo's mobile Internet activities mainly comprised chatting with friends on QQ or watching reality shows on iQiyi, an online video platform:

> The school introduced us to PC Internet, teaching basic skills such as using the search engine, and managing documents in Microsoft Office. There are tasks where I find PC more efficient than the mobile phone. For example, when working on my English writing, the search engine on PC displays files in a more readable way. Although I don't have PC at home, I use the PC at my classmate's house in the county centre and sometimes download TV drama and software for my mom.

Interviewees aged under 30 years old have learned PC skills mostly through formal education. Experience of using a PC was not considered as essential for ICT skills by the interviewees at first, but this group of ICT users often become Internet proxies for mobile-only users. Interviews with workers in Western Factory shows that PC skills are often required for management positions. Li, manager of one of the storage areas in the factory learned to use computers in the vocational school:

> I learned PC Internet in 1998 at school. I was one of the few workers in the factory who knew how to open and save files on computers. There was a position that required the use of PC and email to send and receive images of products in the 2000s. My school training on IT skills were proved to be useful.

Although the multi-functional mobile phone could satisfy most of the everyday information, communication and entertainment needs, the adoption and use of PC is still beneficial for individuals to live and work in the digital era. People who are not frequent users of PC but have a basic knowledge of computers are still advantaged in exploiting various Internet functions to solve problems and fulfil information needs. PC adoption through formal education is considered by many interviewers to be an efficient approach for gaining digital skills.

4.3 Use divides: everyday Internet activities

4.3.1 Demographic variance in everyday Internet use

Participation in various Internet activities was measured by 14 Likert-scale questions[44] in the survey. I conducted a Principal Components Analysis (PCA) on these 14 items with the varimax rotation, which maximises the dispersion of loadings within each factor. The Kaiser-Meyer-Olkin test suggests that the sampling size is adequate (KMO = .87, KMO values for each item are all above .80). The Bartless's test suggests that items were correlated for PCA ($\chi 2(91) = 1415.899$, $p < .001$). Initial analysis shows there are three components with eigenvalues greater than 1, and therefore I extracted three components using Kaiser's criterion. The four components explain 58.13% of the variance. A scree plot (Shown in Figure 19) also suggests that there should be three components in the PCA. In the second PCA analysis, three components remained in the factor loadings. Table 13 shows the summary of PCA results after rotation for the 14 items related to participation in Internet activities. Component 1 comprises Internet activities related to Culture and Online Consumption, component 2 consists of Internet activities related to Professional and Economic Practices, and component 3 includes activities for Social Networking and Communication. Component scores, which are the linear composite of original variables, were saved as new variables for further analysis. The PCA shows three underlying components in Internet activities and helps classify various Internet activities into three types: 1) culture and online consumption, 2) professional and economic practices, and 3) social networking and communication.

[44] In the urban sample, an extra question was added to measure participation in online news reading

Table 13. Summary of exploratory factor analysis results for participations in Internet activities

Items	Factor loadings (varimax rotated) [a]		
	Culture and Online Consumption	**Professional and Economic Practices**	**Social Networking and Communication**
Online shopping	**.66**	.50	.18
Navigation	**.65**	.40	.10
E-commerce	**.65**	.32	-.07
Photos or videos	**.60**	-.04	.38
Games	**.56**	.11	.03
Music or live video	**.53**	-.20	.45
E-books or MOOCs	**.50**	.36	.12
Processing documents	.12	**.84**	.09
Emails	.23	**.82**	.11
Money transfer	.53	**.56**	.27
Search engine	.40	**.50**	.35
Social media	.16	-.02	**.82**
SMS	.04	.28	**.76**
Voice or video calls	.07	.38	**.64**

[a] Factor loading are sorted by size

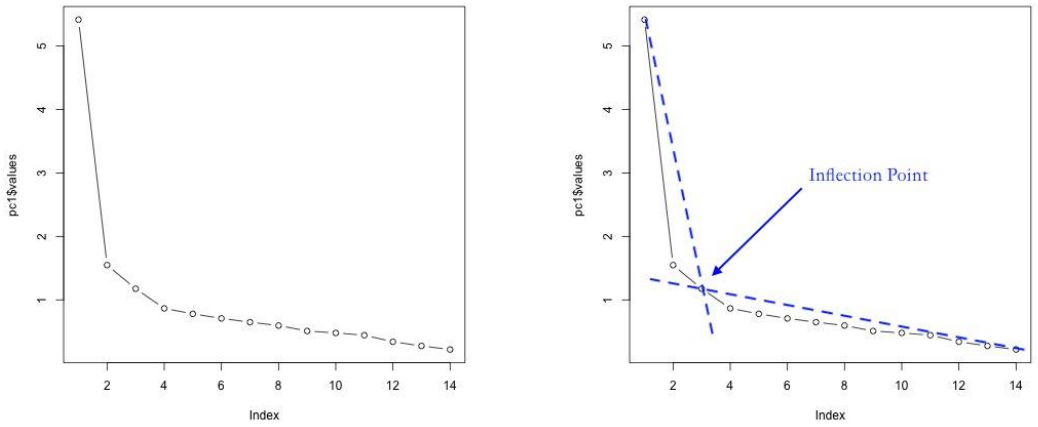


Figure 19. Scree Plot from the Principal Components Analysis of Internet Activities Items. Plot on the right shows the inflection point at the 3rd component.

Culture and Online Consumption.

I ran multiple regressions on the three components of Internet activities - culture and online consumption, professional and economic practices, and social networking and communication, with demographic variables as predictors. The backward stepwise method was employed to find the model that best improved the AIC score. Results from the multiple regression models are shown in Table 14.

In the model of the first component, culture and online consumption, three variables were found to be associated with this type of Internet activities: age, gender and

education, which account for 14.15% of the variance in online participation in culture and online consumption. The older generation and female Internet users are found to be less likely to participate in cultural activities or consume online than other users. Users who have attended high school are more likely to take part in this type of Internet activities than those who only attend primary and middle school.

Professional and Economic Practices.

The final multiple regression model for the second type of online activities, professional and economic practices, shows that urban residence, education above high school level, and having migrant experience are associated with more active participation in Internet activities such as processing documents, sending emails, money transfer and using search engines. People with a higher income level are also more likely to participate in this type of Internet activities. The model accounts for 60.14% of total variance in the dependent variable.

Social Networking and Communication.

The model for online participation in social networking and communication suggests that two demographic variables, gender and monthly income, are associated with the use of social media and SMS. Nevertheless, this model only accounts for 3.54% of total variance in the component, indicating that there might be other variables account for the use of the Internet for social networking and communication. But the model is still useful for exploring the significant demographic factors in the use of the Internet for social networking and communication. The older generation and users who have lower monthly income are less likely to participate in social networking and communication activities online.

Summary.

In this section, I used multiple regression models on three types of Internet activities, with demographic variables as predictors. The regression results suggest that there are demographic variances in all three types of online participation. First, elderly and female users are less likely to participate in culture, entertainment and online consumption activities. Users with high school degrees are more likely than users with lower education levels to participate in the first type of activities. Second, higher participation in professional and economic practices are explained by residence or migrant experience in urban areas, higher education level, and higher income level. Third, the older generation and users who have lower monthly income are less likely to participate in Internet activities related to social networking and communication. In the following section, I will use qualitative data to explore the demographic variance in three types of online participation.

Table 14. Multiple Regression Models for Three Types of Internet Activities

	Culture and Online Consumption					Professional and Economic Practices					Social Networking and Communication				
	ΔR^2	*B*	*SE B*	*β*	*p*	ΔR^2	*B*	*SE B*	*β*	*p*	ΔR^2	*B*	*SE B*	*β*	*p*
Step 1	0.1658					0.6082					0.02163				
(Constant)		1.41	0.41		<.001***		-1.79	0.30		<.001***		0.15	0.46		.74
Residence Urban		-0.03	0.20	-0.01	.88		0.74	0.14	0.34	<.001***		-0.11	0.22	-0.05	.62
Age		-0.04	0.01	-0.34	<.001***		0.01	0.01	0.06	.26		-0.02	0.01	-0.13	.11
Gender Female		-0.04	0.01	-0.15	.02*		-0.03	0.09	-0.02	.74		0.13	0.14	0.07	.34
Education High School		0.58	0.21	0.66	.006**		0.56	0.15	0.60	<.001***		0.01	0.23	0.01	.96
Education Vocational School		0.21	0.25	222.00	.40		1.06	0.18	1090.00	<.001***		0.11	0.27	116.00	.69
Education Undergraduate (or above)		0.17	0.28	0.08	.55		1.35	0.20	0.64	<.001***		-0.06	0.31	-0.03	.83
Monthly Income		0.00	0.00	0.00	.64		0.00	0.00	0.00	.04*		0.00	0.00	0.00	.01*
Migrant Worker Yes		0.12	0.13	1.06	.35		0.18	0.09	1.49	.06^		0.11	0.14	0.91	.46
Step 2	0.1415[a]	1.30	0.38		<.001***	0..6014[b]	-1.49	0.13		<.001***	0.03540[c]	0.24	0.31		.44
(Constant)															
Residence Urban							0.85	0.14	0.39	<.001***					
Age		-0.04	0.01	-0.32	<.000***							-0.02	0.01	-0.14	.032*
Gender Female		-0.31	0.12	-0.16	.008**										
Education High School		0.55	0.17	0.60	.002**		0.44	0.14	0.47	.002**					
Education Vocational School		0.23	0.17	1.96	.18		0.88	0.16	902.00	<.001***					
Education Undergraduate (or above)		0.17	0.20	0.09	.38		1.13	0.17	0.55	<.001***					
Monthly Income							0.00	0.00	0.00	.03*		0.00	0.00	0.17	.009**
Migrant Worker Yes							0.184	0.086	0.199	.03*					

*** *p*<.001; ** *p* <.01; * *p* <0.05; ^*p*< 0.1

[a.] F (5, 248) = 9.342, p < .001

[b.] F (6, 238) = 62.36, p < .001

[c.] F (2, 236) = 5.367, p = .005

4.3.2 After access: Exploring the mechanisms behind use divides

Based on extensive fieldwork in the developing world, scholars working in ICT4D have highlighted different types of uses of the Internet, such as online document editing, social networking, and entertainment (Donner, Gitau, & Marsden, 2011). While individual participation in different Internet activities varies due to different life stage and personal preferences, the regression analyses presented above suggests the existence of usage divides among various social groups in Central China. Following the categorisation of online participation in the previous section, I examine how demographic variables influence participation in three types of Internet activities, and most importantly, explore how the use of Internet functions relates to everyday information practices.

Culture and online consumption.

Gender is not a barrier to the adoption of ICTs and does not significantly influence ICT experience and engagement level. However, female interviewees did express a lack of Internet participation, particularly in online entertainment and consumption of cultural products on the Internet. Fang from Fossil Village explained to me why she thinks women in rural China should avoid "reading too much online". She relies heavily on WeChat as a source of cultural and entertainment resources, because content "sent from friends" is often more relevant to rural life:

> I could stay happy if I don't choose to see how other people live a wealthy life. The online world is often an urban world. For me, I have never worked in the cities, and couldn't possibly fulfil my desire of being super-rich.

Hua was visiting Fang during the interview; she added: "Rural women are 'superficial' for a reason: We don't work and hence have less pocket money for shopping; We watch romantic dramas but are stuck with our marriage in reality. I would tell all of my girlfriends: don't overthink." Female Internet users in the urban area are also withdrawing from consuming cultural products from the Internet. Li experienced the

gender gap in Internet participation from her marriage. She missed the old days when her family would watch TV together after dinner, but now,

> My husband and I no longer share common interests because we watch completely different online videos, read from different Internet resources, and interact with different social circles.

Li fears the representation of women online will have a substantial negative impact not only on her marriage but also the future of her daughter:

> I accept the fact that Henan is a conservative province, and my generation has been constrained in our role as housewives. However, I am deeply concerned for my daughter, for she lives in a digital world that emphasises "women with high education are unmarriageable". The more I read online, the more I feel anxious and disoriented. I try to find values from online content that support my belief, but on the contrary, I find a value crisis for Chinese women, especially for my daughter's generation.

Perhaps Li's daughter would not find it challenging to find inspirational content online. Female interviewees who have received higher education show similar levels of participation in culture, entertainment, and online consumption as male interviewees. Two young female workers from Western Factory, Mimi and Fei, who attended the same vocational school, and both majored in pharmaceutical manufacturing of Chinese medicine, greatly benefited from their engagement in e-commerce and participation in online learning from MOOCs or WeChat courses.

Mimi is one of the few persons in Western Factory to engage in micro-entrepreneurship online as a part-time career. She works as a sale representative of a Swedish cosmetics company on weekends and holidays. Through her narrative of her experience in running an online business, I saw her great passion for e-commerce. Married at the age of 22, Mimi used to be treated as a typical Chinese housewife by her husband and mother-in-law: "After giving birth to my daughter, I was in a depression, not knowing how to raise my daughter to be independent and professional." She found answers on how to balance work and family and scientific parenting skills from online

resources available on WeChat, by reading articles written by women bloggers. Her life changed when she joined the business team with her schoolmates as a sale representative:

> I find customers on WeChat and extend my business network through WeChat groups. After working both full-time in the factory and part-time on the Internet, my monthly income doubled. I no longer need to beg my husband to take more family responsibilities, because my status within the family improves as I contribute more substantially to the family's finance.

Unlike Li, Mimi does not feel the lack of valuable content for women to consume on the Internet. "The Internet provides a massive amount of cultural and entertainment products for everyone. But I think the most important factor is for us (female users) to have an incentive to learn." Her incentive to learn originates from the "continuing motivation to establish a profession like my college friends."

Professional and economic practices.

One of the most obvious urban-rural differences in online participation is the use of the Internet for professional and economic practices. In the previous session, PCA results showed that search engine use is located in the same component with processing documents, sending or receiving emails, and money transfer. The same classification is supported by qualitative interviews: frequent use of search engines often relates to professional context, for example, searching for government policy on Chinese medicine by an office clerk in Western Factory, or searching for pictures of house construction plans by a construction worker living in Fossil Village. With a higher percentage of working-class residents, urban interviewees and rural residents who have migrant experience show a high level of familiarity and engagement in Internet activities related to professional and economic practices.

Yue, a non-user of search engines in Fossil Village, told me that she "only receives information" by news app and WeChat notifications, which were both installed on the phone either by the mobile phone manufacturer or by her son. "I know there is an

app called Baidu, which delivers things upon your request. However, I rarely use search engines because I don't know how to describe my needs." With limited experience in using search engines, Yue "meets" the topics she is interested in by chance instead of actively "seeking" online information. Fang, who is also a non-user of search engines, has a different reason for not using the Internet for professional and economic practices. Compared to search engines, she prefers "using people around me as my 'Baidu'", which she considers to be more "locally-relevant" and also "trustworthy". Young generations in Fossil Village, most of whom have worked or lived in an urban area, hold different views toward search engines from their parents. Ying, who studied in Happy Valley county and returned to Fossil Village, enjoyed the role of search engines in introducing her to new skills. Search engines for young generations like Ying, opens a window of knowledge and new information in everyday life:

> Search engines are the first place I would go to for new information and skills. I don't want to fall in the stereotype of a rural girl and teach myself to learn to play music instruments like an electronic keyboard. I find tutorials from Baidu and learn musical notations from images.

Among Internet users who participate in professional and economic activities online, I observed the influence of education on different levels of sophistication in uses. Xia works in a management role in an IT department in Western Factory. Although she graduated from university more than ten years ago, her educational background in computer science has undoubtedly helped her in mastering search engines in both her professional setting and in everyday contexts.

> The best search engine, in my opinion, is Google before it has been banned by the government. I define a good search engine as one that clearly distinguishes sponsored ads and search results, which domestic search engines like Baidu fail to incorporate into the design.

Ai works in one of the manufacturing departments in the factory. She feels her use of the Internet "is limited", due to the lack of "diversity in information sources". Unlike Xia, who searches for information across multiple search engines, Ai has not tried

any of the search engines other than Baidu, because she considers "familiarity with functionalities on the search engine is more important than search efficiency." Another usage difference between Ling and Xia is their use of advanced search methods. Xia uses voice search on the Baidu app on her mobile phone in everyday life, because "voice to text transformation is more efficient than typing and shows similar search results." Ai, on the other hand, only uses text search, and finds it difficult sometimes to switch between text and voice input. Knowledge of ICTs and an educational background in information systems helped Xia to become a more experienced user of search engines.

Social networking and communication.

Interviewees frequently mentioned social networking applications such as WeChat and QQ as one of the first Internet activities they engaged in when they started using the Internet. Survey data reveals variance in the level of engagement among different generations and across groups with different income levels. In-depth interviews found that the use gaps in social networking and communication Internet activities could be explained by differences in social capital and attitudes towards social connections.

Social connection (*guanxi,* 关系) culture is considered by social science researchers as an important characteristic of Chinese society (Gold, Guthrie, & Wank, 2002; Kipnis, 1996). *Guanxi*, which extends from connections with extended families, schoolmates, and colleagues, could reach more extensive social networks that consist of weaker ties and could yield political, economic and social benefits for individuals. The functional use of *guanxi* through online social networking apps is reflected in the variety of Internet activities among interviewees who have higher social-economic status. Wei is the manager of a manufacturing department at Western Factory and also a heavy user of WeChat. Among dozens of WeChat groups that he added in the app, a group that he finds most useful is formed by local friends who share the same interests and have the similar

experience in investing in the stock market. Wei considers the group to be a "library of human resources (*renmai*,人脉)":

> People who know the stock market are often wealthier than the rest of my friends. I rely on this group to introduce me to weaker ties. For example, if I need inside information about policies in a telecommunication company, I would turn to this group, asking for a reference to employees who work in the company to solve my problem. Compared to traditional social networks, this group network could not directly help with my career but is an important resource for solving minor problems in life.

Active use of social networking apps might sometimes result in an additional income. Gui is one of the few employees in Western Factory who successfully found a new career from the digital economy. He now works both as a Didi[45] driver and a sales representative for a local alcohol manufacturer. He saw business opportunities through a WeChat group, which consists of hundreds of volunteers in a local charitable organisation. He described that the opportunity "found" him because his business partner appreciated his active role in managing and organising the online group. And through participation in online social networking, he "changed his old-fashioned perception of depending on a 'stable' salary and encouraged him to not only socialise online but build a career based on his online network."

Age, however, in many cases hinders older generation Internet users to explore new functions and establish new connections on social networking platforms. Shun, previously the head of Fossil Village, has a WeChat account but was limited to accepting friends' invitations because of his unfamiliarity in using the mobile phone. He also dislikes group chat functions on WeChat, because it "violates the basic rule of social networking in China", which states "birds of a feather flock together (*wuyileiju*, 物以类聚)". Retired from his job as the head of the village, Shun also uses his WeChat network

[45] Didi is a major Chinese ride-sharing company.

to sell life insurance to friends. But different from Gui, he distrusts online friends whom he never meets through offline social networks. “Money and friends, these are the two things that I only made offline,” is how Shun expressed his opposition to online-only networks.

4.4 Conclusion

4.4.1 Results

In this chapter, I used survey data collected from Fossil Village and Western Factory in Central China in 2017 and 2018 to describe ICT developments in rural and urban China. Summary statistics from the descriptive data analysis suggests an unequal ICT adoption of the Internet, mobile phone and PC between rural and urban China, and points to rural-urban differences in the experience of using digital technologies and in everyday online engagement levels. Rural and urban Internet users also show different levels of participation in various Internet activities. Observing the digital divides in the adoption, experience, engagement and use of ICTs in rural and urban China, I ran statistical tests to study the influence of demographic variables including residence, age, gender, education, income, and migrant experience in different stages of the domestication of ICTs. Two types of divides, access and use, could be identified, with the former consisting of gaps in ICT adoption, experience, and engagement, and the latter consisting of gaps in Internet use.

Quantitative results show that age is associated with all variables in the access divide: the older generations are more likely to become Internet non-users or mobile-only Internet users. They tend to have longer mobile and PC experience but are less engaged online every day, as measured by the hours they spend online. Longer experience of using the mobile phone is found positively related to having migrant experience or living in the

urban area. Experienced use of PC and everyday online engagement, however, is associated with higher education levels.

Using qualitative data, I examined the social mechanisms behind the ICT access divide. Lack of knowledge of *pinyin* is a barrier to the adoption of ICT for older generations, but new information formats such as video and audio, and proxy users, including family members or neighbours, have started to bring the undereducated elderly users online. Interviews with rural Internet users who have migrant experience suggest the urban-to-rural ICT diffusion happens both at the technical level (introducing villagers to new functionalities) and at informational and lifestyle level (presenting urban ways of life). Despite increasing uses of the Internet in Chinese rural society, rural-urban differences in infrastructure and structure of economic industries still inhibit rural Internet users to benefit from the digital economy. Chinese formal education in ICT skills shows a positive impact on equipping both rural and urban populations with PC skills, indicating the mutual process of top-down and bottom-up informatisation in ICT adoption.

Before conducting statistical analysis on the demographic factors behind the ICT use divide, I first categorised various Internet activities into three components using Principal Components Analysis (PCA) and reduced the dimension for the analysis of Internet activities related to 1) Culture and Online Consumption; 2) Professional and Economic Practices; and 3) Social Networking and Communication. It is important to note that the use of search engines is classified as a sub-category of professional and economic practices, which locates it in the same category with managing documents, money transfer, and sending emails. Regression models show that age, being female users, and having an education level below high school degree are negatively associated with the use of the Internet for culture, entertainment and consumption. Residence in an urban area, having migrant experience, and having higher education and income levels are

found to be related to more frequent uses of the Internet in professional and economic practices. The older generation and users with lower income levels are less likely to use the Internet for social networking and communication.

Qualitative interviews showed the demographic variance in Internet use apart from access to ICTs. Offline gender inequalities are mirrored in a lack of equal representation online, and some women users show withdrawal from Internet uses for entertainment and cultural consumption. And yet, young female interviewees who received higher education find new opportunities for micro-entrepreneurship through the use of the Internet and as a consequence improved their social status. I also explored how rural users lack the use of search engines due to unfamiliarity with information seeking and distrust of online information sources. Sophistication in using search engines also seems to vary among users of different education levels, with the more educated users making of use of diverse search engine platforms and advanced search methods. Functional uses of the Internet for social networking and communication still requires accumulation of offline social capital or *guanxi*, but active participation in online social networks could also lead to new offline social connections and even job opportunities.

4.4.2 Discussion

This chapter shows that digital divides in ICT adoption and use are more complex, and that the different stages of technology development involve different socio-economic factors. Inspired by previous empirical studies and theoretical frameworks on the digital divide, adoption and use gaps, I proposed to evaluate different stages of grassroots informatisation, which consists of ICTs adoption (the adoption of the Internet and being a mobile-only user), ICTs experience (experience of using the mobile phone and PC), everyday ICTs engagement (time spent online per day), and ICTs participation (use of the Internet for different activities). The different stages of digital divides echoes with

DiMaggio, Hargittai, Celeste, and Shafer's (2004) definition of five dimensions of digital inequalities, which consists of adoption of technologies, use of technologies, skills for creative use, and skills for the creation of new technologies. This project, however, contributes to the specification of different categories of Internet participation in everyday life.

Findings from this chapter shed light on the understanding of the digital divides in developing countries. Previous empirical studies on digital divide have suggested adoption (Goldfarb & Prince, 2008; van Dijk & Hacker, 2003), use and participation (Hargittai & Walejko, 2008; Shaw & Hargittai, 2018) and information divides in the domestication of ICTs (L. Yu, 2010). Statistical analysis in this research confirmed that there are digital divides both in the adoption of ICTs and in the everyday use of the Internet across different demographic groups. Age was found to be the most important factor accounting for gaps in ICT adoption and use. Nevertheless, I also noticed that having migrant experience of working in larger cities or simply being residents of urban areas could lead to more ICT experience and higher participation in professional and economic practices online. The categorisation of different types of Internet participation in this study has simplified the typology of Internet use into three factors: Entertainment and Consumption, Professional and Economic Practices, and Social Networking and Communication. While categories of social networking and culture and online consumption were also reported by other empirical studies (A. J. van Deursen & van Dijk, 2014), this research highlighted the importance of the third category: professional and economic practices as a type of Internet activities that demonstrate a sharp rural-urban divide. I further explored through individuals' experiences the social consequences of digital divides, revealing how the digital gaps were formed and widened or narrowed and bridged in the everyday lives of Chinese Internet users.

This chapter has potential implications for both technology design for development and for policymaking regarding informatisation. First, I found that the older generation is particularly disadvantaged in ICTs adoption due to the lack of knowledge with *pinyin*, suggesting the necessity to enhance input methods such as voice recognition on mobile devices. Second, the government-initiated digital skills training workshops in rural China have been primarily focused on PC Internet, which often overlooks rural users' urgent need for training on using the mobile phone for professional and economic practices. Future training on ICT skills or e-commerce should incorporate tutorials on the use of diverse types of Internet devices, helping residents in developing areas to maximise the social and economic benefits of using the Internet.

Chapter 5 Understanding Everyday Information Needs in China

As shown in the previous chapter, Internet users undertake quite different types of online activities. The Internet has become a major source of information in many everyday contexts. However, empirical research on everyday information needs often focuses on one or two types of information contexts, such as health, climate change, news, and hobbies. Very little research provides evidence-driven mappings of different information needs in everyday life. In this chapter, I will start with a quantitative categorisation of different types of everyday information in order to establish the underlying dimensions of information needs. In the second part of the analysis, I will look into each dimension of everyday information separately using qualitative data to understand information practices and information sources in different contexts. In the third part of the chapter, I will use quantitative survey data to explore how information needs vary across different social groups.

5.1 Theorising a multi-dimensional model of everyday information contexts

Survey respondents were asked to rate the relative importance of ten information needs in their everyday life on Likert-type scales from "very unimportant (1)", "unimportant (2)", "important (3)", to "very important (4)". The surveyed information includes "Social policy", "State affairs", "Employment and business opportunities", "Self-learning and personal development", "Entertainment", "Romance and relationships", "Shopping", "Health, diet and nutrition", "Science and environment", and "Local events". Figure 20 provides a heatmap of survey responses on the ten types of everyday information. It shows that social policy is ranked as the most important type of information, followed by information about local events and health. Information about entertainment and shopping, according to survey respondents, is the least important information types compared to the others. Information about the government, which has

been the main research topic in political and communication research, ranks as the third least important information Chinese Internet users need in everyday life.

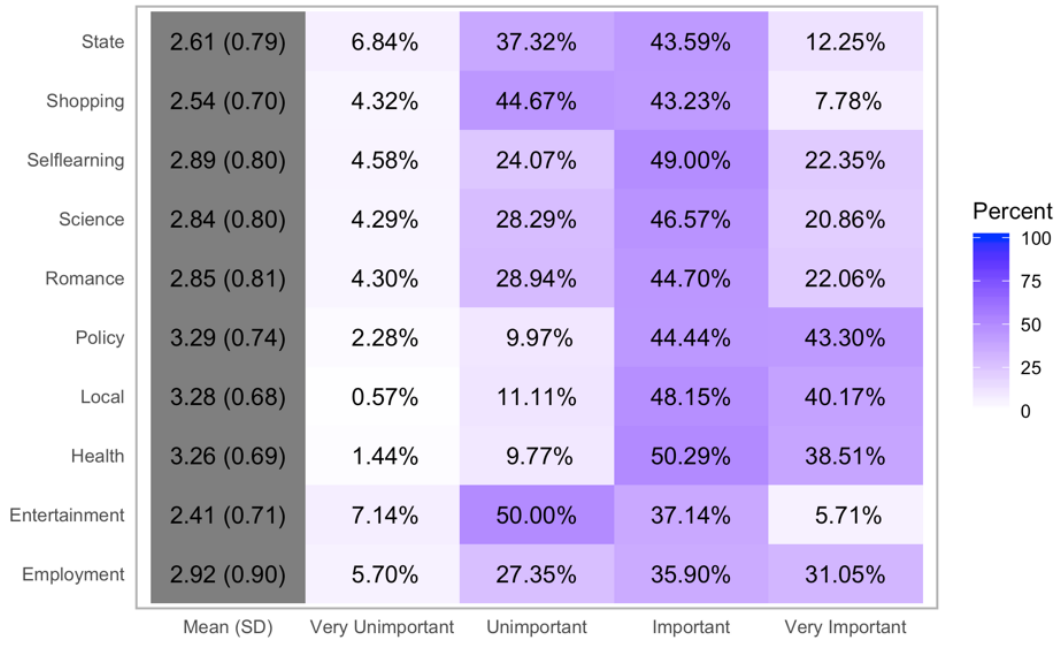


Figure 20. Heatmap of the importance of different types of information in everyday life

To detect the underlying categories of everyday information needs among rural and urban survey respondents, I ran an Exploratory Factor Analysis (EFA) with the *psych* package in R (Revelle, 2018, 2019) on a series of survey questions that ask about the importance of different types of information in everyday life. EFA is useful to find dimensions within a group of variables and helps social science researchers to identify underlying factors (Fabrigar & Wegener, 2012, p. 564). The aim of applying EFA on a set of variables is mainly to find latent structure rather than to conduct hypothesis testing as in Structural Equation Modelling (SEM) (Ramlall, 2017). Detection of latent structures in a group of variables requires measurement of unique variances, and thus EFA is more appropriate for finding underlying dimensions than PCA in this case[46]. I also applied

[46] Principal Components Analysis (PCA) is often confused with Factor Analysis as a method for dimension reduction, but they are based on different mathematical foundations and have different applications. PCA "does not distinguish between common and unique variances" whereas EFA differentiates the two types of variances (Park, Dailey, & Lemus, 2002, p. 564).

Exploratory Factor Analysis (EFA) instead of Confirmatory Factor Analysis (CFA) because the aim of this chapter is to explore a categorisation of everyday information, instead of confirming the current sample on an existing theory.

Before running the CFA, I first checked the Kaiser-Meyer-Olkin (KMO) measure of the sample, which was equal to 0.78, higher than the middling sampling adequacy of 0.7. The Bartlett's test of sphericity was significant (Bartlett's K^2 (9) = 52.84, $p < .001$), rejecting the null hypothesis that variables are unrelated. I then conducted a parallel analysis, which is a method recommended by Thompson and Daneil (1996) as a more objective criterion to decide the number of factors that should be extracted in the CFA. The parallel analysis result suggests that the number of factors is 4. In the parallel analysis scree plots (See Figure 21), the point of inflection, the point where the actual data drops before levelling off on the tail, is between two and five. I decided to use four as a number of factors.

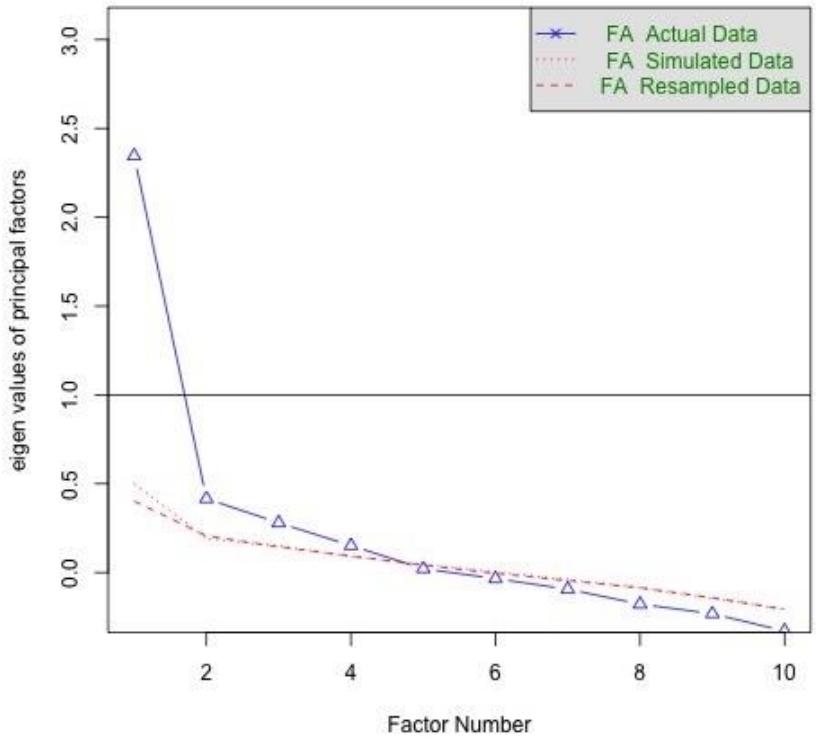


Figure 21. A scree plot of the parallel analysis

To extract factors, I performed variance maximising through the rotation of the variable space. I reviewed the summary table of the number of variances that could be accounted for by different factors. To confirm the number of factors to keep, I looked at the eigenvalues of each factor and selected those valued above 1. After deciding on the number of extracted factors, I ran the factor analysis and rotated the factor structure using oblique instead of rotation. Here I chose oblique rotation with oblimin because it allows extracted factors to be related, as in a real life context, where different categories of information might be interrelated (Matsunaga, 2010). As Table 15 shows, four factors were identified: each consists of at least one type of everyday information. Figure 22 shows a diagram of the factor loadings of variables on everyday information and the correlations between factor MR3 and MR4 with factor MR1. The Root Mean Square of Residuals (RMSR) is 0.02, close to 0.

Table 15. Factor Loadings for Exploratory Factor Analysis with the oblique rotation of everyday information needs

Scale	MR1	MR3	MR2	MR4
Social Policy	.24	**.43**	-.06	.14
State Affairs	-.04	**.74**	.1	-.03
Employment	.22	**.35**	-.2	.28
Self-learning and personal development	.05	.26	.01	**.31**
Entertainment	0	.07	**.74**	.05
Romance and relations	.05	-.02	.14	**.56**
Shopping	**.31**	-.02	**.37**	-.01
Health, diet and nutrition	**.76**	-.09	.04	.1
Science and environment	**.63**	.17	-.07	-.06
Local Events	**.33**	.07	.17	-.19
Sum of squared loadings	1.44	1.11	.81	.68
Correlations between factors				
MR1	1			
MR3	**.39**	1		
MR2	.1	.16	1	
MR4	**.57**	.29	.14	1

Note. Factor loadings or correlation coefficients >.03 are in boldface. Factor loading scores calculated using regressions on four dimensions are added to the dataset for future regression analysis. The survey questions are: How important are the following types of information in your everyday life?

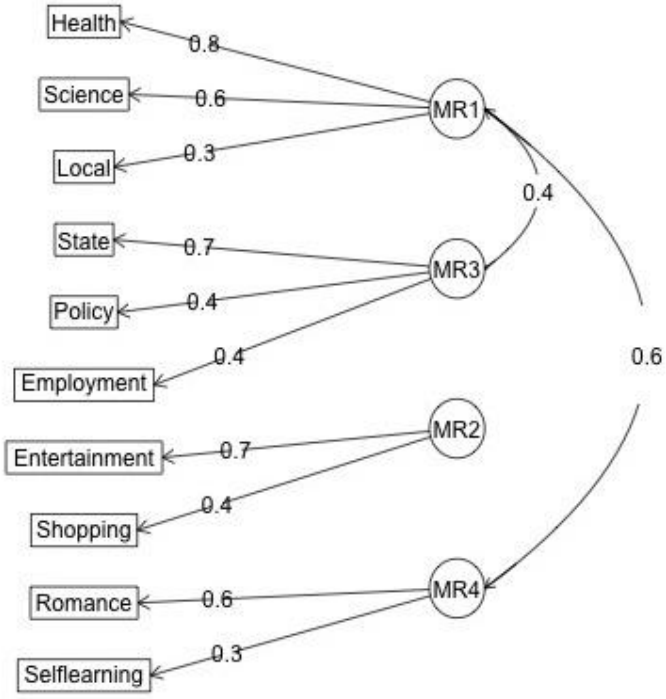


Figure 22.. A path diagram of the four factors detected from the information needs questions.

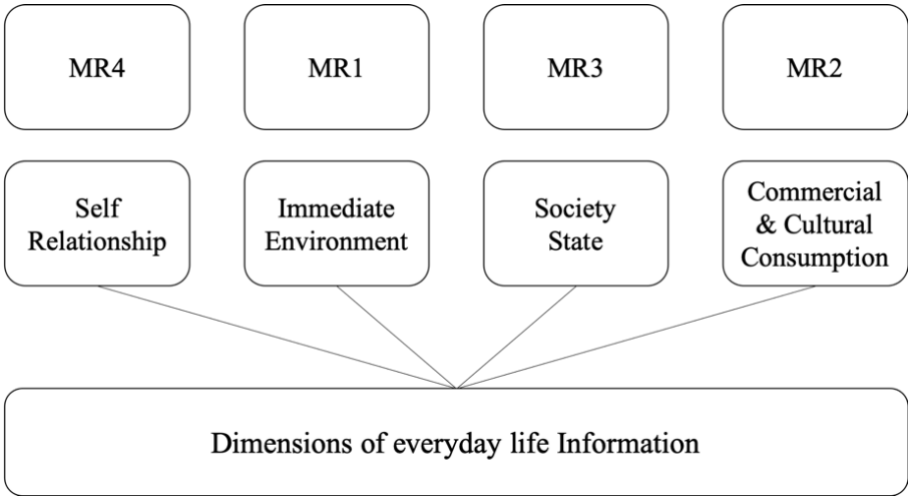


Figure 23. Four dimensions of everyday life information

Using results from the factor analysis, I theorise four underlying factors of everyday information needs into four dimensions (see Figure 23 for a diagram of the dimensions). 1) information related to self and relationships, including self-learning and romance. 2) information about the immediate environment, including health, science and local events. 3) information about the government and public affairs, including political affairs, social policy, and employment. 4) information about commercial and cultural consumption, including shopping and entertainment. The quantitative results also show that different information dimensions are interconnected, and thus, I argue that the study of any information dimension should not be viewed in complete isolation from the other contexts. In the following section, I will use qualitative analysis to show how users practice information seeking within these different dimensions of information. I will return to the quantitative analysis of the factors behind the needs for different types of information at the end of the chapter.

5.2 How the Internet changes everyday information seeking practices in different contexts

Identifying how to categorise everyday information is a crucial step towards studying the use of the Internet for information seeking practices. As Wilson rightly suggested, "If we wish to uncover the determining factors of behaviour we must do so by first undertaking in-depth studies of well-defined categories of persons, developing explanatory concepts and then testing these concepts in related but different settings"(Wilson, 2006, p. 667). In this section, I will use qualitative data from individual interviews and focus group studies to understand what kinds of information users seek in each dimension of everyday information. More importantly, I will discuss how the Internet has become an information source in each context and whether or not users face challenges in using online information to seek information. Qualitative data has covered

almost all ten categories of information, but due to page restrictions, I will choose one category within each information dimension to examine in detail. At the end of the section, I will discuss how these dimensions of information fit into a broader picture of information seeking practices.

5.2.1 Information about the self and about relationships: Personal development

Both information categories in the first dimension are related to the very intimate social circles of the individual and the development of the individual self. The Internet has provided diverse sources for users in rural and urban China to learn about experiences of personal development, to acquire skills to start a new hobby, or to upgrade the skills to work in a rapidly digitalised society.

Learn to master guanxi.

Chinese rural society has embedded a deep-rooted culture of social connections, or *guanxi* (关系) (Yan, 1996). Most of the villagers living in Fossil Village share public spaces (a recreational centre, meeting rooms, and a playground), play poker, and work together in the tent where mushrooms are grown with the same group of people. Many of the families are related. There were at least three occasions when, in the middle of my interview, the interviewees had visitors calling on the phone or knocking on the door to invite them to attend a funeral, a childbirth, or a wedding. Gifting cash (*lijin,* 礼金), a widespread tradition in China, makes up for a huge proportion of monthly expenses for villagers. A middle-aged couple, Hua and Xiao, spent more than 500 RMB in the August of 2017 on gifting cash for other families in the village. “Gifting cash is an easier task compared to the daily management of the sophisticated social network living in the village,” Hua told me on my first day arriving at the village. Therefore, learning tips about managing family relations online is important for villagers in Fossil Village. Hua’s must-

read WeChat Public Account is Learn Some Social Skills (Xuedian Weiren Chushi, 学点为人处世) (see Figure 24 a screenshot of the Account on Hua's mobile phone). Interestingly, I found that female villagers play a more active role than males in bonding with families and neighbours and are more interested in online information about interpersonal relationships than their partners.

Fang, aged 46, emphasised that following updated information about her friends and neighbours was more important than reading political news. She only started to use a smartphone in 2015 and the first mobile app she learned was WeChat. Fang spent more than two hours on the mobile Internet every day, mainly to check new conversations in her WeChat groups with fellow villagers and close friends. For many villagers like Fang, information about how to build strong ties within the village and extend weak ties with relatives living in the country is more practical than information about the government:

> I joined two WeChat groups, one is a group for village residents, and another is a group of family members at my parents' home […] I am more like a lurker in both groups than a conversation initiator. I heard about what happens in the village, who gets a new job in the town centre, which family has a relative in the local government […] The most important task for me, as a housewife, is to manage my family well, to maintain a good relationship with my neighbours, and to have a good reputation within the village. For ordinary people (*laobaixing*, 老百姓) like me, it does not matter who gets to be the emperor (*huangdi*, 皇帝).

In addition to WeChat group chats, Public Accounts on WeChat and News apps such as Toutiao are also main online sources for personal development. Urban residents in China might subscribe to magazines or newspapers that have special columns on relationships and personal development. However, for many villagers, WeChat and news apps are the first media platforms they used that deliver free articles about topics such as anger management or communication skills. As Yue, a 48-year-old farmer, described her experience of self-learning when reading online news,

> Please do not laugh at me, but I learned how to manage family relationships by reading news articles about Liu Tao (刘涛), a famous female actress who manages

> to balance her family and career. The news stories about how she handles a financial crisis with her husband was particularly informational: When Liu Tao's husband had crippling debts, instead of walking away from the marriage, she decided to return to the stage to make enough money to pay back the family loans. My family has encountered the same problem. I sometimes get courage and reassurance from reading news stories like Liu Tao's, and think about the positive influence I could have on my children by overcoming tremendous financial difficulties with my husband.

WeChat also provides female users living in Fossil Village with self-help e-books. Nan, aged 48, is one of the few female interviewees who have attended high school and has an active interest in literature. Unlike Yue, she does not like reading news stories about female celebrities. "Instead, I follow news stories about Jack Ma and Liu Qiangdong, CEOs of technology companies. I don't want to be an ignorant housewife who only cares about farming and house chores." Yue also collects articles about personal development on WeChat, by adding prose and essays of famous writers she received on public accounts as her "favourite" articles:

> When I was in high school, I used to write down all the inspirational paragraphs in my notebook. I was one of the top-ranked students in school. And now, I feel like returning to student life when reading prose on WeChat. The articles on life, romance, and relationships are so well-written that I often go back to my WeChat collection of articles to remind myself of the words. For example, I fought and argued with my husband for many decades, but now I learned a new concept, "anger control", from WeChat. I have been trying to practice methods of anger control and also using new communication strategies at home.



Figure 24. Screenshot of Hua's WeChat Public Account, Learn Some Social Skills. The most recent articles are: "When you are depressed, look at this stubborn donkey", "Women, remember this powerful sentence!", "Three important responsibilities of men: career, home, and children", "There isn't the next life, so cherish this one you are living!"

Female interviewees from Fossil Village who are working or studying in the urban areas invest more time and money in seeking information about communication skills as part of the self-learning process. For example, Di, a 26-year-old middle school teacher, purchases and reads e-books on communication skills for teachers on the Internet. Figure 25 provides a list of Di's favourite WeChat Public Accounts. Compared to other female villagers who rely on randomly collecting articles on *guanxi* skills from "pushed" information on public accounts, she also actively searches for solutions on *guanxi*-related questions on Baidu:

> I subscribed to many accounts about social connections from WeChat Public Accounts, but there are some specific issues about self-learning that have not been covered in WeChat articles. For example, when I have conflicts with my students or when some of the students have shown behaviours that I could not understand, I turned to Baidu for advice in these cases […] Unlike search engines, WeChat could not provide context-specific information on social connections.



Figure 25. Screenshot of some of Di's WeChat public accounts (local accounts is covered with a grey box to protect the identity of interviewees). Translated titles of WeChat public accounts from the top to bottom. 1. Quiet Reading. 2. Social Skills and Etiquette. 3. How to Whiten and Brighten your Face. 4. Reading for Women. 5. Positive Energy (Chicken soup Articles). 6. How to Wear Make-up. 7. A Study room by Your Pillow. 8. How to Be Smart.

Male interviewees tend to seek more online information about work-related connections than family relationships. Shan, aged 51, works in the Mechanical Engineering Department in Western Factory:

> I left the army in the 1998s and have constantly felt the different social norms in the military and corporate environment: I receive less direct instructions from my superiors and have to be a more sophisticated person in workplace. I keep watching online talks from Tencent video to learn how to manage interpersonal relationships in workplaces. Each of the talks focuses on a specific issue such as how to express disagreement in front of your boss, or how to react to criticisms from co-workers.

As mentioned, guanxi is only one example of personal development; but it stands out as a key aspect in both rural and urban areas.

Hobbies and leisure.

The farming of mushrooms is seasonal in Fossil Village, and many villagers have free time to pursue old hobbies or start new ones between the harvest season of mushrooms in late winter and the tourist season in the summer. The wide proliferation of

the mobile Internet has provided much new information about hobbies and leisure in Fossil Village.

Compared to a diverse range of everyday entertainment activities available in the county, there is a limited number of leisure activities residents can enjoy in Fossil Village: walking around mushroom tents or in the kiwi fields after dinner, playing Mahjong or poker in front of the village school, or swimming in the open water in the valley during the summer. The Internet has introduced new leisure activities that used to be popular only in urban areas. Two activities, Karaoke and group dancing, have become particularly popular among female residents in Fossil Village in recent years.

Nan used to perform Henan Opera for the village when she was young. Now, a mobile app called WeSing (*Quanmin K Ge,* 全民 K 歌) has become one of her favourite apps in her daily life. Another two interviewees in the village, Haiyu and Hua, are also big fans of this Karaoke app. As Hua describes her experience of using the app:

> WeSing not only allows you to practice singing with thousands of Chinese songs available in the database but also automatically shows the intonation and scores the accuracy of your singing after each sentence. Best of all, I can listen to other users' records and compare my performance with my friends'.

Yue learns to dance from a mobile app called Tangdou Square Dance (*Tangdou Guangchangwu,* 糖豆广场舞) (see Figure 26 a screenshot of the app on Yue's mobile phone). The app was downloaded on her smartphone by her son in 2016:

> I have heard about Yang Liping, a famous Chinse dancer, on TV. Last year, while I was randomly clicking on the Tangdou App, I found a video tutorial of Yang Liping's Peacock dance, with a step-by-step demonstration. Now, whenever I am free, I will set up my smartphone on a phone stand in the courtyard and learn to dance with the tutorial.

It is important to note that mobile apps like WeSing and Tangdou Dance are particularly easy-to-use for rural users who are unfamiliar with advanced functions like in-app search. As a new mobile Internet user, Nan does not know how to search for the genre of dance she wants to learn in Tangdou Dance, nor does she know how to save and

download tutorials that she enjoys. Nevertheless, according to her, “Once I watch the tutorial once, it will always rank on the top of the front page”. The multi-media platforms, therefore, assist rural users to locate relevant information on hobbies and interests. Compared to middle-aged users, young generation users in urban areas prefer personalising news apps on their mobile phones to constantly follow information about their hobbies. For example, Long, aged 30, works in the manufacturing department at Western Factory. He is interested in learning street dance and has favourited news stories about “hip-hop” and “street dance” on the Toutiao news app. He notices from his previous Internet experience that after starring one or two articles on a topic, the app will “automatically push related news articles based on users’ preferences.” While the recommendation algorithms have helped users like Long to locate useful information on news apps, the recommendation system also undermines the autonomy of information users, which will be discussed in the next chapter.

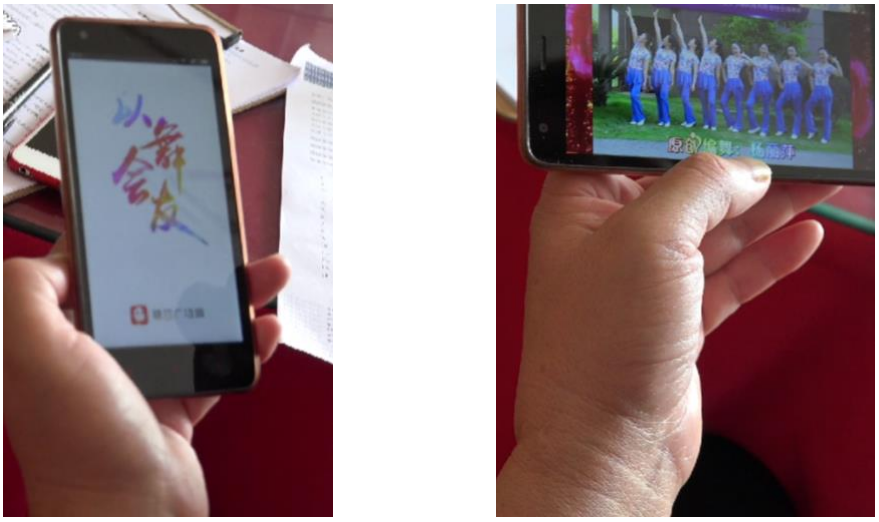


Figure 26. Video clips of Yue demonstrating her information seeking practices in learning to dance on Tangdou Dance App

Meanwhile, passions for a hobby could also motivate rural Internet users who are more experienced with digital technologies to seek information from diverse online information sources and advanced search functions. Haiyu and Hai both enjoy growing flowers in their backyards. Haiyu finds Baidu image search a useful resource to learn

about the names and instructions of a flower. Hai, meanwhile, uses Taobao, the e-commerce platform, as his favourite online information source on flowers:

> I used to purchase flower seeds from Taobao. After several times of shopping online, I noticed that it could be a perfect information source on how to grow flowers: Fist, all flowers are described on Taobao with images, making it easy for me to find the species that I am interested in; second, most of Taobao shops provide detailed instruction on how to plant and care for the flowers, whether or not they enjoy direct sunlight or the recommended frequency of watering the plants […] Even if I am not looking for flowers to purchase on Taobao, I still use it frequently to find detailed information on flowers.

Payal Arora argues in her recent book *the Next Billion Users: Digital Life Beyond the West* that Internet users in developing countries spent considerable time online not on education and employment, but on leisure and entertainment (Arora, 2019). Qualitative data in my research support Arora's argument that information seeking for leisure and hobbies indeed constitutes a large proportion of Internet use in everyday life. However, the line between leisure, business and work are not clear-cut. For example, online information on hobbies such as cooking tips sometimes offers unexpected benefits for rural residents: Nan's family runs an agritourism business during the summer. Her restaurant business is booming in 2017 after she learned several new recipes for cooking Sichuan- and Hunan- flavoured dishes from the Internet.

Professional skills.

Young generation users in rural and urban areas benefit from receiving information about professional skills on the Internet. However, personal development information related to professional or technical skills often requires prior knowledge in a field. It also requires sufficient investment of time or money for online learning. Due to the lack of education and low monthly disposable income, interviewees living in Fossil Village are less likely to use the Internet to seek information about professional skills.

Nevertheless, Bing and Di, two young professionals from Fossil Village who returned to their hometowns after graduating from universities, illustrate how the Internet

facilitates continued learning by providing information about professional skills. Di teaches math in a middle school in Dragon Town. She graduated with a math major and his first job was as a secretary in Happy Value County, but she soon found herself more enthusiastic of becoming a teacher. After four years of interning at middle schools in neighbouring towns, she obtained the qualification for teaching in middle schools in 2016. For Di's everyday teaching, the Internet not only assists the digitalisation of exam results but also provides free training materials on teaching and PC skills:

> All middle school teachers in rural areas have to participate in a 'national training program for teachers' (*guopeike* 国培课)[47] every year. All training materials are available on a website, which covers a wide range of teaching-related information such as ethics and communication strategies. I find the training, especially exercises after each training session, to be extremely beneficial. I did each exercise carefully, practising on writing teaching plans or assessing the quality of sample teaching plans […] I also learned to make PowerPoint slides on the Internet, by following step-by-step video tutorials on Baidu.

There is, however, a generational gap in using the Internet to learn teaching skills. Many of Di's colleagues are in their 50s. Making PowerPoint slides or finding teaching plans on websites such as 7139 Math.com is challenging. "Most of the information on commercial websites are sponsored ads that try to sell books or videos to teachers". Di admits that she does not trust the quality of educational information on these websites. She now uses Baidu Wenku, a document sharing platform on Baidu, to search for teaching materials for herself and for her colleagues.

Bing, who is the only full-time doctor in Fossil Village, is also a keen learner like Di. His information mainly comes from taking free online courses within a mobile app called the Doctor's Centre (*Yishengzhan,* 医生站), which is developed by a private

[47] The National Training Plan is initiated by the Department of Education of China. Henan government outlines the training of teachers from pre-school to high school, assigning teachers from urban schools to exchange in rural schools, and also gives plans for digital skill training among teachers, hosting teachers from rural schools to visit top-ranked schools in the capital city, and training of schoolmasters in rural areas.

company in Shanghai, the company being called “The Medical Industry” (see Figure 27 a screenshot of the app on Being’s mobile phone). Bing was trained as a General Practitioner (*Quanke Yisheng*, 全科医生), but with many of the villagers having to take care of pre-school children, he desperately needs medical training on paediatrics:

> I downloaded the app in 2013 when I interned in a hospital in the county. Almost every colleague had the app installed on their phones at that time. Now, working in Fossil Village alone, I rely on the app to receive first-hand medical training. Whenever I have free time every day, I update my professional knowledge by watching online videos on the Doctor’s Centre, mostly on my smartphone because I need to use the office PC to print prescriptions for patients. The app is the most trustworthy platform in my everyday learning where I can search for talks about specific symptoms or diseases. Many of the speakers are experienced doctors working in famous public hospitals in large cities such as Beijing and Shanghai.



Figure 27. Bing demonstrates how he finds information on medical training on a mobile app, the Doctor’s Centre.

5.2.2 Information about the immediate environment: Health

Medical institutions and healthcare services are not distributed equally in rural and urban areas in China. Fossil Village, for example, only has one General Practitioner serving more than a thousand households. When compared with cities in coastal areas in China, the working-class in Western Factory also lacks good medical facilities and experienced medics in the county. I found that with the scarcity of medical services in Happy Valley county, interviewees from both rural and urban field sites express a strong

need for health-related information in everyday life. While the Internet has provided new channels for health information seeking, it also created stress and confusion among users. Two types of health-related information are frequently mentioned by interviewees, information about everyday health such as diet, nutrition and food safety, and information about the prevention or treatment of diseases.

Everyday monitoring of health information: Nutrition and food safety.

With the spread of the Internet as a new information source, interviewees mentioned the lack of reliable information about diet, nutrition, and food safety. Both rural and urban interviewees rely heavily on their family, colleagues, or friends for health-related information. Social media, such as WeChat, has thus become one of the most important information sources on well-beings and lifestyle. Meanwhile, many interviewees also monitor health-related information through reading news articles or articles published on WeChat public accounts.

Many interviewees get information through first-hand experience shared by their families or friends. In the focus group study with four female interviewees in Western Factory, Yanyan is considered as a key information proxy on diet and exercise by the remaining three interviewees. Yanyan's colleague, Lijuan explains, "I have followed several health-related social media accounts, but none of them provide the first-hand experience of different diets or food supplements." As a key opinion leader in her friend circle, Yanyan has downloaded several health-related mobile apps to find the most reliable information on diet and exercise:

> I am a "laboratory white mouse" who is willing to test all health tips on the Internet: I downloaded Boohee (*Bohe,* 薄荷) and Keep apps on my mobile phone to track my daily calorie intake and exercises. I also try group lessons offered by newly opened gyms in the country and share my experiences with friends and colleagues. There are also times when I could not find any reliable online information on diet, for example, whether or not a healthy adult should add protein powder in the diet […] The personal trainers in my local gym tried to convince me to drink it daily for weight control. I guess since there are no

> scientific reports or official guidelines available online, the only way to find out is through personal experience.

When it comes to diet and food safety related to children, many parents in Western Factory are willing to pay to get health information from doctors or experts on the Internet. During my fieldwork in Western Factory in 2018, I witnessed the growing popularity of paid courses on WeChat Official Accounts among urban interviewees. One type of course popular among young mothers is about nutrition advice for infants and toddlers. Han is a young mother with two babies aged under two years old. She pays around 10 RMB each week to sign up for an audio lecture offered by a nutritionist on WeChat (Figure 28 shows a screenshot of health-related mobile apps on Han's mobile phone):

> I learned about the online course on WeChat from a book written by a Dr Cui Yutao, a paediatrician. Dr Cui also recommended the Yuxueyuan app (*育学园*) that provides more reading and video materials on the nutrition and dietary guidelines for babies and infants. I also use health information from the app to persuade my in-laws to not use "old methods" in childcare. For example, my in-laws bought a baby-walker[48] for my elder son. I persuaded them to replace it with a push-along car when I read a WeChat article from the account. It translates warnings from the US Consumer Product Safety Commission that baby walkers could result in delays in baby's physical development and have safety risks for babies. My in-laws have never heard about the safety hazard of baby-walkers on TV or newspaper until I shared them the WeChat article.

[48] The Ministry of Health of China (renamed as National Health Commission in 2013) has issued guidance on how to avoid children from falling in 2011, but the guidance was not widely publicized by mainstream media http://www.gov.cn/gzdt/2011-09/06/content_1941745.htm In contrast, a webpage on NHS website on baby walkers was last reviewed in 2017 https://www.nhs.uk/conditions/pregnancy-and-baby/keeping-kids-active/



Figure 28. Screenshot of Han's mobile apps for medical care where she takes online courses on diet and nutrition

However, compared to urban interviewees who either have direct access to personal trainers at local gyms or have paid for online courses on diet and nutrition, many rural interviewees rely on word-of-mouth from families and friends. Hua and her families tried several dietary suggestions recommended by relatives:

> My uncle heard that eating spinach is good for health. He uses a huge proportion of his farmland to grow spinach and even bought a fridge to freeze spinach to eat in winter. He also heard that dandelion (*Pugongying*, 蒲公英) is beneficial for your health and asked me to dig dandelion and other wild vegetables for him. Do you know that dandelion could also cure cancer? It is true - I heard that there is one guy in the neighbouring village who survived cancer by only eating dandelions for three meals a day. I searched on Baidu, and the result seems to support that [claim].[49] All my family is eating dandelions every day during the spring to prevent cancer.

Hua's experience shows an increasing confusion among interviewees about the information on diet and nutrition without reliable information sources on the topic. As Hai describes his stress in reading health-related news articles on the Internet, "if I take all health-related articles on news apps seriously, I would probably starve to death:

[49] The first page of search results indeed shows online blogs that "proves" the claim that dandelion can *cure* cancer (See the first search result in: http://www.sohu.com/a/228456591_194618). When the same search query is performed on Google, the first result is a webpage on dandelion published by Memorial Sloan Kettering Cancer Center that shows there is no scientific evidence that dandelion can kill cancer cells. See Appendix E for screenshots of the two search results.

Almost everything edible could be harmful to health." Yu also agrees with Hai, "in many cases, news reports are contradictory to each other. I often feel confused by the conflicting articles on diet and nutrition." The growing stress in health-related information also leads to a widespread of misinformation related to health, which will be examined in detail in the next chapter. Meanwhile, we see that high-quality health information online requires sophisticated technical skills or financial investment, which creates new digital divides between the information haves and the have-less. I will discuss the lack of information sources on the Internet in the next chapter.

Patients in need: Disease and medicine.

Most of the interviewees view online information as a supplementary source of medical information to the diagnoses and prescriptions from doctors. Interviewees often have higher trust in local doctors than online information about diseases. Many urban interviewees use search engines as a directory to find medical information for different diseases. For example, Xia describes Baidu as an "introductory source of information" before her hospital visits:

> Due to a large amount of appointments each doctor has in the local hospital, doctor visits are often very brief. I prefer to search the symptoms I have on Baidu and have a basic idea of what treatment options I have before going to see the doctors. The advantage of searching online prior to the hospital visit is that I have a professional offline information source (doctors) to check the trustworthiness of online prescriptions.

Xia has also tried to consult with doctors who specialise in Chinese medicine on WeChat. The price of a medical appointment on WeChat, according to her, is much lower than local hospitals. However, after talking to the doctor on WeChat, she made another appointment in the local hospital to "check if the prescription of Chinese medicines is reliable." Working at the IT department in Western Factory, Xia is more aware of sponsored advertisements on search engines. She avoids most of the search results on the first few pages that are "ranked at the top because they are sponsored". Xia's colleague,

Hui, who works in a manufacturing department, also distrusts search engines when it comes to diagnoses of diseases. She only uses Baidu to find which department she should go to for having different symptoms, because she finds that "most of the online results about treatment have commercial interests".

Nevertheless, for Internet users who are less experienced with the search engine, using the Internet to seek treatment for treatment of diseases is challenging. Many of them find it hard to distinguish sponsored advertisements from relevant and reliable health information sources. In a walk-through demonstration of everyday information seeking processes, Yan shows how she uses Baidu to find information on "how to prevent grey hair". She typed "turn grey hair into black hair, methods" in the search box on Baidu (Figure 29 shows screenshots of Yan's searching process on Baidu). The first page of search results mainly consists of sponsored ads (with labels coloured in grey in the right bottom of each search result). Without noticing the labels, Yan clicked on the second and third results, both of the two webpages have pop-up windows that invite her to call the specialists for detailed treatment. After clicking on several websites in the search results, Yan gave up the information seeking process without finding answers to her query.

Due to a lack of digital skills in using search engines to seek information about diseases, many villagers who work in the cities contacted Bing, the village doctor, for medical advice on WeChat. Medical insurance policy in China encourages rural patients to go to clinics in their hometown instead of hospitals in larger cities in coastal provinces by giving a higher waiver if the patients receive treatment at the province where they are originally from. The policy means that migrant workers have to spend more than they can afford if they receive treatment in the cities where they work instead of coming back home. In Fossil Village, those who have migrated to large cities often call Bing to ask

him to give a diagnosis and offer prescriptions. Bing explains why migrant workers from Fossil Village are reluctant to use the Internet to find treatment:

> Whenever I can, I will always make a phone call, preferably a video call, on WeChat with the patient to know about their symptoms. I will also give them a full description of the causes of the disease, what medicines they should buy in the pharmacy, as well as side effects of medicines […] However, if they search for diagnoses online, they are often misled to have some extra tests or to buy more expansive medicines from private hospitals in cities.



Figure 29. A walk-through demonstrate of Yan's information seeking process to find treatment for grey hair on Baidu, advertisements are labelled on the lower right cover in grey coloured text ("广告")

For minor illnesses and discomfort, some interviewees consider online forums a useful platform to seek medical help. For example, Guo, who works as a secretary in Western Factory, had a rash on his foot. Having tried all medicines and treatment plans prescribed by local doctors for more than half a year, he still suffered from pain. He searched the symptoms in an online forum and found a group of patients who have suffered from similar conditions. He found a medicine highly recommended by many members in the forum and bought the medicine from the local pharmacy. It turned out that the recommended medicine in online forum was more effective than the doctor's prescriptions:

> This experience made me trust the Internet forums as a reliable source of health information for treatments of minor illness. My own experience of local medical

> services is that they tend to overtreat diseases with expensive antibiotics. Online forums are, after all, databases of wisdom from the crowd.

Offline patients' groups are popular in larger cities in China but are hard to find at the county level due to geographical constraints. Online forums on Baidu, for example, the forums for patients with Hepatitis B[50], provide emotional support to many families in both rural and urban areas. Many patients in the interviews also mentioned that if the online patients' groups are moderated by qualified doctors or organized by hospitals, they would be more willing to participate in online forums to seek medical advice.

Meanwhile, mobile apps such as WeChat QR scanners have been used by patients to check if the medicine they bought online or in local pharmacy is fake. Lanlan and her husband both have chronic diseases. Whenever she buys medicine from pharmacies in Dragon Town, she always sent the name and photos of the medicine to her son, who is an undergraduate student in Hunan Province:

> My mobile phone is too old to install WeChat, but I could send photos of the medicines I bought via image messages (*Caixin,* 彩信). It is not free but it prevents me from taking fake medicines […] My son could then search the serial number on the anti-counterfeit label online and call me if the medicine is fake […] Image messages are expensive, so I only send important things like images of the medicine, to my son.

Hua, who has been using WeChat for many years, uses QR scanners with ease. In a walk-through demonstration, she showed me how she checked whether a cosmetic medicine that she bought from a clinic in the neighbouring county was fake. After confirming that the product is indeed genuine, she then compared the online retailer's price with the clinic's price and realised that she was over-charged for the products. Hua then decided that she would buy the same product on No.1 Store (*Yihaodian,* 一号店), the online retailor recommended on WeChat, next time.

[50] I conducted an ethnographic research on the Hepatitis B patients' group on Baidu in 2014.

5.2.3 Information on public affairs and the government: Agricultural markets, business opportunities, and e-commerce

For both rural and urban interviewees, the Internet is not only used as a tool for social networking and entertainment, but it has also become an essential information source to find market information, business opportunities and means for learning digital skills to start pursuing e-commerce.

Agricultural market information.

In her fieldwork in rural China, Oreglia found that ICTs are not used to seek information about farming and markets, and the Internet is mainly "about leisure and communication" (Oreglia, 2013, p. 99). While my fieldwork in Fossil Village echoes Oreglia's research that farming is indeed a community activity where all villagers share their experience of growing *Shitake* mushrooms or kiwi fruit, I find that villagers obtained information about the growing process of mushrooms mostly through experts sent to the village by the Agriculture Department in local government. Information related to farming is also shared among neighbours and families. Nevertheless, the Internet has provided essential market information such as mushroom prices for farmers and has enabled some of the villagers to negotiate a better price with mushroom middlemen.

Located in a mountain area, Fossil Village has around 500 *Mu*[51] farming fields, accounting for approximately 3.79% of the total area of the village. Crops such as wheat and corn used to be the major agricultural products in the village until local government promoted the growing of mushrooms, kiwi fruit, and cornel (*Zhuyu*, 茱萸, an ingredient used in Chinese traditional medicine) in the 2000s. Most of the villagers' primary annual income is from growing and selling mushrooms, and almost every adult villager has experience working in mushroom tents for over ten years. As the young couple, Hua and

[51] *Mu* is a traditional measurement of farmland in China, 1 *Mu* equals to 667 square meters.

Xiao, mentioned, experts sent by the government to introduce growing techniques were their first source of agricultural information. Experts and specialists hired by local government taught methods of packaging wood logs for mushroom growing, planting mycelium in the log, placing and stocking seeded logs in the tent, and controlling moisture and temperature during the growing seasons. Each year, the agricultural department of the local government sent mushroom experts to Fossil Village to update the information related to mushroom-growing. As Xiao recalls:

> We have been growing mushrooms for over 18 years, even before we got married. The local government had a policy back then that gave mushroom spawn for free if we chop logs from the woods. Both of us were very supportive of the policy and tried to persuade our parents to prepare more than 1000 logs, but unfortunately, our parents were extremely risk-averse and only agreed to prepare less than 500 logs. All adult members of our families participated in the free lectures on mushroom growing in the village centre. We learned everything from the experts. We made a huge amount of money in that year, with each log of mushroom sold at 35 RMB on average […] And now, we do not need expert knowledge on mushroom growing because we all share practical experiences with our families or neighbours. However, the local government still sends experts each year to answer questions on the timing of different production stages, or to help analyse the reasons for why the logs get mouldy.

Some villagers also grow fruit and vegetables in small quantities in their backyards, mainly for family consumption. They have used the Internet to find information related to the planting seasons for different vegetables. Some villagers also visited the office which deals with seeds at the Department of Agriculture in the county government to consult about "what kinds of vegetables are more appropriate for the local climate" (Yue). However, many families in Fossil Village have lived in local areas and depended on farming for generations. Highly experienced farmers are often an important source of information on agricultural production for other villagers. Nan prefers asking experienced villagers rather than the Internet when she finds a great quantity of mouldy logs in the mushroom tent, "this (problems such as mould) is mainly related to local weather. If you search for the problem online, advice on the Internet will not consider the

temperature and humidity of local areas. I normally discuss the problems related to farming with my neighbours and compare the percentage of mouldy logs (in my tent) with other families'." Lan also agrees with Nan that online information about agriculture lacks local context:

> When we buy the mushroom spawns each year, we all receive a printed manual that gives detailed instructions on the growing process. However, I find the instructions on these leaflets too narrow, for example, requiring an exact number of hours of steaming to sterilise logs. In practice, we need more flexible instructions as the local weather is highly unpredictable.

Villagers used to rely solely on the middlemen for market information such as price. In each October, the harvest season of shitake mushrooms, several middlemen would visit each household in Fossil Village, asking to buy fresh or dried shitake mushrooms. Most of the villagers do not know middlemen personally, but they told me that "the prices per *jin*[52] offered by middlemen are almost the same" (Lanlan). Villagers also exchange information about market prices while playing poker or picking up children from school. However, most of the villagers have never negotiated with the middlemen to get a higher retail price before the proliferation of the mobile Internet. The advantage of using ICTs for market information first appeared when young farmers in Fossil Village started to add middlemen on WeChat. Hua and Xiao are both WeChat friends with several middlemen since 2014. They have benefited greatly from knowing market information through social media during the harvest seasons. Hua was in charge of selling mushroom last year while Xiao worked on a construction site in the county:

> Before the harvest season last year, I had already asked one of my WeChat friends who is a middleman in Dragon Town for his inside information about the market. He told me that by removing the entire stem before drying the shitake mushroom, I could sell the same product 3 to 5 RMB higher than fresh mushrooms. He also told me to keep all the stems and look for any middlemen from the county who is willing to buy the dried stems as a flavouring ingredient […] One of Xiao's WeChat friends frequently travels between Henan and South-eastern provinces as middleman. He shared a valuable piece of information that consumers in

[52] *Jin*(斤) is commonly used by Chinese farmers as the unit of weight. One *Jin* equals to 0.5 kilograms.

> Shanghai and Beijing prefer mushrooms grown from logs that are made of wild wood instead of sawdust. So, this year, we grew one *Jin* of mushrooms on wild wood and sold it for 150 RMB, five times higher than the other types of mushrooms.

Villagers also use the search engine and e-commerce platforms such as Taobao to find market information during harvest season. Knowledge of the market has brought financial benefits to farmers in negotiating a good price with the middlemen. Hong uses Baidu to learn about the trends for mushroom prices:

> I only search for market information of mushrooms each year to see if there is a high demand for mushrooms. If posts in online forums say that market prices of dried mushroom are low, I could keep the stock for several weeks until the prices increase. But normally the price I sell is lower than the prices I found online.

Although having information about the market can help farmers to choose the timing of selling mushrooms to middlemen, it has not fundamentally changed the power dynamics between individual farmers and middlemen. One of the production group in Fossil Village has a farming field where group members grow and manage mushrooms collectively. Harvests of mushrooms of this group are also sold together to middlemen at large quantities, which often helps group members to negotiate a higher price than average. As Nan, who is not a member of the group, explains:

> The price per *Jin* we (individual farmers in other groups) can get is 1 to 2 RMB lower than that group. I am not able to sell the mushroom at the same price because the middlemen always have reasons (to lower the price). For example, the technique I used is not good enough, or the quality of my mushrooms is not satisfying enough.

Many villagers also tried to find the price information about mushrooms on Baidu, but many of them told me that there is often a time lag between online prices and offline market information. Hua explains, “mushroom prices change every day, and sometimes even within a couple of hours.” Nan says that it is also difficult to find price information that is specific to Dragon Town or Happy Valley county, “when I searched for mushroom prices on Baidu, the results are often market information for Zhengzhou (the capital city

of Henan). The price shown in the search result is normally 5 to 6 RMB higher than local prices."

Business opportunities for working-class entrepreneurs.

Among the young interviewees who work on the assembly lines in Western Factory, many share a pessimistic view about potential future career paths. The work routine for factory workers is more rigid than management teams: Each manufacturing department works for 10 to 15 continuous days, with day shifts from 7 am to 3 pm and night shifts from 8 pm to 4 am. Tasks are often repetitive and tedious but are also physically demanding with prolonged sitting or standing hours. Meanwhile, life outside of the factory is changing at a rapid pace. Various logistics companies have opened new service points. Food delivery services such as Meituan and Dianping have covered the majority of restaurants, cafés, and movie theatres in Happy Valley county. As young generations in Happy Valley choose to work in industries that are related to the digital economy, many young workers in Western Factory are feeling increasingly anxious and insecure. Career path for workers in manufacturing plants is highly predictable: most of the workers retire in their 50s, at younger ages than employees in management roles. In recent years, newly assigned managers in manufacturing plants were not selected from experienced workers but instead chosen from employees in management departments who have university degrees. Feeling insecure about the future, many young workers I interviewed have considered starting a part-time career in the digital economy. Among them, Mimi, Gui and Fei have already worked both as full-time factory workers and part-time digital entrepreneurs for more than a year. The Internet for them not only provides virtual platforms to start and manage business online, but also an essential information source to learn about business opportunities and acquire essential skills to be an entrepreneur. Meanwhile, I also found a worrying situation in which the concept of the

digital economy has a dark side in luring ambitious young workers into multi-level selling schemes (also known as pyramid schemes), described later.

As introduced in the previous chapter, Gui, a young worker from Western Factory, first learned about the opportunity of starting a business on WeChat by being an active member in a WeChat group consisting of local car-owners. Through this WeChat group, he was then introduced to another close-knit social network of a local NGO and friended with several successful young entrepreneurs who were the first people to start an e-commerce business in Happy Valley county. Since 2013, Gui turned his WeChat Moment into a "guidebook" for e-commerce:

> I have been a lurking learner on WeChat for years. I was particularly interested in Feng, the leader and organiser of the NGO, who shares updates on his e-commerce business in his Moments. I learned how he discusses the design of the product logo within the NGO group, how he plans for an online promotion to sell kiwi fruit. It is from his WeChat post that I realised that social media could be a business tool and that selling fruit online does not lose face (*Diulian,* 丢脸).

In 2015, Gui started to sell different products on WeChat. The first product he sold on WeChat was tooth powder, but he soon noticed that the profit of the powder was "too high to be reliable". He suspected that the product used false advertising ("sell dog meat by hanging a sheep's head (*Gua Yangtou Mai Gourou,* 挂羊头卖狗肉)") by using the name of a famous medical company to mislead customers. In 2016, Gui decided to quit from the business of tooth powder and "took basic training on business by signing up a free program offered by the local government." By the end of 2016, he decided on selling fruit on WeChat after learning via the training that organic fruit such as kiwi will be in high demand in large cities as consumers want to buy fresh fruit directly from farmers. After a whole year of selling kiwi fruit as a second-level distributor, Gui wanted to find a WeChat market that no one in Happy Valley county had invested in:

> I turned to WeChat again for business ideas and inspiration. This time I joined in a national WeChat group of fruit retailers and added a young university graduate who could provide blood oranges directly from the place of origin. I took an

> overnight train to Hubei province during Chinese Lunar New Year (a national holiday). I vividly remembered driving with the young man, who is only 22 or 23 years old, to visit each orange field in the mountain areas. Some of the villages we visited located on the banks of the Yangtze River and were only reachable by motorcycle.

Gui's efforts in seeking new business opportunities paid off. He has become a first-level retailer of the blood oranges after that visit and has received more profit than selling kiwi fruit (Figure 30 shows the WeChat-commerce group Gui joined on WeChat and his WeChat conversation with a customer). In addition to fruit, he also sells yellow rice wine produced by a local brewery to ensure stable income during non-holiday seasons (when sales of fruits are low). It is not a coincidence that Gui started his first e-commerce business on WeChat, the social media platform, instead of Taobao, the online shopping website. Gui has not used a PC since he graduated from university and after working on the assembly line since 2000. He complains that:

> My PC skills, including using software to document incomes and expenses, are poor. I blame my lack of digital skills partly on my job as a factory worker: I have spent years with manufacturing machines but ironically, have never touched the control panels on PCs. I was once eliminated in the selection of workers' representative in the union at Western Factory because they (the union) wanted someone who can master Microsoft Office software […] But if I could have the same chances as (employees who work in) the office, I can easily pick up some basic PC skills.



Figure 30. Screenshots of Gui's WeChat group that consists of retailers of fruit around China (Left) and his conversation with a customer on WeChat (Right),

However, as much as Gui relies on WeChat to expand the business network, continuing his business on social media has many constraints: First, many other interviewees mentioned that they had been disturbed by daily WeChat Moments sent by friends who are doing We-Commerce (*Weishang,* 微商). Some of them even blocked accounts that sell products in WeChat Moments. Second, each WeChat users could only add 5000 friends. To reach to a national market, Gui has to hire other distributors among families, colleagues, and friends. "Building an e-commerce store on Taobao could save the profits I have to share with distributors," said Gui. Currently, his Taobao shop is still under "decoration" (*Zhuangxiu,* 装修), to design a better display of products with logos. Gui has already invested more than 2000 RMB on finding part-time website developers to decorate his Taobao store.

Two other female workers in Western Factory, Mimi and Fei, who were introduced in the previous chapter, also started online businesses as a part-time career. However, their source of information on entrepreneurship and the digital economy is different from that of Gui, which has led them to different career choices. Mimi has been working on the packaging line in Western Factor for seven years:

> I joined Western Factory directly after graduating from university. I was very excited at the beginning but soon became sluggish (*Lansan,* 懒散) after doing repetitive labour every day, from morning to afternoon. I am also very ignorant about public affairs, being 'thrown' into the post since I was 20 years old. My first opportunity to knowing about e-commerce was on WeChat and through my friend's introduction of the O[53] company. I was desperate to change my life by becoming more confident at work and achieving financial independence from my marriage.

Like Mimi, Fei also joined Western Factory as a worker on the polishing line after graduating from university in 2015. She first learned about e-commerce through WeChat friends. In 2015, Fei was a victim of a pyramid scheme and lost all of her savings within

[53] To protect the identity of Mimi and Fei, I will use anonymous names of the companies they joined.

four months. Since August 2017, she heard about the W company through a WeChat friend. Both Fei and Mimi have less diverse sources of information about digital businesses than Gui, who not only adds digital entrepreneurs on WeChat but also befriends experienced e-commerce practitioners in Happy Valley county. Fei and Mimi both learned digital business models only from taking intensive training sessions offered by the O and W company, both direct marketing companies. In the WeChat groups set up by the companies, they also find peer support from other female members:

> I have tried to learn about e-commerce in my free time but have not made any progress so far. I found that by joining in the learning group organised by the O company on WeChat or offline, I could meet female friends while learning about We-Commerce", says Mimi. "The W company has transformed me, including how to communicate with customers, and how to overcome using a weak voice (*Shuohua Ruanruo,* 说话软弱) as a woman […] The local headquarters of the W company is also led by a woman who came from rural areas of Happy Valley county. I also found friends in the group to talk about relationships with my husband, in-laws and my child. Compared to my colleagues, they are more understanding and less judgmental.

Fei also shares similar feelings. Despite the emotional support the O and W companies provided for female working-class entrepreneurs like Mimi and Fei, there are some company regulations and training content that are problematic. To begin with, both companies misused concepts related to the digital economy in the training materials. Mimi explains how the O company defines digital commerce:

> I was encouraged to spread the ideas and products of the O company in my WeChat Moment […] I learned from taking courses offered by the O company that it is now a "sharing economy"(*Fenxiang Jingji, 分享经济*), "sharing" means to share products on my WeChat".

Sharing economy is translated as *Gongxiang Jingji*, not *Fenxiang jingji* in Chinese. The concept refers to sharing underused facilities or products such as apartments, bicycles, or portable power banks on peer-to-peer platforms. By distorting the concept of sharing economy from *Gongxiang* into *Fenxiang*, the lecturer of the O company was trying to rationalise the company's strategy of distributing products only through personal

connections on social media. Nevertheless, for part-time entrepreneurs like Mimi and Fei, these subtle changes and misuses of concepts were hardly noticeable.

The second potential danger is that the companies that Mimi and Fei joined are both direct marketing companies, a type of company that claims to provide products and services through individual distributors instead of retailers. However, in recent years, several direct marketing companies, also known as multi-level marketing companies, are reported to have a pyramid structure of sales representatives and they make profits mainly through recruiting new distributors and charging deposits from lower-ranked distributors[54]. Fei says:

> I was required to add at least 1000 WeChat friends to be a 'sales representative'. To meet the requirement, I spent 80 RMB per month on a third-party plug-in in WeChat, which could automatically add strangers through the functions like People Nearby or Shake.

The O company that Mimi works for does not set strict rules on how many customers she has to reach, but the company was also reported previously by mainstream media to have features of multi-level marketing. Internet search engines, however, did not help Mimi to find the news articles that investigated the O company:

> When I first heard about the company, I did a search on Baidu. After all, I have heard about the danger of multi-level marketing and don't want to start my digital entrepreneur experience with pyramid selling schemes […] However, if you search the company on Baidu, most of the results on the first page are positive. (Interviewer: Have you searched for news articles on the company?) News reports on the company were not displayed on the first page. More importantly, Baidu Encyclopaedia (*Baidu Baike*, 百度百科) shows all positive information about the company[55].

Mimi and Fei joined We-Commerce, selling products and finding distributors on WeChat, for more than a year. Both of them have seen a positive influence of having a

[54] A WeChat Public Account, Dingxiang Doctor, investigated Quanjian, a company that claims to be a direct-marketing business, and exposed the false advertisements, medical accidents, and financial fraud that were related to the company. The CEO of the company was later arrested for multi-level marketing and false advertising.

[55] Like Wikipedia, Baidu Encyclopaedia could be edited or revised by any Internet user. Both interviewees are not aware that results on Baidu could be edited by Internet users.

part-time career in e-commerce, including the increase of a monthly income, having more financial independence in their marriages, and building a social network of supportive female entrepreneurs. However, I also see that their experience of e-commerce is different from Gui, facing more hierarchy within the companies they joined and having less autonomy in creating their digital business models.

E-commerce skills training in Fossil Village.

Compared to the working-class in Happy Valley county, residents in Fossil Village have fewer opportunities to observe how e-commerce entrepreneurs run businesses online since the nearest e-commerce businesses to the villagers were located more than 10 kilometres in Dragon Town. Since 2014, Shun, the former head of the village, tried to turn Fossil Village into a "Taobao Village"[56] by encouraging villagers to open online stores on Taobao and sell mushrooms and other local agricultural products online. However, due to the lack of business experience and digital skills, many villagers have faced technical difficulties in starting online businesses. In the summer of 2014, Dragon Town government paid a professional e-commerce consultant company to provide free digital skills and e-commerce training workshops to villagers. The top-down approach to teaching e-commerce skills to villagers resembles the government promotion of growing mushrooms in the 2000s, offering facilities (free PCs, cheap warehouses to rent, and affordable logistics services) as well as training (general PC skills, introduction to e-commerce platforms, business ideas, and financial knowledge). However, I find that for villagers, starting e-commerce on Taobao is much harder than learning to grow mushrooms.

[56] Taobao Village is defined as a village that has more than 100 Taobao shop owners, accounting for over 10 per cent of households in the village, and with annual sales more than 10 million RMB (AliResearch Institute, 2014).

Despite all the technical difficulties, I find that young villagers are in general very enthusiastic about participating in the training. In particular, young female villagers are more likely than males to eventually open Taobao stores and started running e-commerce since 2014. This echoes with a report published by the World Bank on Chinese Taobao Village, which shows that female entrepreneurs account for a higher percentage (almost half) of all online business owners whereas in traditional industries it is around 25 per cent. Young females, in particular, benefit from e-commerce, with the average of female e-commerce entrepreneurs aged 31.4, 16.2 younger than female in traditional industry (Luo, 2019). Qiang, whose son is one of the organisers of the e-commerce training workshops, compares the difference between female and male villagers in participating in e-commerce:

> My son earned his fortune in e-commerce by spending years of learning and working as a salesman in Southern China. Our village has the opportunity for young people to learn about e-commerce for free. However, many young males in the village would rather play poker than sitting in front of the PC and learn. The Internet can undoubtedly be used to feed the family, but it takes hard work and patience […] There are young women in the village who are always working on their mobile phones. I asked what they were doing for a living. They told me that they sell kiwi fruit and mushrooms online. They also told me that earning 20 to 30 RMB per day is much better than being an idler (*Xianren,* 闲人).

However, it should also be noted that the government-initiated e-commerce training is only available to residents in Fossil Village under 40 years old. Local government seems to take a sceptical attitude for middle-age villagers to have sufficient skills in starting online businesses. Haiyu's application for taking the workshops, for example, was declined several times. She was very disappointed when she heard that some of the participants in the training workshop from other villages were in their 50s and even 60s. "I will to apply again in 2018, although I have already learned so much from asking neighbours who have already taken the training," she said.

For participants in the e-commerce workshops, they could still face barriers that may not be solved by the training. For example, the lack of knowledge about market information (as mentioned in the section on agricultural market information), or the disadvantages in competing with middle- to large-sized Taobao stores that offer lower prices for the same products. As Yan describes the difficulties she has encountered in logistics and online competitions:

> Since I started my Taobao store in 2016, I have always been struggling with the daily management of the online shops. The cost of running an online business is beyond my previous estimation. For example, when the packages broke on the way to delivery, I have to refund the customers. Because I mainly sell beverages made by a local brewery, I can barely make any profit from e-commerce […] Another problem I encounter is logistics, I have been trying to lower the price of my produces to compete with other Taobao stores that sell similar products. However, since early this year, I found that all of my competitors have a lower price for the product than my store, probably because they could get cheaper logistics. The sales of my Taobao store was almost zero in 2017.

Like Yan, sales of mushrooms in Chufang's Taobao store also stagnated since 2016. Her challenge comes from not being able to invest in "search engine optimisation" (*Sousuo Yinqing Youhua*, 搜索引擎优化), and paying Taobao to recommend her store on the first few pages of search results. She also struggles to find information about promotion strategies from the Internet, "I learned online that I need to hire others to give fake reviews and comments to improve the ranking of my store. As far as I know, there are not any alternative methods to boost the sales of the Taobao store. Since there are only few Taobao stores in the village, I do not have any business models to learn from."

Likewise, agricultural products such as mushrooms are challenging to sell on e-commerce platforms. Many interviewees in Fossil Village mentioned that urban consumers are often concerned with food safety and prefer to purchase vegetables and fruit from online retailers or local supermarkets. Many participants of the workshops could not find products from local areas to sell online. For example, Chufang says:

> The workshop showed us that having a team for e-commerce is better than working alone. However, finding a business partner is extremely hard if you live in a mountain village. I tried to post on online forums, looking for a reliable partner to sell agricultural products together, but most of the replies discouraged me from selling mushrooms online. Some Internet users reached out to me and wanted me to become their sales representative. But I found their business ideas even more impractical than mine. It's just so hard to find any opportunities.

However, participants of the e-commerce workshops obtained a more comprehensive understanding of Chinese e-commerce industry from the training. As one interviewee mentioned, tutors in the workshop not only introduced the process of opening an online shop on Taobao but also compared Taobao with other e-commerce platforms. Zhou, for example, benefited from having a more diverse choice of e-commerce platforms after participating in the training:

> Knowledge about all the digital platforms for e-commerce is useful. After the workshops, I did my own research on how much deposit I need to invest in different platforms […] I also first heard about Meituan (美团) from the e-commerce workshop and learned that I could advertise for the guesthouse I manage on the app. I have received more bookings online since I posted on Meituan (se Figure 31). (Interviewer: Do you have to pay for the advertisement?) Meituan will charge 10% of each online booking, but the business is booming.

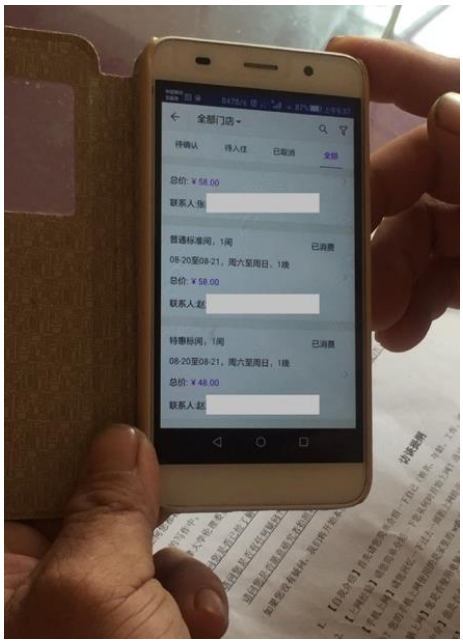


Figure 31. Zhou shows the online bookings he has received from Meituan app, after posting the guesthouse his family manages online.

5.2.4 Information on commercial or cultural consumption: Shopping

Interestingly, although the e-commerce workshop in Fossil Village has not succeeded in training all of its young villagers to become digital entrepreneurs, it has yielded unexpected benefits in training most of them to be more informed consumers on e-commerce platforms. Many interviewees mentioned that the most important digital skills they learnt from taking the training is advanced knowledge about algorithms behind e-commerce platforms. As Ji explains:

> This (digital skill training workshops) is the first free course I took that is related to the use of the Internet. I have only used the Internet for social networking and entertaining previously. The workshops gave a comprehensive introduction to fundamental structures behind the Internet, such as the ranking algorithms of products on Taobao, or the strategies of displaying products on the front pages. After learning from the workshop, I now learned that the top ranked results might be part of a search engine optimization and that reading negative reviews is more important than reading the positive (but fake) ones. I also shared what I learned from the workshop with my colleagues. We all found it useful for online shopping.

E-commerce platforms have enabled many consumers in Happy Valley county to bypass local retailers or distributors and buy products at a lower price. As users become familiar with e-commerce platforms, they have also extended the range of products they shop online, from buying clothes and mobile phones to vegetable seeds and even construction materials. A local contractor, Hai, for example, has saved a considerable amount of money for his construction team by buying cement and steel on Taobao directly from the manufacturers:

> I used to buy all construction materials in the county, and sometimes had to hire a truck and buy materials from Zhengzhou, the capital city of Henan. Now, Taobao has included all building materials, including cement, on the website. The price of construction materials on Taobao is at least 20% cheaper than the offline market in the county, and most of the products I bought online could be delivered directly to Dragon Town, with some large-sized packages like bricks delivered to Happy Valley county. (Interviewer: Why do you think that there is such a huge price difference?) Online prices are usually similar to manufacturer's price, without going through several levels of distributors from major cities to second tier cities, and to Happy Valley county. Most of the materials I buy online are made and delivered from provinces in Southern China, such as Jiangsu. With the

> same budget, I can now buy materials with better quality and can offer higher salaries to the workers.

When looking for online information about different products, users who have experience or knowledge of the history of e-commerce platforms are more sophisticated consumers. For example, Bing gives an interesting metaphor for Taobao and Tmall: Tmall is an e-commerce platform for verified dealers or official stores of different brands, whereas Taobao consists of consumer-to-consumer businesses:

> Tmall is like a supermarket and Taobao a bazaar. Because stores on Tmall are verified (by the platform), I do not spend too much time reading reviews. I also buy expensive products exclusively on Tmall, just to be safe (from buying fake products).

Another interviewee, Jing, said that she benefits from comparing products across different e-commerce platforms, "I normally search for the same product on several different platforms, including Tmall, Taobao, Vipshop (*Weipinhui*, 唯品会), and Pinduoduo (拼多多). I find that if you read all negative reviews of the same product on each platform, you will make a well-informed decision on whether or not the product is worth buying." Having diversified Internet devices when looking for information about products is also advantageous. Yanyan has downloaded e-commerce apps on her mobile phone and also saved e-commerce websites as bookmarks from the Internet browser on her PC:

> I use mobile apps to browse e-commerce platforms whenever I have free time at work. I also added marks for the products I like in the wish list. When I arrive home, I would open the PC and check the items on the larger screen. Online shopping websites do not allow the comparison of more than five products on the screen of mobile phones, but I have my 'online shopping routine' to overcome that (limitation) by using a combination of mobile and PC devices.

5.3 Urban-rural differences in everyday information needs

Previous literature review on information needs in rural China has suggested that there is a lack of empirical study on what kinds of information rural residents need in

everyday life contexts (Y. Zhang & Yu, 2013). In this section, I return to the analysis of survey data to see if the everyday information needs are different among various demographic groups, particularly as between rural and urban residents.

I use multiple regression analysis on four dimensions of everyday information needs, with demographic variables such as age, gender, marital status, number of children if any, monthly income, and residence as independent variables (see Table 16). Four regression models are all significant, but it is important to note that the model for everyday information relating to self and relationships is not significant, which indicates that there are other factors that might explain information needs in relation to this dimension. We find that urban users have higher needs than rural users for everyday information about the immediate environment (B = .47, $p < .001$) and information about public affairs and the government (B = .42, $p < .001$) than do rural users. However, rural information users have a higher demand for information about commercial and cultural consumption (B = .47, $p < .01$) than do urban residents. This finding indicates that rural residents have higher needs for information about culture, leisure, and shopping in their everyday lives. It also explains why the digital training workshops that were initially aimed at providing information about e-commerce and digital entrepreneurship has become a source of information about online shopping for villagers. The regression results also suggest that there is a gender difference in information needs: female users have higher needs for information about the immediate environment such as health or local events (B = .17, $p < .01$) but have lower needs in information about public affairs and the government (B = -.16, $p < .01$). The gender differences are also reflected in the qualitative results, for example, in the different information seeking strategies for seeking e-commerce information as between male and female working-class users.

Table 16. Multiple regression results on four everyday information dimensions, with demographic variables as independent variables

	Dependent variable:			
	Self, Relationship	Immediate Environment	Society, State	Commercial, Cultural
	(1)	(2)	(3)	(4)
Age	-0.005	-0.011^	-0.007	0.007
	(0.005)	(0.006)	(0.006)	(0.005)
Gender Female	0.053	0.171^	-0.159^	0.062
	(0.086)	(0.096)	(0.093)	(0.088)
Marital Status Married	-0.261	-0.361	-0.105	-0.610*
	(0.261)	(0.292)	(0.282)	(0.267)
Children Yes	0.295	0.664*	0.339	0.194
	(0.236)	(0.264)	(0.256)	(0.242)
Monthly Income	-0.00001	0.0001	0.0001*	0.00001
	(0.00004)	(0.00005)	(0.00004)	(0.00004)
Residence Urban	0.227*	0.469***	0.419***	-0.469**
	(0.094)	(0.105)	(0.102)	(0.097)
Constant	0.010	-0.336	-0.316	0.329
	(0.252)	(0.282)	(0.273)	(0.258)
Observations	302	302	302	302
R^2	0.036	0.123	0.092	0.119
Adjusted R^2	0.017	0.105	0.074	0.101
Residual Std. Error (df = 295)	0.735	0.823	0.796	0.754
F Statistic (df = 6; 295)	1.852^	6.891***	4.990***	6.651***

*Note: ^p<0.1; *p<0.05; **p<0.01; ***p<0.001*

5.4 Summary of the chapter

In this chapter, I used a mixed-methods approach to understand everyday information needs among Chinese rural and urban users and how the Internet has changed information seeking practices in different contexts. Using Exploratory Factor Analysis on survey questions about everyday information needs, I identified four everyday information dimensions, personal development and romance, immediate environment, the government and public affairs, and commercial and cultural consumption. Each dimension is related to the different roles of individuals in families, local community, wider society, and the market economy. Different dimensions of information needs are not isolated but interrelated. The mapping of everyday information can serve as a guideline to carefully investigate each information context with qualitative interviews and focus group studies. Within each dimension, I therefore focused on subcategories of information needs within a context and compared the role of the Internet as an information source to traditional media or offline face-to-face communication, as well as variances in information seeking practices across different demographic groups. The analysis of different information dimensions shows that some types of information, for example, hobbies and entertainment, have lower technical and informational barriers than, for example, information about health, e-commerce, and personal development. A comparative study of the reliability and accessibility of different types of information and its consequences for a "content divide" could be a focus of future study. Table G1 in Appendix G provides a summary of different information sources for each information need, with associated users discovered as part of the qualitative analysis.

Information seeking for personal development consists of learning about social relationships, information for pursuing hobbies, and information on upgrading professional skills. I find that Internet users in China seek information on everyday skills

and interests from a wide range of sources, with some subscribing to news and articles on social media and news apps while others actively seek information from search engines or e-commerce websites. Several case studies in Fossil Village also suggest that online music or video sharing platforms that include user-friendly recommendation systems are increasingly popular among rural users for obtaining information about personal development skills or hobbies. Online training apps developed by the government or private companies are important tools for teachers and doctors working in rural areas to upgrade their professional skills. Nevertheless, using the Internet for upgrading professional or digital skills is challenging for rural users who lack higher education backgrounds.

I also identified two roles of the Internet for health information seeking: to monitor news articles on everyday health issues such as diet and nutrition using news app or WeChat, and secondly to search for diagnoses, treatments and medicines for diseases on search engines and online forums. However, I found that experienced Internet users in urban areas have more professional information sources such as paid courses or health-related apps compared to rural users who rely heavily on the experiences of families or friends. Lacking reliable Internet sources about food and diet, users often receive more misinformation and experience a higher level of stress in health-related information seeking. For information on the diagnosis and treatment of disease, online information is also considered by grassroots users as less trustworthy than specialists and experts. Nevertheless, search engines are used by some users to find treatment for minor diseases or to find online support groups for patients, but inexperienced users often face challenges in distinguishing sponsored advertisements from among the search results. On a positive note, the adoption of the QR scanning function on WeChat has enabled many rural mobile users to identify substandard or fake medicines.

The Internet provides market information about agricultural products for rural users and information on new business opportunities for the urban working-class. I find that although middlemen still exercise a dominant power in setting the purchasing price for agricultural products in rural areas, villagers have gained negotiation power through private communication with middlemen on social media or searching for price information on Baidu and e-commerce platforms. And yet information about agricultural products on search engines lacks geographical relevance. Meanwhile, the Internet offers business ideas for the working-class users in Happy Valley county, but the most reliable information on digital entrepreneurship comes from personal connections with local business leaders or from first-hand experience with e-commerce. For many working-class interviewees, social media are often preferable business platforms than online shopping platforms for starting with e-commerce. However, I find that if social media are the only sources of information for e-commerce, users might be persuaded to join direct marketing companies instead of starting an independent business online. Dependence on direct sales companies also have potential financial risks for the working-class entrepreneurs. E-commerce training in rural China, in contrast, is provided by government-led training workshops in Fossil Village. However, most of the participants in the training program have not succeeded in managing the Taobao stores due to a lack of PC skills, initial capital investment on store decorations or for search engine optimisation, and affordable logistics services in rural areas. The study of information seeking for e-commerce is a crucial step in understanding how China's transformation from a primarily agricultural and manufacturing economy to a service-based digital economy will influence the lives of grassroots users. While some users have successfully upgraded their digital skills for online commerce, we also see many working-class and rural Internet users fail to find online information to support self-employment. The future of the Chinese digital

economy will depend on whether millions of Chinese Internet users can adapt to the digital transformation of labour.

On the last dimension of everyday information, online shopping, I find that rural residents in Fossil Village obtained information on shopping from undertaking e-commerce training. Online shopping websites also help both rural and urban consumers to bypass retailers and distributors and buy products such as construction materials directly from manufacturers. I also show that using diverse platforms or devices for shopping and having background knowledge about the ranking algorithms behind shopping websites can enable consumers to make more informed decisions for everyday shopping on the Internet.

In the final section of this chapter, I used multiple regression analysis on four dimensions of everyday information, with demographic factors as independent variables. The quantitative results echo the qualitative analysis that urban users have a higher demand for information about the immediate environment and information about public affairs and the government. The results also point to how rural users have higher information needs for information about shopping and cultural consumption. This finding calls for attention from information providers to pay more attention to rural users' information needs in the commercial and cultural contexts. But as we have seen, these are only one aspect of the met and unmet needs of different users in different contexts.

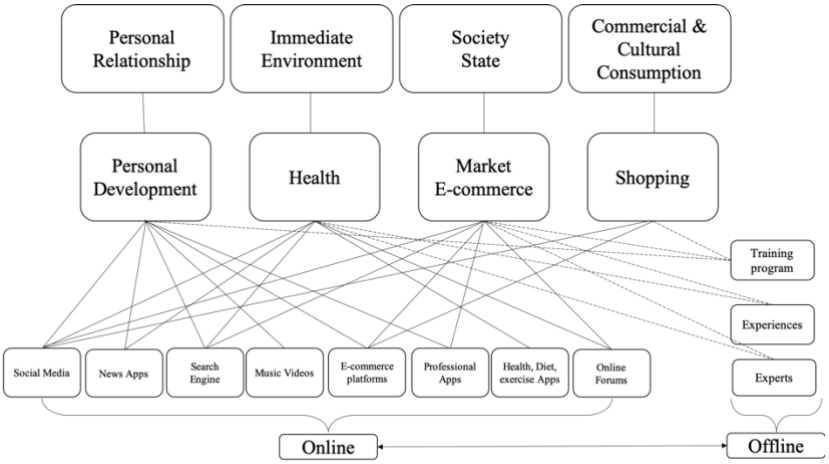


Figure 32. The relationship between information needs and information sources. Solid lines represent information seeking from online sources, and dashed lines represent information seeking from offline sources. Note that the online and offline sources are sometimes interconnected.

To sum up, the results in this chapter have shown the diversity and complexity of everyday information needs, online information sources, and users' information seeking approaches. Figure 32 shows the relationships between information needs and online as well as offline information sources. I have shown that Chinese Internet users seek and search for information beyond politics and employment and have increasingly diverse information needs in different contexts. A closer examination of the role of the Internet as the source of everyday information shows both strengths and limitations of digital technologies. While Internet users are provided with information to negotiate with gatekeepers such as middlemen or distributors, barriers that exist in social-economic structures such as the lack of scale in agricultural production still prevents users from bypassing the gatekeepers in certain markets. Several case studies of e-commerce also show that there are potential risks involved in the over-dependence on digital platforms such as social media but also significant source of information for online business. I found that traditional information sources, such as expert knowledge and shared experiences, remain essential in many information contexts.

Meanwhile, the Internet has facilitated stronger connectivity to experts and professionals, for example with online medical appointments and remote medical

consulting, and among users who want to share experiences such as online patient groups and e-commerce business WeChat groups. Chinese government informatisation plans for rural education or e-commerce also achieve positive outcomes when provided both through digital platforms and offline training programs. However, the top-down approach of informatisation plans in China have neglected the information dimension related to the immediate environment, such as health and food safety. In the next chapter, I will study the problems emerging from everyday information seeking on the Internet and explore the relationship between digital technologies and issues such as misinformation and information overload.

Chapter 6 The Digital Disturbance? Misinformation and Information Overload

As Chapter 5 demonstrates, the Internet has influenced information seeking practices in several everyday contexts in contemporary Chinese society. The spread of the Internet has led to new channels between information users and information sources. However, Internet users in China also confront new issues involved in online information seeking practices. In this chapter, I will focus on problems users face in online information seeking in everyday life, including the feeling of information over- load (or lack of information provision) and difficulties in identifying misinformation. I will also show that Internet users have created new approaches to tackle these problems by seeking information through human or algorithmic proxies.

6.1 Trust in information sources, misinformation, and information overload in rural and urban China

Before analysing the factors that account for issues related to misinformation and information overload, I will first use descriptive survey data to show the importance of the Internet as a source of information in everyday life, trust in the Internet as an information source, and users' experiences of issues such as misinformation and information overload. The Internet is not the only source of information in everyday life, and information from traditional media or face-to-face communication sometimes circulate through digital platforms. The first group of heatmaps compares the importance of different information sources in rural and urban users' everyday lives. For rural users, TV or Radio is the most important information source, followed by the telephone and the Internet (see Figure 33). Urban users, however, rate the Internet as the most important

information source (Figure 34). Newspapers[57] are the least important information source for both groups of users.

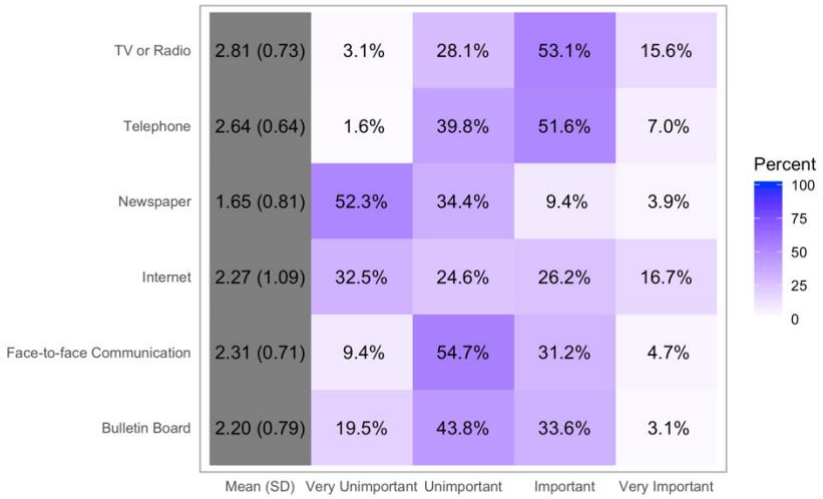


Figure 33. Information sources in everyday life among rural respondents

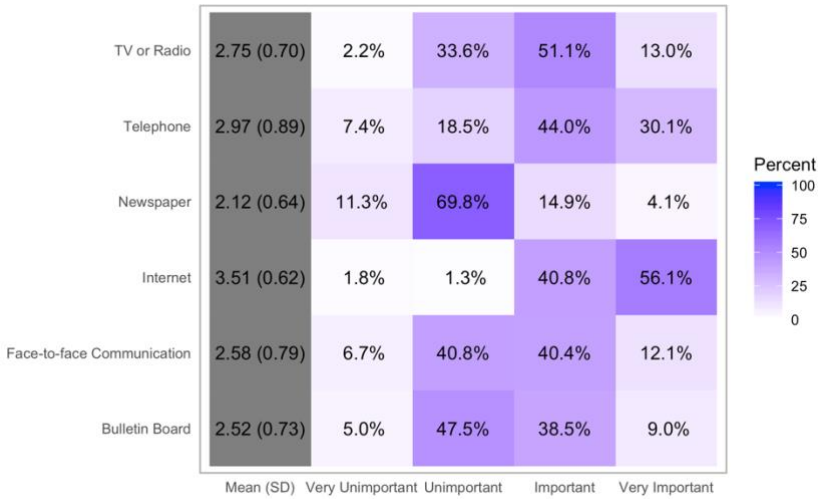


Figure 34. Information sources in everyday life among urban respondents

Figure 35 shows levels of trust in different information sources among rural users. The Internet is the least trusted information source, and bulletin boards are the most trusted source of information among rural users. Figure 36 shows that urban respondents have higher trust towards the Internet as an everyday information source, but this is only slightly higher than face-to-face communication. Yet bulletin boards are also considered

[57] Note here that newspaper in the survey refers to the printed newspaper. Many interviewees follow WeChat Public Accounts that are created and updated by newspapers or news agencies, such as People's Daily or Xinhua News.

as the most reliable source of information, along with information from the telephone. While the Internet has increasingly become a major channel of information seeking in both rural and urban China, there is a high level of distrust in relation to online information among users in both field sites.



Figure 35. Trust in information sources in everyday life among rural respondents



Figure 36. Trust in information sources in everyday life among urban respondents

I also compared the differences between rural and urban respondents in their experiences in information seeking. Figure 37 and Figure 38 show that the most challenging obstacles that both rural and urban users confront in everyday information seeking on the Internet is misinformation, followed by the feeling that they lack information sources. Meanwhile, users from both field sites feel more strongly that they

lack information sources than that they suffer from information overload. More than 42.4% of rural users are not confident in using the Internet for information seeking, compared to only 13.64% of urban users who lack confidence in seeking information online. In the following sections, I will use both quantitative regression analysis and qualitative analysis to examine the reasons behind the digital disturbances in everyday information seeking practices and discuss how users navigate through difficult informational situations by using various approaches.

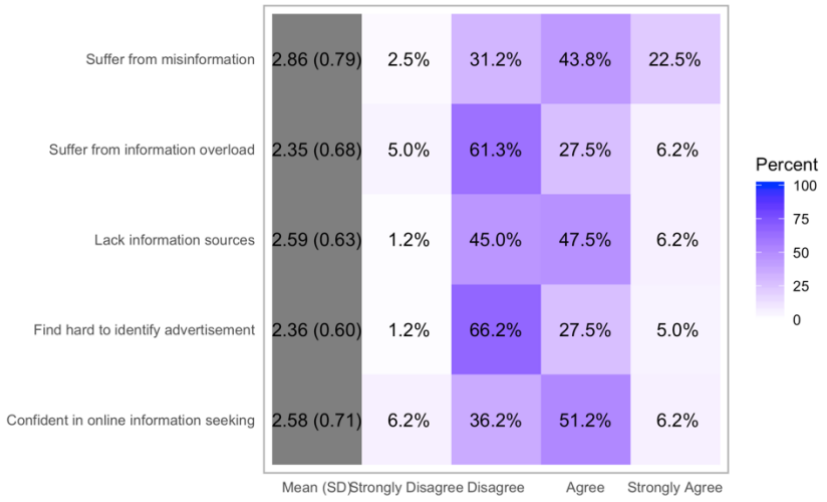


Figure 37. Experiences in seeking information on the Internet among rural respondents

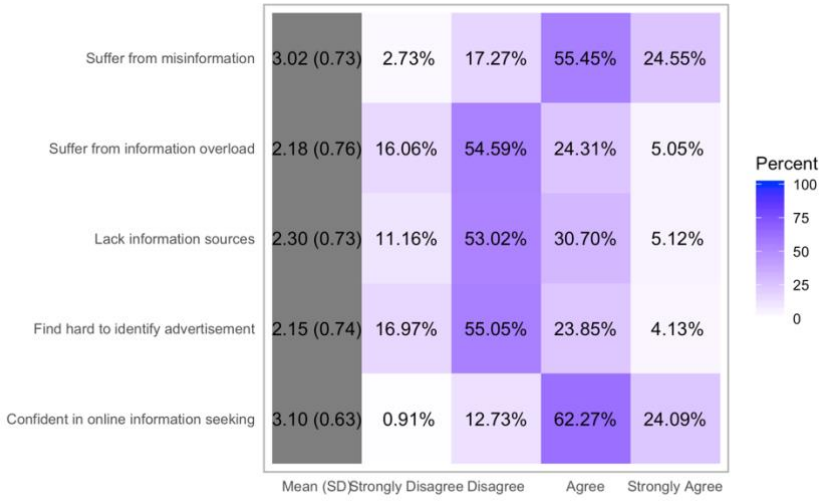


Figure 38. Experiences in seeking information on the Internet among urban respondents

6.2 Misinformation: "Living in the era of attention-grabbing designs"

6.2.1 Trust, identifying online advertisements, and online rumours

The importance of the Internet as an information source, trust in online information sources, the challenges in identifying online advertisements, and the experience of encountering rumours online are all measured by Likert-style questions, with 1 = "Strongly Disagree", 2 = "Disagree", 3 = "Agree", 4 = "Strongly Agree". In this section, I will explore what factors might explain different user experiences related to misinformation on the Internet. I applied ordinal logistic regression[58] in R on information experiences related to online misinformation with socio-economic, demographic, and technology use variables as independent variables. Given a large number of factors included in the model, I applied a backward stepwise model selection using the Akaike information criterion (AIC) as a goodness-of-fit criterion (Akaike, 1981) to find a model with a lowest AIC value. AIC is a preferable method for variable selection for its generalizability in different statistical models, including in non-normally distributed samples (Yamashita, Yamashita, & Kamimura, 2007).

Table 17 shows the results of logistic regression models on four dependent variables that are related to user experiences of misinformation on the Internet in everyday life. Model 1, 3, 5, and 7 are models with all independent variables; and Model 2, 4, 6, and 8 are models selected using the backward stepwise methods and have the lowest AIC value. As is shown in Model 2 and 4, the odds that urban respondents use the Internet as an information source and trust the Internet as an information source are both higher than those of rural respondents. Younger generation users and users who have children are more likely to use the Internet for information seeking. Technology use

[58] I used the *polr* and *stepAIC* functions from MASS (Ripley et al., 2019) to fit logistic regression models on the ordered categorical variables.

variables are also associated with dependence and trust in the Internet for information seeking: Regression results suggest that Internet users who spend a longer time online are more likely to depend on the Internet as an information source. However, the odds that mobile-only users trust online information is 2.21(1/0.451) higher than Internet users who also use PCs to access the Internet. Model 6 and Model 8 show that the challenge that users face in identifying advertisements and being subject to online rumours is associated mainly with education. The odds that users with an undergraduate (or above) education is 4.27 (1/0.234) higher than users who have an education background lower than high school. Users with a higher education background are more likely to distinguish misinformation from facts, but they also have higher odds of experiencing online rumours on a daily basis.

Table 17. Logistic regression models on online experiences of trust in the Internet, online advertisements, and rumours

	Internet as an information source			**Trust in the Internet as an information source**			**Face challenges in identifying advertisements**			**Experience rumours online**		
	(1) B (SE)	(2) B (SE)	Odds Ratio	(3) B (SE)	(4) B (SE)	Odds Ratio	(5) B (SE)	(6) B (SE)	Odds Ratio	(7) B (SE)	(8) B (SE)	Odds Ratio
Age	-0.056***	-0.055**	0.946	0.023			0.027			0.006		
	(0.016)	(0.017)		(0.017)			(0.016)			(0.016)		
Gender Female	-0.246			-0.034			0.072			0.107		
	(0.260)			(0.258)			(0.262)			(0.243)		
Marital Status Married	-1.310***	-1.421	0.242	-0.554*			0.839**			1.090***	1.069	2.911
	(0.277)	(0.802)		(0.266)			(0.258)			(0.241)	(0.722)	
Children Yes	2.126***	2.130**	8.412	1.045***	0.751	2.119	-0.530			-1.014***	-0.992	0.371
	(0.303)	(0.724)		(0.280)	(0.399)		(0.279)			(0.257)	(0.634)	
Migrant Worker Yes	0.076			-0.031			-0.370	-0.502	0.605	0.316		
	(0.277)			(0.276)			(0.274)	(0.268)		(0.262)		
Monthly Income	0.0001			-0.00000			-0.0001			-0.0001		
	(0.0002)			(0.0001)			(0.0001)			(0.0001)		
Education High school	0.502			0.207			0.170	-0.045	0.956	0.680**	0.933*	2.543
	(0.275)			(0.283)			(0.279)	(0.371)		(0.263)	(0.365)	
Education Vocational school	0.407*			0.183			-0.145	-0.583	0.558	0.158	0.514	1.672
	(0.202)			(0.196)			(0.202)	(0.337)		(0.182)	(0.337)	
Education Undergraduate	0.462*			-0.218			-0.846***	-1.454***	0.234	-0.163	0.195	1.215
	(0.232)			(0.221)			(0.232)	(0.393)		(0.204)	(0.405)	
Residence Urban	1.482***	1.725***	5.610	1.267***	1.237***	3.446	-0.295			0.460*		
	(0.262)	(0.304)		(0.246)	(0.296)		(0.229)			(0.233)		
Mobile Years	0.010			-0.041			-0.040			-0.015		
	(0.030)			(0.032)			(0.031)			(0.031)		
Mobile Only Yes	-0.263			-0.768**	-0.797**	0.451	0.096			0.364	0.395	1.485
	(0.279)			(0.280)	(0.274)		(0.290)			(0.267)	(0.270)	
Time Spent Online	0.169*	0.204**	1.226	0.064			-0.003			-0.008		
	(0.069)	(0.071)		(0.061)			(0.058)			(0.056)		
N	258	258		259	259		244	244		261	261	
Residual Deviance	463.351	469.101		464.874	470.418		484.119	488.682		560.331	563.709	
AIC	495.351	485.101		496.874	482.418		516.119	502.682		592.331	581.709	

NOTE: *p < .05; **p < .01; ***p < .001

6.2.2 Types of misinformation

Since the Internet has become a major source for seeking information, most interviewees from Fossil Village and Western Factory have experienced an increase in false advertisements and rumours. I begin the qualitative analysis of online misinformation with a description of different types of misinformation users have frequently encountered in everyday life.

Foreign affairs.

Social science scholars who have studied the role of the Chinese government in online information have found that the government is more likely to sensor information that has the potential to galvanise citizens into collective action (King et al., 2013). The sharing of politically sensitive information related to protests or criticisms against Party leaders such as the president Xi Jinping is closely monitored by the government. However, I find that the government's strict censorship overlooks misinformation related to some types of political information, including information on foreign affairs and local incidents.

One of the main areas where misinformation frequently appears is in foreign affairs and the government's foreign policies. China has borders with 14 countries and has historical, economic, or political conflicts with neighbouring countries such as Japan. Nan, a female Internet user in Fossil Village, was confused by a news article on the Diaoyu islands (a group of disputed islands in the East China Sea. They are also known as the Senkaku islands in Japan):

> I received the article on WeChat Moments, which says that there is a military occupation from Japan of the Diaoyu islands and President Xi Jinping has visited the island. (Note: both incidents were false). The article says that we are going to start a war with Japan for their continuing occupation of the islands. (Interviewer: Did you believe in the news article?) I was initially very sceptical of the news since most of the Internet articles are not reliable. However, I thought this (article) is related to foreign affairs and state diplomacy, and no one would dare to falsify this type of information. So, I was convinced that we were going to war with Japan soon.

Nan was later told by her son, who lives in North-eastern China near the Diaoyu islands, that the situation was not upgraded to a military conflict and the WeChat article was misinformation. Xia, who works in Western Factory, has seen similar WeChat articles. “There is always a call for readers of the article to boycott products made in Japan,” she said. In some cases, the articles end with a curse that those who do not forward the articles in WeChat groups will suffer terrible retributions (*Zaotianqian,* 遭天谴). It is therefore not surprising that when Nan read the article about Diaoyu islands, she was angered by the Japanese “occupation” of the islands and forwarded the article in her family’s WeChat group. Hong from Fossil Village has seen similar WeChat articles around the same time as Nan. “It even shows a video clip of fighter aircraft flying above the sea, which makes the article look more convincing.” Online rumours that aim to arouse public indignation using nationalism are widespread, especially when China is in dispute with other countries on economic or political issues. Despite the government’s rigid censorship concerning politically sensitive topics, this type of political misinformation remains uncensored and widespread on Chinese social media.

Local incidents.

Another type of misinformation that commonly appears on WeChat are local incidents. As an interviewee from Western Factory, Ai, described, “misinformation is concentrated in the area of local news or social issues.” WeChat groups and online forums are often the sources of this type of misinformation. Dun from Western Factory was shocked on one occasion by a piece of breaking news in a WeChat group that the head of the Happy Valley county passed away. He searched on Baidu the next day and found out the politician was attending an event on the same day of his “death” and realised that the article was a rumour. Dun’s co-workers Shan and Zheng both found that much misinformation about local incidents comes from the local forum on Baidu Tieba (online

forums hosted by Baidu and visible to search engine users). The local forum on Baidu now has almost 400,000 subscribers[59]:

> Some people fabricate rumours about their enemies and use Tieba to spread the rumour. (Interviewer: What kinds of rumours?) For example, a local resident was involved in a lethal car accident […] Tieba is now turning into an online space where the Angry Youth (*Fenqing,* 愤青) take revenge on individuals such as ex-girlfriends or insolvent debtors by spreading fake news about them.

Wei finds that rumours about missing children in local areas are more viral ones than other types of misinformation. He said that "it is quite common to see the message of a local child gone missing shared in different WeChat groups." Rumours that have pictures or videos attached are more likely to be shared by social media users:

> Most of the stories are fake since the parents' phone numbers in the stories are not registered within Henan Province. (Interviewer: How did you find out that the phone numbers are not local?) I copied and pasted the numbers on the dial pad of my phone to check (if the numbers are local).

Many rural interviewees use WeChat groups as the main source of everyday information, but they have seen an increasing number of rumours about local incidents in the village's WeChat groups. Natural disasters, social unrest, and accidents are the most common types of misinformation in WeChat groups with the potential to spread fear among users.

Haiyu was anxious when she read a WeChat article that predicted "an earthquake measuring 8 on the Richter scale will destroy Henan Province in 2020". Video clips on different news incidents are sometimes re-edited to substantiate a rumour. Ji once received a WeChat article in the group that said that a student was beaten to death by his classmates. The article seemed convincing with a video of a student being beaten with an iron tube by a group of teenage boys wearing school uniforms. However, after a few days the police clarified with a post-mortem report that the student had died from suicide and

[59] Baidu Forum (or Tieba) is an online discussion group set up by Internet users in Happy Valley county. The county has approximately 430,000 residents. The vast number of subscriptions also comes from students or previous residents of Happy Valley Country, who are living in other cities.

was not attacked by his classmates. The widespread video was taken from a different violent incident that took place a few years ago. According to Ji, his "instinct" for identifying fake news is less accurate when the misinformation is backed up with video evidence. Although Ji graduated from high school and worked in the cities, she still finds falsified videos misleading. For older generations in Fossil Village, misinformation in a video format can still sometimes challenge their beliefs. Liu is a university student from Fossil Village, and her father once forwarded her a video on WeChat:

> The video shows a dragon flying from the river and breathing out fire. I thought it was a joke my dad wants to share with me, but he actually believed in the video and was convinced that whoever took the video was blessed to document the spectacle. So, he forwarded the video to more people to 'turn his luck' (*Zhuanyun,* 转运).

Due to the lack of local newspapers in rural areas, interviewees in Fossil Village do not have up to date news reports of the accidents happening in their local area. Photos, videos and messages about accidents are often shared in WeChat groups or WeChat Moments, which creates tensions and anxieties within the community. One such rumour that I witnessed was a video of three mothers holding the dead bodies of their children. The caption in the video showed that all children had drowned while playing in the river. The video had been shared in the village's WeChat group, with a message saying, "three innocent lives lost in X village in Happy Valley county, please forward if you want to protect children in the neighbourhood". Zhou also watched the video and forwarded the message and the video on his WeChat Moments, but later he read on the Toutiao news app that there no child had drowned from swimming in the river and the video was taken from a different incident. Misinformation that strikes fear in rural communities resulted in a national-scale panic and unrest in 18th century China (Kuhn, 1992). In 1768, a rumour saying that sorcerers can steal the souls of people by clipping off the end of the men's

braids[60] resulted in a national social crisis. Qianlong, the emperor of China's last imperial dynasty, believed that the rumour was part of a conspiracy against the dynasty and forced a barbaric suppression to stop the spread of the rumour. During the campaign, roving monks, Taoist clergy, and vagrants were interrogated and accused as soul-stealers. Internet users in contemporary China may have more information sources for information seeking, but when it comes to natural disasters or social disturbances, the increasing diversity of information formats (including audio and videos) has intensified fear within the community and poses new challenges in identifying rumours.

Financial fraud and pyramid schemes.

In the previous chapter, I described how many working-class interviewees started their e-commerce career by joining direct marketing companies. Although the business model is still controversial, most of the above-mentioned direct marketing companies in urban China have been registered by the Department of Commerce in China. I found that rural Internet users are suffering from financial fraud and pyramid selling schemes. Financial fraud is often disguised as a business opportunity and shared through WeChat in Fossil Village. Shun, the former head of the village, was the first victim of financial fraud in the village. He invested 20,000 RMB in the black tea business:

> I was told through my WeChat friend that the product is popular in coastal provinces like Shanghai and Guangzhou. The friend also sent me articles that described more than 10 health benefits of the Black Tea, including curing cancer. So, I spent most of my savings on purchasing the black tea and teapots. Three months after, I saw on TV news that the Black Tea business was a fraud.

Some villagers also suspect that their personal information online might be misused by websites and swindlers. Nan recalls receiving a phone call one day, and the caller knew her name and date of birth and asked her to book train tickets from him instead of from the official website of the national railway. "I was surprised to hear that

[60] Men in Qing dynasty wore braids by decree. The cutting off of a braid was an act of rebellion.

he already knew my personal information. They could have succeeded if I were an elderly villager who is not familiar with the Internet." Nan is right – Ling, a female village aged 47, told me that she has received such phone calls and is "so frightened by financial fraud on the Internet" that she decided to only use WeChat for talking to her family and accepting mobile payments when selling lunchboxes on the highway.

Search engines are useful information sources for quick fact-checking for rural Internet users, especially when the misinformation is related to a fraud that has spread across the country. However, even for fraud that has been reported by Chinese mainstream media, Baidu often fails to warn users of the financial risks involved. Haiyu, 51, lived in Happy Valley county but sometimes returns to Fossil Village on weekends. Many of her neighbours in the county have recommended her to join in an organization called *Shanxinhui* (善心汇) and asked her to pay for the membership fee to receive "high interests rates and monthly cash payments." But she has her doubts about the organization and searched on Baidu (see Figure 39). The search results led to "controversial viewpoints" with top-ranked webpages promoting the organization and other posts on online Q&A forums reporting the organization as a Ponzi scheme. As of July 2017, after the individuals behind *Shanxinhui* were arrested on suspicion of financial fraud, Haiyu was still indecisive about whether or not to join the organisation. It is true that having access to a search engine helped Haiyu to postpone her decision to join and might prevent her from being defrauded and becoming a further victim. Nevertheless, lacking information skills to distinguish sponsored advertisements from trustworthy news reports still leaves inexperienced Internet users like Haiyu susceptible to misinformation.



Figure 39. Haiyu searched for the organisation, Shanxinhui, on Baidu.

Health and food safety.

Both rural and urban interviewees receive misinformation about health and food safety. And again, many believe the misinformation to be credible when it has video "proof". Han's in-laws shared a video showing a child barking after he was bitten by a dog. She suspected that the video was fake and searched on Baidu for the symptoms of rabies. After finding that the police had already scotched the video as fake news online, she shared the article from the authority with her family members on WeChat. "We would rather wrongly believe (in the fake information) than rightly doubt (that it is misinformation)" was the response she got from her in-laws.

Internet users are of course extremely cautious concerning health-related topics. The growing concern is partly due to the frequent food safety crises (dairy products found tainted with melamine[61]) or medicine scandals (fake vaccines[62]). The lack of the public's confidence in the quality of food and medicines also undermines the efficacy of fact-checking articles to prevent the distribution of health-related misinformation. For example, the couple Hua and Xiao watched a short video online that shows that the nori (a kind of edible seaweed) they bought from the supermarket is made of black-coloured

[61] https://www.bbc.com/news/10565838
[62] https://www.thelancet.com/journals/lancet/article/PIIS0140-6736(18)31695-7/fulltext

plastic. The video was later proved by the Chinese authorities to be fake news. However, the impact of the misinformation continues. “We are convinced that the fake nori is indeed made of plastic, especially since it is backed up by a short video,” says Hua. The last sentence in the video appealed to many rural consumers, according to Xiao, claiming that “food producers’ standards of morality are dropping in China”. Hua and Xiao are not the only ones affected by the misinformation about nori in the village. Yu also watched the video and has not eaten or purchased any nori since then. Yu also believed that “videos don’t lie.” Unlike the couple, Yu had not read any news articles that the video was fake. She trusts the majority of her WeChat friends who shared or commented the video in the groups, saying the video is “unlikely to be fake because no one has posted in the group that the video was fake news.” Nevertheless, WeChat users who posted videos or articles that were later reported as fake news are unlikely to later clarify the facts in the same group. For users like Yu whose only information source is WeChat, it is difficult to receive fact-checking articles concerning the misinformation.

6.2.3 Attention-grabbing design: Massive production of misinformation on mobile news aggregators and social media

Two types of information platforms, social media and mobile news apps, were frequently mentioned by interviewees as sources of misinformation. As Long, who works in Western Factory, summarised, misinformation is “eye-catching, emotional, and sensational.” Some features in social media and mobile news apps have particularly facilitated the dissemination of misinformation due to technology features that are designed to attract users’ attention.

In China’s fast-growing mobile news apps market, as elsewhere, technology companies compete for capital investment through measurements such as daily active users, or users’ time spent within the app. Attention-grabbing design is therefore essential

for news apps' success but often results in sacrificing information quality over quantity. A popular news app, Qu Toutiao, even gives a small amount of financial incentives to users for downloading the app and reading news articles within the app. However, as users' limited attention on the Internet concentrate on news apps such as Qu Toutiao or Toutiao, there has been a decreased serendipitous encounters of diverse information sources on the Internet (Webster, 2014).

Meanwhile, news apps such as Toutiao News are defined as "Internet new services set up by non-news agencies" (*Fei Xinwen Danwei Sheli de Hulianwang Xinxi Fuwu Danwei*, 非新闻单位设立的新闻信息服务单位) according to the Internet News Services Regulation[63]. The regulations specify that this type of Internet service, compared to news services set up by mainstream media agencies, does not have to have a license for reporting and editing (*Caibianquan*, 采编权)[64]. The shortage of news reports conducted by the news app itself has led to a dependence on re-editing of news content from media agencies and inviting individual bloggers to open accounts on the news platforms. As we will see from the interviews, both approaches have contributed to the increase of misinformation on news apps. The fierce competition for the attention of users, the lack of quality control of online information, and the profusion of information has received much discussion from Internet scholars outside of China, primarily focused on the US. Researchers are worried about the dominance of digital platforms such as Goggle and Facebook in content delivery and thus which has challenged the assumption that the Internet is a neutral platform for all publishers (M. Hindman, 2018; Neuman, 2016).

[63] https://www.cac.gov.cn/2017-05/02/c_1120902760.htm

[64] In practice, many independent news service teams have been conducting journalistic investigations, with some becoming popular news sources for Internet users. However, independent news services sometimes risk being punished and banned by the authority in the name of "illegally conducting journalistic investigations".

Interviewees have noticed an increasing amount of disinformation and misinformation on news aggregator apps and websites. For example, Yang from Western Factory feels disappointed about the mismatch between titles and content in the news articles in the pop-up windows:

> My work has been constantly disturbed by the pop-up windows (*Tanchuang,* 弹窗) from Baidu or Tencent on PCs. Some of the titles are very eye-catching, such as 'a spectacle rarely seen in a century' or 'the brutal murder of a child'. But if you click on the link, the content is completely different from the titles. The titles are often written in a misleading way that users will be tempted to click on them.

Users of mobile news apps find that the constantly refreshing feature is another reason for the lack of information quality. For example, in a focus group conducted with four female Internet users in Western Factory, all participants complained about the continuous feeding of low-quality information on news aggregator apps:

> I downloaded the Toutiao app and noticed that whenever I pull down the front page, the app would provide hundreds of new articles. The constant refreshing of information gives me an illusion that I am learning, but some of the articles I read on the app are either repetitive content with different titles or later proved to be fake news after few days (Pang).

> I have gradually realised the importance of professional editors after using the news aggregator apps: Without the obligation to observe journalistic reporting standards, many of the popular articles in the apps are actually opinions, not facts. Consumption of news in everyday life is now turning into a fast-food style reading experience (*Kuaicanshi Yuedu,* 快餐式阅读) (Lijuan).

Still, participants in the focus groups all agree that they would not uninstall these news aggregator apps because there are very few alternative news apps to choose from in the mobile application market. Pang is pessimistic about the future of online news:

> After several years of using the constant feed features on mobile apps, I could hardly resist the temptation whereby refreshing news apps make me feel connected with the world. However, I also learned that there is no balance between constantly feeding and high quality.

Many interviewees use WeChat groups as an important source of misinformation. Functions that enable group members to withdraw a message within few minutes have been used to send spam in group chats. For example, Guo has seen a member of his

WeChat group sending short videos of brutal scenes of violence in the chat. The sender claimed that the incident happened within the county, but the accent of people speaking in the video was "definitely not local", says Guo. Each video was sent and then withdrawn within one or two minutes, leaving no trace for other group members to report the messages as misinformation. "What is also missing in WeChat", says Guo, "is the power of a group leader (*Qunzhu,* 群主) to curate and moderate group discussions as in BBS forums or QQ." As was mentioned by many interviewees, misinformation in video or image formats is often more widespread than text-formatted rumours. As the mobile Internet has upgraded from 3G or 4G to 5G in China, short-videos or live-streaming videos will become increasingly popular as an information format. Thus, Internet users' information literacy to identify falsified videos and spot post-production editing processes will become ever more important skills to prevent misinformation in video format from spreading virally on social media.

6.2.4 Living in a post-truth era: "Aren't we too obsessed with details?"

Amongst all the misinformation circulated on Chinese Internet, false evidence or misleading facts in news reports about "hotpot social incidents" (*Shehui Redian Shijian,* 社会热点事件) are the most disturbing for many interviewees. In one of the focus groups in Western Factory, participants called the presentation of different versions of news facts and unexpected "twists" (*Fanzhuan,* 反转) as being a phenomenon of a "post-truth era" (*Houzhenxiang Shidai,* 后真相时代). The concept post-truth has a political meaning in Western democracies. It was selected as the word of the year by the Oxford Dictionary in 2016 after an increasing number of debates around misinformation, disinformation and facts during Brexit and the Presidential Campaign of Donald Trump. Nevertheless, the concept is used differently by the focus group participants in China. Tao explains his

understanding of 'the truth' in relation to using the Internet as a source of everyday information:

> My family used to have a very straightforward approach to receive information: We sit together in front of the TV during dinner and watch structured news content on TV at 7 pm. When I was a child, I joked about the stereotyped formula of CCTV news. The first 10 minutes on the good news of the politicians; the middle 10 minutes on the updates on social policies; and the last 10 minutes on the bad news of foreign countries […] Now, I am faced with the opposite news environment where there is no information formula I could follow, or at least learn from.

Guo agrees with Tao about the changes in information seeking for news information in China:

> When the news apps fast feed all categories of information every day, I have significantly shortened the time I spend on thinking independently about social issues. When a breaking news story such as the child abuse in Red-Yellow-Blue kindergarten was reported on news apps, the accused abusers, victims, and the police all presented different facts through Internet news apps or social media. All the "twists" of stories, facts or rumours about the news have occupied my entire attention, and I found myself informed but confused eventually.

Guo and Tao's experiences all point to the difference between information seeking and critical thinking. Like Internet users around the world, Chinese users have seen the increased diversity of information channels in everyday life on the Internet. Different from Western countries, however, Chinese users have experienced a more dramatic change of the media environment transitioning from an official-dominated mainstream media system to an online space where different voices can be expressed through media reports, independent social media accounts, or videos and images shared by the persons concerned. By using the concept of post-truth, Internet users in China express a desire to be able to navigate from a complex online information environment where, as Guo describes it, "truth becomes a plural noun, involving naturally conflicted but diverse facts." However, Chinese Internet users' obsession with the details about the truth about social incidents has been manipulated so that they believe in un-checked

"facts" about social incidents. Jun believes that there is a reason why users tend to share the unchecked details before media agencies or newspaper confirm them:

> Information provided by the Party has been brief, just like in the pre-digital era. Internet users believe in the saying that "the shorter the message, the bigger the incident" (Xinwen Yueduan Shiqing Yueda, 新闻越短事情越大) […] My sense is that we are too obsessed with details because most of the Internet users only recently started receiving information from such a diverse range of sources. As the curiosity wears off, we will realise that there is no black and white in society.

Thus, I find that the concept of "post-truth" in China extends beyond the political context and reaches into the realm of social issues such as education, healthcare, and food safety. Yet behind Chinese Internet users' keen interest in multifaceted facts is the government's undermined dominance in shaping online information and a growing public interest in having diverse voices in the public sphere.

6.3 Information Overload? "Fed with the wrong stuff"

6.3.1 Who is overwhelmed (or underwhelmed) by online information?

I conducted logistic regressions to find out what demographic, socio-economic, or technology use factors are associated with user experiences of information overload, or the opposite, a lack of information sources. Model 9 and 11 in Table 19 are regression results for feeling information overload and lacking information sources with all independent variables included in the model. Model 10 and 12 are regression models selected using backward stepwise model selection methods. Paradoxically, older generation users are more likely than younger generations to experience both information overload and information underload - the lack of information sources. Female and rural users also have higher odds of lacking information sources. Experience with and engagement in the Internet helps user to navigate the information flow: Users who have adopted mobile phones for longer have lower odds of experiencing information overload than inexperienced users. Users who spend more extended time online also have lower

odds of having insufficient information sources than do users who have limited hours of using the Internet.

Table 18. Logistic regression models on online experiences related to information overload, lack in information sources, and helping others to find online information

	Experiencing information overload			**Lacking information sources**			**Helping others to find online information**		
	(9) B (SE)	(10) B (SE)	Odds Ratio	(11) B (SE)	(12) B (SE)	Odds Ratio	(13) B (SE)	(14) B (SE)	Odds Ratio
Age	0.035* (0.016)	0.049** (0.015)	1.051	0.063*** (0.016)	0.060*** (0.016)	1.062	-0.051** (0.016)	-0.058*** (0.011)	0.943
Gender Female	-0.0005 (0.248)			0.446 (0.261)	0.560* (0.256)	1.751	-0.681** (0.257)	-0.707** (0.240)	0.493
Marital Status Married	0.555* (0.260)			0.976*** (0.253)			0.994*** (0.261)	0.833*** (0.054)	2.299
Children Yes	-0.029 (0.275)			-0.870** (0.273)			0.004 (0.278)		
Migrant Worker Yes	-0.230 (0.268)			-0.272 (0.270)			0.039 (0.278)		
Monthly Income	-0.0002 (0.0001)			-0.00000 (0.0002)			-0.0003 (0.0001)	-0.0003 (0.0001)	1.000
Education High school	-0.046 (0.271)			-0.359 (0.275)			0.469 (0.280)	0.278 (0.250)	1.321
Education Vocational school	-0.142 (0.191)			0.064 (0.200)			1.209*** (0.198)	0.931*** (0.194)	2.537
Education Undergraduate (or above)	-0.492* (0.218)			-0.050 (0.223)			0.762*** (0.224)	0.461* (0.210)	1.585
Residence Urban	-0.303 (0.222)			-0.541* (0.226)	-0.573* (0.278)	0.564	-0.343 (0.246)		
Mobile Years	-0.045 (0.031)	-0.047 (0.030)	0.954	-0.020 (0.032)			-0.011 (0.032)		
Mobile Only Yes	-0.349 (0.268)			0.293 (0.283)			-0.408 (0.275)	-0.479 (0.251)	0.619
Time Spent Online	0.036 (0.058)			-0.080 (0.056)	-0.096 (0.056)	0.908	0.077 (0.058)		
N	260	260		244	244		251	251	
Residual Deviance	546.223	554.126		495.235	501.128		483.906	486.221	
AIC	578.223	564.126		527.235	515.128		515.906	508.221	

NOTE: $^{*}p < .05$; $^{**}p < .01$; $^{***}p < .001$

6.3.2 Over-whelmed or under-informed: "It's not good enough"

In the descriptive data analysis, I find that information overload and the lack of information sources can be found to co-exist simultaneously. Logistic regression analysis reveals that both the demographic and technology use variables are associated with information overload and lack of information. To understand the complexities of user experiences in navigating information flow in everyday life, I therefore add the analysis of qualitative data from individual interviews and focus group studies.

Many rural Internet users in Fossil Village, especially older female users, experienced a lack of online information due to their lack of diversified information sources for everyday purposes. Ling, aged 47, takes cares of her grandson in Fossil Village. The only three online information sources she makes use of are WeChat (chats and Moments), Toutiao news app, and Tencent video (to play funny videos for her grandson). When interviewed about whether or not she experienced information overload, Ling laughed:

> I only read articles shared by other villagers in WeChat Moments. (Interviewer: What about Toudiao?) Well, I only have one hour to 'play' (*Kou*, 扣) my mobile phone because I am busy taking care of the baby. I feel stupid when listening to other villagers discussing news articles while playing poker. When I heard about some news stories they mentioned, I wanted to read the article but could not find it from my WeChat.

Among older generation Internet users in Fossil Village, most of them only recently learned to "play with" (玩 wan, or 扣 kou) their smartphone. Compared to young or urban Internet users' varied online information sources, the older generation users in rural areas such as Ling mainly depend on WeChat as an information source. Even if they use news apps, because of their lack of Internet experience in utilising search functions within the app they have encountered difficulties in finding online information beyond their immediate social circles. Nan, aged 48, is concerned with her lack of information

sources compared to younger villagers. Due to the lack of information skills in using search engines or search functions in news apps, she heavily depends on information that she encounters or serendipity as a way of accessing useful information in everyday life:

> After two to three years of using the mobile phone, I still don't know what the device can do beyond WeChat and online videos. You see, I always seek information randomly (huluan zhao, 胡乱找), by clicking on here and there in the apps. (Interviewer: Have you received notifications from news apps?) Yesterday when I was watching the TV, Tencent News App notified me to check out some local news. I immediately turned my focus to the news app and started reading, until I finished not only the article, but also the advertisement on the bottom of the page, and all comments below the news article.

Nan's information needs have not been satisfied with only reading articles on news apps and social media. Similar to Ling, she finds most of her everyday life is organised around her younger daughter, which leads to what she describes a "random and unstructured swallowing" (*Huluan Tunxiaqu,* 胡乱吞下去) of information. Yet she has a strong feeling of being left behind by an increasingly digitalised society:

> I rarely travel outside of the village and know almost nothing about the Internet. I am worried that I will eventually be left out by society. I have been to high school, but the Internet is too difficult to use for us born in the 70s and living in rural China. The thought that the rest of my 30 or 40 years of life will remain less informed than others is frightening.

Young female Internet users in rural China also feel that they lack information on the Internet. Chufang, a 30-year-old female resident in Fossil Village, has downloaded more than three news apps (Toutiao, Souhu, Tencent) and two social media platforms (Sina Weibo and WeChat) on her smartphone, but she still feels that the "amount of online information is not sufficient enough for everyday information seeking". She gives the example of having difficulty in seeking information about parenting skills on the Internet:

> The Internet has provided extensive practical information on parenting, for example I play online videos to teach my daughter to draw and sing. I also read and collect articles about how to stimulate the intellectual development of the child's brain through playing games. (Interviewer: with all the information sources you have, why do you still feel under-informed?) To be honest, I find none of the information is good enough. So, I keep seeking information on parenting on different digital platforms, even if the amount of relevant

> information is too much to consume on a daily basis. When I have an abundance of information (on the Internet), I enjoy the privilege of choosing the ones of high quality – those that give detailed instructions or that are supported by specialists or experts. If I receive information on the Internet through one or two of the channels, I don't even have the opportunity to compare and choose (from different sources).

Like Chufang, Di, aged 26, also agrees that the lack of information is a more important issue than information overload. "I tend to blame myself for not catching up with the trends on the Internet rather than blaming online information providers for occupying my attention," she says. Having graduated from university and taken online training sessions on digital skills, Di has explored a way to prioritise most of the online information flow and yet remains informed about major events in everyday life:

> Some types of everyday information, such as news analysis of state affairs and about social policies, have important social functions. I don't want to sound ignorant when discussing politics and social issues with my colleagues. Another type of information I don't want to miss is information about personal development, the ones that teach me how to balance life and career […] I catch up with the information that I consider important every night before sleep and mute the notifications of all the insignificant ones, such as group chats.

Nevertheless, Di feels that when it comes to discussion about politics or society, she is still less informed compared to her colleges living in Dragon Town. There is a commonly shared view by many young interviewees in Fossil Village that having more information could help broaden their horizons and even increase business opportunities. Bing, the young village doctor, tries to have as much information as possible to design new business plans:

> I use online information about urban lifestyles, for example, stories of successful young entrepreneurs, to push myself to keep learning. Life in Fossil Village could be stress-free but also has no opportunity for personal development. I try to keep informed about all the official policies related to medical services in rural China. For example, I thoroughly read the new policy on medical insurance for rural residents and learned that pharmacies in rural China could not add an extra cost onto medicines under the new 'zero interest' policy. Also, I could now increase the range of medicines that I sell in the pharmacy as the list of medicines covered by insurance has significantly expanded.

Clearly, among both old and young generation users in Fossil Village, there is a growing need for more information in everyday life. However, many Internet users are also trying to avoid receiving redundant information from WeChat. The most efficient approach to handling information overload on social media is through leaving unwanted WeChat groups or muting group conversations that users consider unimportant. Nevertheless, due to the lack of familiarity with mobile functions, many rural users have challenges in managing information overload on social media. For example, unlike Di, who mutes group chat notifications, Chang was added in a WeChat group by a WeChat friend and received spam messages every day. In my interview with Chang, she asked me to delete the group for her after being bothered by notifications from group chats for several weeks. In some cases, rural Internet users want to avoid information on the Internet that remind them of the sharp divide between rich and poor regions and feel overwhelmed with information that is far beyond their social circles. Fang avoids online information to maintain her inner peace undisturbed (六根清净 *liugen qingjing*):

> If I see too much online about rich people but couldn't live the same lifestyle as they do, I feel upset about my own life […] I try not to see such information and avoid adding rich people on WeChat. I am satisfied with only socializing with a handful of people in the neighbourhood […] I know that if I think too much, I will be depressed, for I have lived in the village throughout my life and never worked in the cities for a single day. Now half-way to the grave, I only want to raise my children well and live a simple life.

6.3.3 Informed and anxious

In an age when information assets are as valuable as financial assets, many interviewees, despite feeling overwhelmed by digital information, choose not to control the number of information sources they subscribe to on news apps or on social media. One of their primary concerns is to "not miss out from the important news," according to Guo. The fear of being disconnected from society by not subscribing to enough news

information is so strong that even thinking about the hypothetical scenario where there is "no Internet access for 24 hours" makes Guo feel anxious.

Users experience anxiety when seeking information online not only because of the quantity of information they have received – but also because of the content of the information they are exposed to. Some users experience a mismatch between what they learned from online information and reality. As Li explains, "I now have access to more information, but am feeling increasingly anxious about my life." As a mother of a teenage girl, Li closely follows articles on high school education from WeChat Public Accounts or friends' Moments. However, the more information she receives about scientific research on education, the more she is aware of the educational gap between Henan Province and first-tier cities such as Beijing and Shanghai:

> Most of the articles on social media introduce educational methods to provide the child with education resources for all-around development - intellectual, physical, and emotional. But I couldn't use the methods on my child because of the intense competition for college entrance exams in Central provinces in China. Receiving online information about what an ideal education looks like makes me feel powerless, for not being able to provide my child with the best environment.

Guo also expresses his disappointment when seeing the striking difference between his everyday life and the life of the super-rich in China:

> There is a saying on Chinese Internet that "poverty limits your imagination of the world" (*Pinqiong Xianzhi Ni de Xiangxiangli, 贫穷限制你的想象力*), which is exactly how I feel when discovering the prosperous world outside of Happy Valley county. We are the most grassroots groups in China. My knowledge of Chinese society used to be constrained by a limited number of information sources on traditional media, but now the Internet live-streams other people's daily life on the screen. Although I know some information online is fake or exaggerated, I am still convinced that the gap (between the rich and the poor) is widening in China.

Some interviewees feel anxious about online information when they encounter a clash of different values and opinions on the Internet concerning social issues. For example, Gang considers himself a rational and tolerant information-seeker in most contexts, but he is irritated when online comments underneath the news about

underprivileged groups “do not show sympathy for the poor”. Despite the discomfort of reading opposing opinions, Gang still searches for news stories about vulnerable groups and reads through all the comments below the articles. “I feel fed up but am still curious about the rationales of different social values,” he says.

Anxiety also comes from a lack of reliable information on the Internet. Hui, from Western Factory, was looking to buy an apartment when I interviewed her. She tried finding apartments on local online forums such as 58.com and from WeChat groups, but neither of the sources provides updated and reliable information. “It is only when you are in urgent need of information that you realise the lack of high-quality information available on the Internet,” says Hui. After asking friends, Hui found a housing agency in Happy Valley county that provides advertising services for interested buyers of apartments. It cost Hui 100 RMB to post one advertisement in the agency’s leaflet. “Slow, expensive, but efficient”, is how Hui describes the offline information services as compared to online information.

Some technology designs in mobile apps also reinforce anxiety about missing out information. Features are designed to alert users to keep up with the information flow constantly. One feature frequently mentioned by interviewees as overwhelming and stressful is the “little red dot” (*Xiaohongdian,* 小红点) on WeChat. Red dots appear on the upper-right corner of chats or public accounts even if users have muted the group conversations or unstarred a public account as their favourite channel. Di, from Fossil Village, for example, has developed the habit of “clearing red dots” by the end of the day. Another type of technology feature that is designed to keep users within the app is the “scrolling down to fresh” (*Xiahua Shuaxin,* 下滑刷新), which feeds new information to users whenever they refresh the page. As mentioned in the previous section on misinformation, many interviewees complain about the lack of information quality in the

constant refreshing process. Users also experience addiction to the feature: as Juan describes, "I find myself drowning (*lunxian,* 沦陷) in the news world on the Toutiao App. It also creates black holes of time (*shijian xianjing,* 时间陷阱) which consumes several hours without you even noticing". Consumption of news information in an unstructured and fragmented manner also drains users' attention without leaving time for coherent thinking, as Jun experiences after her daily use of the news app:

> By constantly refreshing the app, I thought I was learning something new, but by the end of the day, I could hardly remember anything except for one or two repeated news reports with different titles…I always regret the time spent on scrolling down pages in the news apps.

6.4 Coping with digital disturbance through human and algorithmic proxies

Suffering from misinformation, information underload, and information overload, many Internet users have been trying to cope with digital disturbances by developing different approaches. Both human and algorithmic proxies are being used by interviewees to navigate through online information.

6.4.1 Human proxies

Previous research has found that migrant workers are acting as technology proxies who have given (or sent) technology devices such as mobile phones as gifts to their families living in rural China (Oreglia, 2015). During my fieldwork in Fossil Village, I found that as the majority of rural residents now have access to mobile devices and the Internet, young villagers, migrant workers, and students who used to gift digital devices to their families now have a different role in rural technology development; mainly by assisting others to seek information online. In Model 13 and 14 (see Table 19), I used logistic regression analysis to find which groups of Internet users are more likely to become information proxies. The backward stepwise regression results indicate that: Young, male, married, and educated users are more likely to help others to seek

information online. Qualitative interviews show that the main roles of human information proxies consist of conducting information seeking tasks, fact-checking, and directing people to information.

Conducting information seeking tasks.

Young residents or university students from Fossil Village often help their families and neighbours to accomplish information seeking tasks. For mushroom farmers in Fossil Village, timely information about weather is important during the growing season in winter. Yan is often asked by her neighbours to search for weather information on Baidu. She told me that although some of the villagers have changed their feature phone into a smartphone in recent years, they are still unfamiliar with the search engine functions on the phone. Bing, the village doctor, not only helps migrant workers from Fossil Village to provide prescriptions of medicines, but as one of the few young professionals living in Fossil Village, he also helps his neighbours search for various types of everyday information online:

> Some parents ask me to download an app to check the scores of their children. With schools digitalising all information about students' performance online, rural parents often need longer time to adjust to the new school-parent communication channel. Some elderly villagers watched the news on TV and heard about a new policy related to farmers or agriculture and asked me to find the whole policy document online and send it to them on WeChat.

Fact-checking.

Some middle-aged interviewees use traditional media such as TV as a fact-checking method. However, younger generation users and users who have strict work schedules no longer use TV or newspaper as their main source of information. For example, Ping, from Western Factory, finds it hard to fact-check misinformation through traditional media because watching TV or reading newspaper is "no longer part of the everyday routine" for him. Many inexperienced Internet users turn to their families,

friends, co-workers, or neighbours for fact-checking about misinformation or identifying advertisements in search results.

Liuliu, a university student from Fossil Village, told her families that the video of a dragon was falsified. Haiyu's son, who runs a logistic company in Happy Valley county, told Haiyu that the article that said that an earthquake would happen in Henan in 2020 was fake news when she posted the link on WeChat Moments. Di, a teacher at a local school, has helped her colleagues to distinguish which research results are sponsored ads and which are useful teaching materials. Young working-class users in Western Factory also help their parents to fact-check news stories. Jing, for example, helped her in-laws to check if a story about a fatal car accident happened in a neighbouring county was fake. Influential politicians, entrepreneurs, professionals, or social workers are often regarded as trustworthy sources of information. Their WeChat accounts have also been used by residents as a "filter" against misinformation. For example, Luo, a social worker at a local NGO, has actively organised and participated in online donations to help poor families in the county. Jun added Luo's WeChat account through a mutual friend and trusted all the donation links that Luo shared in WeChat Moments.

Directing to information.

My previous results have shown that many users suffer from a lack of information sources. One of the most important roles of human information proxies is to direct users to information sources, with some of them offering online information services. Many young residents in Fossil Village provide their families and friends with guidance on trustworthy digital platforms or online information sources. Jing is one of the early users of online shopping platforms in the village. She often shares links of the Taobao stores where she has purchased clothes or accessories with her friends and families.

Local residents who have a sizable WeChat friends' network have even become a kind of information centre on social media. One of the cases is the account of Du, who runs several WeChat accounts, adding as many local WeChat users as possible and turning his WeChat Moments into a virtual bulletin board for Happy Valley county residents. Since WeChat is the most popular social media platform in rural areas, his WeChat accounts have reached many mountain villages in the county, including Fossil Village. According to Jing, who has used Du's WeChat information service before:

> I was looking for an apartment to rent near the county centre, but I have no social connections in the county. So, I reached out to Du on WeChat, asking him to send an advertisement on all of his WeChat accounts. Du agreed to send the advertisement one or two times for free and charges only few RMB afterwards, much cheaper than the local newspaper, which no one really subscribes to anymore.

Du's information service is an interesting phenomenon on the Chinese Internet. His success is based on an Internet ecology in Happy Valley county whereby social media and online forums have gradually replaced traditional information centres. Meanwhile, Du's account is more influential than online forums such as Baidu Tieba because it is based on WeChat. The social media platform has reached an unprecedentedly high rate of proliferation in rural China and allows rural residents to seek local information without using search engines or other specialised apps. Similar information services on online forums are free but inaccessible to many rural Internet users due to their lack of familiarity with Internet services on search engines. This again shows a mismatch between users' high demand for seeking and exchanging local information and the lack of mobile-friendly and free information services in Chinese small towns and villages.

Users who want to control the amount of information they receive every day on social media turn to human curators. This need for information briefing services has given rise to the popularity of news aggregators on social media. Jun, from Western Factory, is a big fan of a public account called Director Feng's Family (冯站长之家) on WeChat.

The account provides a 3-minute news summary in text and audio for subscribers. Interestingly, mainstream media such as People's Daily or Xinhua News Agency also provide news summaries for subscribers. But Jun prefers the news summary edited by a non-official independent account because it provides both "positive and negative news" about state affairs and foreign policies. However, articles on Director Feng's Family consist of both news briefs and commentaries. Without professional training in journalism, Jun has not noticed the overuse of exclamation marks in the titles of news summaries and the mixture of facts and arguments in news bulletins published on the account.

6.4.2 Algorithmic proxies

Users who lack digital skills to seek information on search engines have also used algorithmic proxies to locate the information sources they need. Among the algorithmic systems that assist users' information seeking, two functions, in-app recommendation systems and location-based searches, were mentioned by interviewees as particularly helpful.

Recommendation systems.

Many rural interviewees benefit from using the recommendation system in news, entertainment or personal-development apps. This helps them to categorise online information into different subjects in the user interface. Users who are new to the mobile Internet or those who have little formal education find this function to be particularly useful: Without using search engines, users are able to navigate through tags and channels to locate various different types of information. Compared to search engines and in-app search functions, recommendation systems suggest content that users might be interested in by analysing users' previous app usage histories or feed content that other users with similar demographic backgrounds liked. Recommendation systems on social media also

integrate the analysis of users' social network to provide information that users might like.

Mobile apps that have built-in recommendation systems are increasingly popular among both rural and urban users. New users of the Internet benefit from receiving personalised content for everyday information seeking by using these recommendation systems. For example, Yue has never used the search engine or in-app search functions, "I have never searched information on Baidu, as I am not sure how to use the interface or how to 'ask' Baidu appropriately." She has enjoyed using tags in Toutiao news apps to collect useful articles on cooking tips, dietary guides, and women's health. The Tangdou dancing app, another of Yue's everyday information sources for personal development, also uses the recommendation system to prioritise the video clips that she has watched on the top of the front page. When Yue wants to find other dancing styles, she "simply clicks on the tags of different styles in the app". Chang, another new user of the Internet in Fossil Village, relies on recommendation systems in online video apps to find her favourite TV drama series.

However, some experienced users of the Internet have started to question the negative influence of the personalisation system on everyday information seeking. Mimi, a young user from Western Factory, feels that news apps that feed content to users based on previous reading history undermines users' autonomy in seeking news information. She says, "news apps such as Toutiao recommend articles based on my reading history, but many of the articles are not my real interests." Mimi hopes that recommendation systems would give users the chance to adjust the recommendation system. For example, through deleting the reading history in a certain period or turning off the personalisation system, she could "step out of the personal bubble" and explore news articles on other

topics. Mimi's colleague, Changyou, shared his experiences in using the recommendation system:

> I don't mind sharing Internet usage history with UC Internet explorer (a popular mobile browser in China), but I also enjoy finding new interests and broadening my information diet (*Xinxi Shipu*, 信息食谱). I learned to clear Internet browsing history from time to time to reset the information preferences saved in the recommendation system.

Gang, another a young employee from Western Factory, has also tried to improve his news reading experience on mobile news apps through managing user preferences saved in the recommendation system. He was looking for information on car brands in 2017 on news apps and had read many articles about car insurance or vehicle registration on Toutiao news apps. After he purchased the new car, he unselected news about "cars" as his topic of interest, and also clicked "not interested" and "don't push similar news" whenever he saw news articles on vehicles on the news apps. Nevertheless, most of the middle-aged or older generation Internet users I interviewed do not have the skills to manage personal preferences in the personalisation system in this way.

Location-based search.

Users have also benefited from location-based search functions to receive contextual information. One popular application that uses location-based search in Fossil Village is the weather, which has been used frequently by mushroom farmers to receive updates on weather forecasts. Users who have experience of using both PC and mobile Internet in Western Factory noticed that the location-based search function on mobile apps provides more locally relevant search results than PCs do. For example, Lijuan prefers to use Meituan instead of Baidu to search for information on travelling:

> I used to search for travel information on Baidu, but most of the results do not have interactive maps integrated into the websites. Meituan app uses my current location and provides recommendations on the routes for driving and information about tourist centres, restaurants, and hotels. My family travelled to the neighbouring county last year using the mobile app – it saved a considerable amount of time in searching. By using location-based search, I navigated the

driving route for my husband, purchased tickets to parks and booked top-rated hotels in advance.

6.5 Conclusion and discussion

In this chapter, I first used survey data to describe rural and urban Internet users' dependency and trust concerning the Internet as an information source, their experiences of online advertisements, misinformation and information overload. Descriptive data analysis indicates that although the Internet has become one of the main sources of everyday information for both rural and urban users, users in both field sites have a high level of distrust in relation to the Internet. Meanwhile, misinformation is a major problem in everyday information seeking for both rural and urban users.

In the second section of this chapter, I applied a mixed methods approach to examine how misinformation and disinformation have disturbed everyday information seeking practices, added sources of misinformation, and introduced several main categories of misinformation that circulate on the Internet. I began with regression analysis to find the demographic, socio-economic, and technology use factors behind the lack of trust in the Internet as well as users' experiences in identifying advertisements and online rumours. I found that rural users and mobile-only users are less likely to trust the Internet as an information source while education is an important factor in raising awareness of online advertisements and rumours. The quantitative analysis then showed in detail how residence, technology use, and education are associated with misinformation. Users with higher education are able to check the reliability of information either through their professional training or by fact-checking on search engines. However, compared to educational programs on general PC skills, education on misinformation does not yet exist in formal education. Qualitative analysis shows that the problems of misinformation exist in many areas of information contexts, ranging from foreign affairs and local incidents to financial fraud and health and food safety. Many

online rumours circulate on social media through group chats or users' timelines, with an increasing number in video formats. I also found that despite tightened censorship in China, political misinformation such as conflicts between China and foreign states have spread virally on social media and given rise to nationalism among grassroots users. Many villagers are targets of financial fraud and have difficulties in using search engines to identify pyramid selling schemes. The increasing number of food safety incidents in China also resulted in users' alertness to the quality of food products and medicines. Rumours about fake food or medicines are likely to persist on social media. Qualitative interviews also suggest that users have experienced a decline of information quality due to some of the attention-grabbing designs. Features such as the constant refreshing of news stories are hard to resist but sometimes feed repetitive content or exaggerated stories to users. The rise of misinformation on Chinese Internet also marks a shift of media preferences in contemporary Chinese "post-truth" society, with independent media or individual bloggers providing more details about social incidents than mainstream media.

In the third section of the chapter, I applied a mixed methods approach to understanding the issue of information overload and underload – not having enough information sources. I found that the two problems co-exist in users' information seeking practices in everyday life, especially among old generation users. Female and rural users are also more likely to lack information sources. Experience of using mobile phones and time spent online per day is also important to help users overcome information overload and to have sufficient information sources when seeking information. Qualitative interviews about information overload showed that rural users, and older generation users in particular, have a high dependence on social media as the primary online information source. They are more likely to lack online information sources beyond the immediate social circle for problem-solving. As a result, many rural Internet users rely on

encountering information when they collect information. For rural users who have been trying to diversify information sources, they feel a lack of high-quality information provided by professionals and experts on the Internet. Some rural users also try to avoid redundant information about urban and luxurious lifestyle, which often creates an overload of stress and anxiety. Urban interviewees also share similar feelings while being exposed to the sharp contrast of income divides or if they are challenged by extreme beliefs online. Keeping up to date with news information also has social functions for both the working-class and rural users and has been reinforced by technology designs such as red dot reminders. However, as users spend longer time continuously keeping up with refreshing information, there is also a growing scepticism towards excessive information seeking for Internet news.

The final section of the chapter looked at solutions that rural and urban Internet users have found to cope with digital disturbances such as misinformation, information overload, and information underload with human or algorithmic proxies. In Fossil Village, I found that young and educated villagers have changed their role in the diffusion of technologies from gifting ICT devices to acting as information proxies and conducting information seeking tasks or fact-checking for their families and neighbours. Individuals who have sizable social media networks in local areas start to offer free or affordable information directory services on WeChat. The lack of professional editorial processes on social media and news apps also entails opportunities for individuals to provide news gathering and bulletin services on social media – while at the same time these services do not yet follow journalistic standards and practices. I also found that algorithms are information proxies for new or inexperienced users. For example, recommendation systems in news or entertainment apps and location-based search functions help users to navigate through a wide range of content and match users with topics that they might be

interested in. However, interviewees with experienced users also suggest that they also need more autonomy in personalising the in-app recommendation system to increase the diversity of information they receive and to protect online privacy.

Previous empirical studies on proxy Internet use highlight the importance of the informal and human-centric process of technology adoption and digital skills acquisition (Reisdorf & Groselj, 2017). Results on information proxies in rural and urban China have shown that everyday information seeking could be facilitated with the help of gatekeepers. Such type of non-direct information acquisition is particularly useful in information contexts where specialised or professional knowledge is required; for example, in health information seeking (McKenzie, 2003). Through assisting non-users and inexperienced users, Internet proxies are important for bridging digital divides, and thus, understanding the process of how Internet proxies function in information practices will help design technology policies that better incorporate marginalised Internet users. Compared to Oreglia's (2015) previous fieldwork on how migrant workers gift mobile technologies to their families in rural China, my findings indicate that the role of Internet proxies is not only technical but also informational. Thus, this study has contributed to the conceptualisation of information proxies in two aspects. First, I find that both human agents and algorithmic systems could become information intermediaries. Second, findings in this research demonstrate that Internet proxies not only help other users to solve technical problems but also help locate online information and validify information sources for inexperienced users.

In the chapters that follow, we will return to misinformation and related issues, including the problems it causes, as part of a more comprehensive analysis of information seeking and information needs.

Chapter 7 Conclusion

On the 3rd of September 1999, at 1 pm, a website in China held a "survival challenge" to test if twelve selected candidates could survive 72 hours in solitary with nothing but an Internet-connected PC. Reporters worried that candidates would suffer from "isolation, loneliness, and even more terribly, hunger" in the challenge.[65] Reporters were not exaggerating. The Chinese Internet at that time was still in an early stage when users needed to dial-up for Internet access through a telephone line. The domain name of Google was only registered in 1997, and Baidu was founded in 2000. Eleven of the candidates survived after 72 hours, most of them had ordered food from the same fast-food chain. However, one participant, who had no Internet experience, starved for more than 22 hours after randomly clicking on the desktop interface and failing to get access to the Internet.[66] The experiment provides a stark contrast with the Chinese Internet today. The widespread adoption of mobile technologies and Internet services in China has created an Internet society where almost all aspects of daily life are or could be digitalised. Among the changes facilitated by the rise of the Internet, perhaps the most significant transformation lies in how information about services and products are delivered to Chinese users and how users actively seek for information from digital channels such as social media, search engines, and online forums.

While the Chinese Internet has fundamentally changed how users socialise, entertain, and seek information, the digital transformation of everyday life is not equally distributed between rural and urban China, and across different social groups in China. Although concepts such as the knowledge economy or e-commerce are widely accepted in urban China, especially in the major cities, the Internet economy in rural China has

[65] http://tech.sina.com.cn/news/internet/1999-9-3/5755.shtml
[66] http://news.sina.com.cn/society/1999-9-4/11625.html

only recently started to flourish after the proliferation of the mobile Internet. The different stages of Internet development in rural and urban China are also reflected in online information seeking. This thesis has shown that, for example, the same information services for renting and selling properties that have successfully replaced traditional information gatekeepers in the real estate industry in urban China, have failed to provide satisfactory services for rural users. Meanwhile, in both urban and rural China, the information channels for Chinese Internet users are increasingly developed and shaped by Internet companies such as Tencent, Alibaba, Baidu, and Bytedance, amidst a decline in the government's dominance of the information flow.

As the Internet provides increasingly diversified information sources for Chinese Internet users, there is also a conceptual transformation of what constitutes everyday information on the Chinese Internet. Political communication scholars such as Guobin Yang (2009b) studied the early years of Chinese Internet ecology from the perspective of political information seeking, where "information disclosure and citizen participation become essential for effective and rapid state response" (p.55). Despite the significance of the Internet to facilitate public debate and political participation, my fieldwork on Chinese grassroots users suggests that non-political issues such as health, interpersonal relationship, or e-commerce are key areas where users are seeking information. Thus, everyday information, in this thesis, highlights the non-political types of information needs. Information scholars such as Savolainen define everyday information as non-work related, drawing the distinction between professional and personal information (Savolainen, 1995). Similarly, ICT4D scholars such as Payal Arora (2019) and Jonathan Donner (2015) also differentiated work and leisure, or focus on the capabilities of ICTs to improve production. However, the boundary between work and leisure is increasingly blurred based on my interviews with urban entrepreneurs who consider e-commerce part

of their everyday routines on the Internet. Therefore, I have broadened the concept of everyday information to also include professional skills training, for example, for teachers and doctors, and work-related information such as e-commerce opportunities. Everyday information also includes entertainment and leisure, where users might encounter useful information through watching online videos on short-video platforms such as TikTok or learn skills through using entertainment apps such as Tangdou Square Dance. Unlike Brenda Dervin's (1998) sense-making approach to studying information, where users seek information to bridge their cognive gap and reach solutions to everyday problems, Everyday information seeking defined in this thesis is more than problem-solving, but also includes the process of shaping one's identity (in the case of female users seek information to understand marriage and relationships) and values (when users seek online information to confirm their opinions on the society).

Against this background, the thesis has examined the use of the Internet for everyday information seeking among working-class and rural Internet users, using a triangulation of different types of data, to understand how users experience the digital transformation of information practices. The thesis first examined the domestication of ICTs (Chapter 4) and showed that there are digital disparities between rural and urban Internet users. The digital divides are strongly associated with long-existing urban-rural gaps but also correlated with demographic factors such as age, gender, education level, and economic status. An in-depth examination of everyday information seeking practices revealed the diversities and complexities of information needs, practices, sources, and approaches (Chapter 5). Nevertheless, the digital disadvantage has not inhibited the use of the Internet for everyday problem-solving among marginalised social groups. As the analysis on everyday information needs has shown, new or inexperienced Internet users share similar enthusiasm as experienced users to explore digital platforms. Emerging

digital platforms such as short-video sharing platforms have provided new channels of information. Information seeking practices have also expanded from social media and search engines to new approaches that are enabled by mobile technologies, such as the increasing use of image search and voice recognition technology.

However, the shift from an information ecology that used to be dominated by official media to one that offers numerous choices of information sources poses new challenges to everyday information seeking for both rural and urban users (Chapter 6). The increased rate of information diffusion does not necessarily entail the improved quality of information. Due to political constraints that limit original journalistic reporting and also due to profit-driven business models that favour eye-catching clickbait headlines, users are overwhelmed with low-quality information and even misinformation in everyday life. As a result, even the most experienced Internet users face the dilemma of being notified constantly on mobile phones but seldom feeling well informed. In the battle against misinformation, the government has only recently begun to catch up and wants to tackle misinformation by posting rebuttals on different platforms. However, as research has suggested, rumours travel faster than counterevidence. The spread of rumours is rooted in the public's fear and insecurity in areas such as food safety. This type of fear that has been instilled in people requires more than the deletion of misinformation. It also needs efforts beyond interventions in online information, through implementing more stringent regulations on industries related to an individual's well-being and increasing the administrative and legislative transparency concerning misinformation.

7.1 The significance of information in everyday life

The Internet has had a profound influence on everyday information and communication practices around the world and in both rural and urban China. The

"survival challenge", if held in 2019, would have had to be renamed the "survival *without* (the Internet) challenge". Nevertheless, researchers who have studied the Chinese Internet tend to focus more intensively on the resilience of the authoritarian regime in contemporary Chinese society by means of the government's information controls through censorship (Roberts, 2018). The Internet has not only strengthened political power but has also created new channels of online activism (R. Han, 2012). Much has been left unstudied however, about how Internet users receive and seek political information in everyday life and which digital platforms play more important roles in shaping how Internet users understand current affairs and social policies. More importantly, as empirical studies in political science have suggested, the forming of political opinions in China includes not only the opposition and support of the regime, but also preferences on issues such as nationalism, market reforms, and traditional cultural values (Pan & Xu, 2017). Unfortunately, we have very few studies focusing on how Chinese Internet users seek everyday information about policies, markets, and traditional cultures on the Internet. By exploring what information Chinese Internet users need and which online information sources they trust or distrust, the study of everyday information seeking practices and the Internet can provide significant insights into understanding the Internet in contemporary Chinese society. Everyday life, as Lefebvre (2014) puts it, is closely connected with politics and society:

> There can be no knowledge of the everyday without knowledge of society and its entirety. There can be no knowledge of everyday life, or of society, or of the situation of the former within the latter, or of their interactions, without a radical critique of the one and of the other, of the one by other, and vice versa (p. 305).

Social scientists in sociology, anthropology, and cultural studies have highlighted the importance of everyday practices for understanding micro-level human behaviours and macro-level social structures. We have seen a similar shift to non-work everyday contexts in information science promoted by scholars who have applied user-centric

perspectives to understanding the daily interactions between information-seekers and information systems (reviewed in Chapter 2). The study of everyday information practices has thus started successfully to bridge the gap of knowledge between individual-level studies of information needs, motivations, and challenges with the social, economic, and cultural contexts of users' lives. By applying the everyday life perspective in the study of the Internet, we are able to look beyond the proliferation of basic Internet infrastructures such as mobile phones and the Internet and scrutinise the different uses and ways of adapting digital technologies in everyday life. As the results in the thesis have demonstrated, despite the common information needs and desires shared across different groups in Chinese society, it is the failure or success of fulfilling everyday information needs that constitute the fault lines of social stratification in human information seeking.

7.1.1 The disappearing boundaries between work and leisure

When examining the role of the Internet in everyday information seeking, I chose information contexts that are non-work related, for example, information seeking for personal development, health, e-commerce, and shopping (Chapter 5). However, the mundane use of the Internet in everyday life settings has demonstrated an increasingly blurred boundary between work and leisure, challenging the commonly held assumption that everyday practices are all about entertainment. Payal Arora (2019), for example, defines the different uses of the Internet for leisure in developing countries as a third dimension of the digital divide. She argues that the entertainment industry, developed mainly by Internet companies in developed countries, has exploited the scarce resource of time in the lives of the global poor.

Nevertheless, by interviewing how Chinese grassroots users experience information seeking and entertainment in everyday life, I found that this assumption that

online leisure is less constructive than other Internet activities is problematic. Whether or not the everyday use of the Internet is beneficial for the Chinese information have-less population should, I argue, be evaluated not only by its social and economic contribution but also its influence for individuals' well-being and development. In other words, I oppose the arbitrary dichotomy between capital-enhancing and entertaining activities and over-concentrating on the outcomes instead of giving due emphasis to the processes of individual's information practices online. By using the work/entertainment dichotomy, researchers will exclude detailed analysis of information contexts that are considered as important for personal development and also overlook many nuances of everyday life information seeking practices. Instead, I recommend assessing the significance of technology uses within various contexts of information seeking practices, examining both the collective effects and individual experiences. There is a balance between structural forces and individual factors, as Charles Tilly suggests in his book, *Durable Inequality*:

> The definition of what analysts of inequality must explain that has emerged from a generation of individualistic investigation. But it complements and clarifies the findings of individualistic analysis by looking at the social structure of inequality (Tilly, 1998, p. 24).

By shifting the research focus from outcomes to processes in everyday information seeking, I found insightful case studies whereby some Chinese Internet users, despite the constraints from structural factors such as age, gender, and residence, were able to obtain cultural, social and economic benefits from non-work related information seeking practices. To give just one example, reading entertainment news articles about the personal lives of movie stars enabled a middle-aged female user in Fossil Village to learn communication strategies and tips on maintaining healthy relationships in a marriage (Chapter 5).

However, the disappearing boundary between work and everyday contexts is also happening at the macro level. The traditional economy that consists of full-time

employment has transformed into a digital economy where working-class users take one or several part-time jobs in addition to their full-time employment. As several case studies in Chapter 5 have shown, many working-class users start their first part-time employment outside of the factory by starting an e-commerce business on social media. It is not a coincidence that all three factory employees who actively seek information for e-commerce work in manufacturing jobs. Their enthusiasm for e-commerce is driven by the realistic concern that with the decreasing importance of manufacturing in the local and national economy, full-time jobs as manufacturing workers will no longer provide sufficient income. It is important to note that although the informal employment takes place in the interviewees' free time in everyday life, as they spend more time and capital investment in e-commerce their businesses will also shift from social- or leisure-oriented practices to work-related practices. Qiu (2016) has revealed the cruel working conditions of technology manufacturing companies such as Foxconn and the peril of working as "iSlaves", and the online businesses described in this thesis can be partly seen as new burdens and partly as new opportunities (that leave traditional manufacturing work behind).

Nevertheless, we tend to romanticise the working conditions of informal employment through e-commerce businesses. There are indeed successful stories, where an ambitious young male worker is able to find business opportunities through a network of local e-commerce business leaders. Compared to employment in the factory, starting a part-time career in the digital economy has lower barriers for formal education and professional expertise. It also offers more flexible schedules, benefiting female factory workers who want to balance life and work. However, operating a business in addition to a full-time job also means more pressure to stay constantly online, especially when new

regulations were set up by factory managers to limit mobile phone use by workers (Wallis, 2013). Working-class entrepreneurs are also exposed to the risks of failures in investment.

The blurring line between work and leisure is so pervasive that a new concept, "second career as a necessity"[67] has become popular on the Chinese Internet to indicate the importance of having a back-up part-time career in the digital economy in addition to the less well-paid, full-time employment. Through case studies of e-commerce information needs in Western Factory and Fossil Village, I have shown that from the macro level, the disappearing boundary between work and leisure brings not only promises and opportunities, but also dangers and risks.

7.1.2 From access to "after-access": Understanding Chinese Internet users' information seeking practices

Theories and empirical studies on information behaviours focus on users' lifeworld to understand the interaction between Internet users and digital technologies. By using the theoretical framework of ELIS, the thesis aims to understand the process of how various social groups in China use the Internet as an information source. Compared to early research on Internet adoption that predominantly centred around how users seek access to ICTs, recent studies on the use of the Internet start to focus on how ICTs embedded in users' daily communication and information routines. This shift of attention from access to "after-access" (Donner, 2015) in Internet research contributes to the understanding of the complexities of diverse online platforms as information sources and also showcase variances in online information seeking practices among different groups of users.

In Chapter 4, I analysed how Internet users seek information when engaging in various Internet activities. Findings from Chapter 5 systematically categorise dimensions

[67] http://www.xinhuanet.com/fortune/2019-09/18/c_1125007386.htm

of everyday information needs, which help to situate the study of digital platforms within different types of information-seeking contexts. In addition to identifying information needs in everyday life, findings in the thesis also enrich our understanding of Chinese Internet ecology. For example, qualitative interviews and focus group studies with rural users show that short-video formatted messages on social media and short-video sharing platforms are becoming increasingly popular as new channels of information seeking for hobbies, everyday health, and even professional skills. Mobile Apps, such as the Doctor's Centre (for rural doctors to update medical knowledge), WeSing (for online entertainment), Keep (for daily exercise), or Yuxueyuan (for parenting tips), are emerging platforms that provide professional, topic-specific, or specialists-curated everyday information for users.

The thesis also benefits from applying the domestication theory framework in studying the Internet and information seeking practices. In the literature review chapter, I reconceptualise domestication to apply in the study of emerging information technologies in everyday life. Qualitative analysis in Chapter 5 and Chapter 6 indicates that the adoption of the Internet into everyday information process has gone through the process of appropriation (when users start to seek information online), objectification (as online information sources become parts of daily information routines), incorporation (where the boundary online and offline information sources disappears), and conversion (when users reshape the information technologies and adapt the online information as part of their social resources). It is important to note that the domestication process of information technology does not necessarily proceed in a linear sequence. For example, news notifications from mobile news apps such as Toutiao could be well incorporated into a rural user's daily life but without being fully appropriated: Interviews with new users of such apps seem to suggest that many of them have not fully explored the

functionalities of news apps to personalise news feed. Applying the domestication theory framework also helps identify different levels of user sophistication in seeking online information. For example, when seeking information for e-commerce opportunities, Gui, the male entrepreneur in Western Factory has incorporated information from offline social networks (connections with successful local business-owners) into online information sources through enhancing his friendship with the group on WeChat and has converted the online and offline network of business information into part of his business resources. Compared to Gui, two female entrepreneurs only start to adopt online information channels for e-commerce (WeChat groups managed by multi-level direct marketing companies). Case studies with the three urban Internet users indicate that only when the Internet is domesticated in integration with other information sources, users could benefit most from the information technology and avoid the risks of misinformation or even fraud.

7.1.3 Methodological challenges

Methodologically, the everyday use of the Internet for information seeking practices pose challenges for social scientists. On the one hand, we need detailed documentation of users' everyday practices in different information contexts. On the other hand, to examine the structural patterns that underlie individual practices, we also need a large-scale macro-level analyses of different user groups. The methodological challenges and the mixed-methods approach that can address them have been discussed in Chapter 3. Here I will only summarise some of the methodological challenges that I encountered after the data collection and to indicate future directions for the study of the Internet in everyday life.

The first challenge, as mentioned in the method chapter, lies in the difficulties in collecting mobile logging data during fieldwork. The use of mobile logging software can

collect data on how users interact with mobile applications (number of application launches), searches for information (use of the keyboard) and explore functionalities on mobile devices (such as logs of censored mobile information). However, as many researchers have criticised, mobile logging studies often lack contextual information about the participants (McMillan, McGregor, & Brown, 2015) or the studies are conducted in non-naturalistic settings (Church, Ferreira, Banovic, & Lyons, 2015). While the use patterns within a mobile app might look similar between two users, their motivations and the consequences of their usage can be different. Researchers from the field of Human-Computer Interaction (HCI) have used qualitative methods such as screen capture or wearable cameras to provide contextual information about the users' mobile use contexts. At the beginning of this research, I planned to use mobile logging to collect mobile usage data plus follow-up qualitative interviews that ask about users' social and informational contexts. However, two challenges emerged in the data collection stage, namely, the issue of recruiting and the lack of researcher's control in mobile logging data collection. Due to users' concerns with privacy, the percentage of interviewees who agreed to download mobile logging software was low. Among the users who were willing to participate, the mobile usage data was also incomplete due to technical issues such as the termination of data uploading process when users switched from 4G network to Wi-Fi or when the batteries were depleted. The alternative method I used to collect data on mobile usage for information seeking was oral walk-throughs or video recording of users' demonstrations of their mobile information seeking process (Chapter 5 and 6 use some of the data collected from oral walk-throughs or video demonstrations). Thus, as this study has shown, doing research on information seeking practices via mobile logging methods requires software that is developed in the language of the participants and by

academic institutions that are familiar with the participants. This goes beyond the scope of this thesis but could be a rewarding topic for future collaboration projects.

The second challenge is the increasingly widespread usage of multi-media information sources in users' everyday lives, which requires information scholars to collect, process, and analyse not only text and audio data but also images, short-videos or even live-videos. As the result chapters have suggested, video sharing platforms are becoming essential information sources for Chinese users, particularly among rural users who are less educated. Short videos can be tutorials for learning skills (dancing, singing, and cooking) and for continuing education (teaching methods or medical training). Thus, information researchers also need to adopt multi-media data analysis methods to triangulate interview transcripts with video clips. Being able to spend several months with participants in each field, however, has enabled me to broaden the types of research data collected in the research, including not only audio, images, and videos collected from structured interviews on everyday information seeking, but also from screenshots, website links, and viral videos shared by the informants.

7.2 Mind the information gap

The thesis showed that ICT development has indeed come to the stage where basic access to the Internet has already been reached. Meanwhile, with narrowing digital divides in Internet access and online engagement, we are nevertheless seeing a widening gap in how Chinese Internet users participate in different types of online activities (Chapter 4). There is also an increasing gap in the information sources users have to solve everyday problems (Chapter 5) and in the strategies they adopt to identify misinformation (Chapter 6). In other words, the digital disparities have shifted from *whether or not* users have adopted the Internet to *how* the Internet is used for everyday information seeking. Compared to digital divides in access, divides in information use and information seeking

practices are more embedded in different contexts in everyday life. The earlier dichotomy between information haves and have-nots is also shifting to become a hierarchy of mastery of the Internet for information seeking purposes.

7.2.1 Digital divides revisited

Digital divides or digital inequalities have been a major theme of research in social science research about the Internet since the late 1990s. As reviewed in Chapter 2, many researchers used Bourdieu's theory of *habitus* as the theoretical framework of digital divides by examining how underlying social structures shape everyday use of digital technologies. Technology use and participation are considered to be technological forms of economic, cultural, or social capital (Selwyn, 2004). Scholars have also defined information capital based on Bourdieu's theory; hence the use of "capital-enhancing activities" to highlight certain online practices and digital skills. As discussed, the relationship between agency and structure can help to bridge an individual's everyday Internet practices with macro-level social, economic, and cultural factors.

However, the results of the thesis have demonstrated that neither *habitus* nor the theory of *social capital* can fully explain the information disparities among Chinese users. First, as critiques of Bourdieu's theory have pointed out, taste, the elucidation of habitus, gives an inherent superiority to the elite culture (Mander, 1987). When studying the information seeking practices from the bottom-up approach, I find that it is problematic to identify which digital platforms or information practices represent a dominant or elite practice. All online information platforms, such as online forums, search engines, or short-video platforms, have a diverse range of content and engage users from all social classes. Thus, deriving the stratification of Internet users only from the *platforms* they use would be an inaccurate interpretation of how social classes are represented in the use of digital technologies. The thesis therefore provided in-depth examinations of different

levels of usage of the Internet *within* several categories of online activities (Chapter 4), avoiding the over-simplified notion of capital-enhancing activities.

Second, it is also problematic to attribute all variances in online practices to the *field* to which an individual belongs. Such a deterministic view can underestimate the influence of other factors, such as familiarity with technologies or an individual's motivations. We saw this in the case of Gui, for example, a working-class business entrepreneur who succeeded in e-commerce despite his disadvantages in education and income level. The key factors in his success are twofold; his familiarity with WeChat, the social media platform, and his devotion to establishing an independent career in addition to his full-time job as a factory worker. It is important to note that I am not rejecting the importance of social structure for information agents. Instead, I want to draw attention to both the *common* and the *exceptional cases* in agency-structure dynamics and to study information inequality not merely *as a single dimension of* social inequality but *in relation to a range* of social divides.

7.2.2 Closing information seeking divides

Chapter 4 showed the digital divides in different categories of Internet activities and identified the influence of socio-economic and demographic variables for the uses of Internet functionalities. Age, education, residence, and gender are associated with different uses of the Internet. Meanwhile, Chapter 5 and Chapter 6 explained the complexities of increasing information seeking divides in the processes and consequences of information seeking practices. The information seeking advantages, as the results suggested, consist of three dimensions: diversity of information sources, the autonomy of information-seekers, and awareness of algorithms.

First, users who have a more diverse range of information sources online and offline are in advantaged positions compared to those who depend on a less diverse

information diet. For example, by expanding information seeking practices from search engines to e-commerce platforms, rural users who sought information on growing flowers were able to find multi-media instructions about plants. The diversity of information is sometimes reflected in the combination of offline and online sources. Working-class users who want to find business opportunities and learn entrepreneurship skills are less likely to fall into Ponzi schemes if they join both local and online business networks. Having diverse information sources in everyday information seeking also helps users to identify misinformation. By subscribing to both new media and mainstream media accounts on digital platforms, users can receive multifaceted facts on controversial social issues and they are also able to fact-check online rumours. However, Chapter 5 showed that inexperienced users tend to depend on one or two dominant platforms or apps for everyday information seeking. Social media and online news are often the foremost apps that users rely on, and the over-dependence on these platforms often lead to users' feelings of a lack of useful information sources. To increase the information diversity for disadvantaged users, developers of the platforms could design functions to assist new users to expend their sources of information within the apps. For example, many older generation users mentioned that they only read friends' posts on WeChat Moments and have never subscribed Public Accounts. WeChat developed an information function called "Top Stories"[68] in May 2019 which recommends the articles that are read by the user's WeChat friends. But despite Tencent's efforts in improving the information function of the mobile social media app, the function did not help to expand information diversity for the informationally disadvantaged users since they lack information sources because of their limited social connections. An introductory article that recommends

[68] https://36kr.com/p/5209539

curated media accounts could potentially help new users to increase their information diversity.

Second, results in the thesis showed that users' autonomy in personalising information flow also constitutes an information seeking advantage. The algorithmic recommendation systems on online news platforms have indeed generated a constant flow of personalised information. However, the autonomy of information seeking requires the users' conscious control over what topics they want to monitor on a daily basis. Having autonomy in tailoring information flow will increase the chances of information encountering and serendipity and alleviate users' feeling of information overload. Nevertheless, as Chapter 6 demonstrated, the autonomy in information seeking often requires users' experiences with ICTs (for example, having basic familiarity with computer science). Again, technology companies could empower disadvantaged information-seekers by providing them with access to alter the algorithmic recommendations and add their information needs into the system. Such a design would incorporate a combination of Information Retrieval (IR) system insights plus insights about users' information needs, as proposed (Ingwersen & Järvelin, 2005).

Third, information seeking disparities are also represented in the different level of users' awareness of algorithms between information haves and have-less (or have-nots) users. Awareness of algorithmic knowledge is essential for the optimum use of search engines. Examples from Chapter 5 and Chapter 6 showed that due to a lack of knowledge about the ranking algorithms of search engines, many Internet users failed to identify paid advertisements in search results, particularly in searching health-related information. However, in Chapter 6, the statistical regression on the awareness of online advertisement showed that education level is positively associated with knowledge of search engine paid listings. Informal education could also provide knowledge about algorithms.

Interviews with rural Internet users who have participated in the digital skill workshops on e-commerce further illustrated the positive effect of algorithmic training. By learning about the ranking algorithms behind e-commerce websites, previous inexperienced Internet users in Fossil Village could distinguish sponsored ads and promotions from other search results on e-commerce platforms. Therefore, policymakers could help raise the algorithmic awareness among disadvantaged information users by offering training and workshops on online information platforms.

7.3 The mismatch of supply and demand in publicly available everyday information

When consulted for advice on governance, the ancient Chinese philosopher Confucius listed the "Provision of sufficient food, support of a strong military, and trust of the people"[69] as three main foci of governance. Trust, as he argues, is more critical than food supply and military force for enhancing the credibility of the government. Since the establishment of the People's Republic of China in 1949, Chinese leaders have been primarily focusing on economic development and the building of military power. Trust from the people, before the rise of the Internet, could be reinforced with concerted campaigns on official media. However, Chinese Internet users nowadays receive everyday information about state policies, foreign affairs, health or e-commerce from an increasingly diversified range of information sources. The declining influence of mainstream media and the growing importance of digital media have resulted in a new information environment in China. Grassroots users in rural and working-class communities are playing more important roles in seeking the information they need,

[69] "子贡问政，子曰：'足食，足兵，民信之矣'"《论语·颜渊》 "Chapter 12. Tsze-kung asked about government. The Master said, 'the requisites of government are that there be sufficiency of food, sufficiency of military equipment, and the confidence of the people in their ruler.' Tsze-kung said, 'if it cannot be helped, and one of these must be dispensed with, which of the three should be forgone first?' 'The military equipment,' said the Master. Tsze-kung again asked, 'if it cannot be helped, and one of the remaining two must be dispensed with, which of them should be forgone?' The Master answered, 'Part with the food. From of old, death has been the lot of all men; but if the people have no faith in their rulers, there is no standing for the state.'"(Confucius, 1971, p. 261)

choose the information source(s) they prefer, and personalise information feeds through algorithms.

Meanwhile, the proliferation of digital technologies such as the Internet and smartphones have challenged the state's dominant power over information flows. The thesis has shown that in the context of everyday information such as health, the role of government in providing trustworthy information channels and preventing the dissemination of misinformation is missing. Technology companies such as Baidu, Tencent, and Alibaba provide search engines, social media, and e-commerce platforms, many of which facilitate the exchange of everyday information. However, results in the thesis showed that there is a vacuum of reliable everyday information on the Chinese Internet, especially on topics such as diet, nutrition, and medical advice.

While the Internet industry is flourishing, middle-class Internet users are willing to pay for information proxies to receive trustworthy information on healthcare, diet, and education (see examples in Chapter 5 such as paid courses on social media). The booming knowledge economy has thus fulfilled the public's lack of reliable information on everyday topics. Nevertheless, some Internet users in China are unable to benefit from the knowledge economy due to the lack of technological sophistication or low monthly disposable income. While the digital revolution has given rise to commercial information channels, many information have-less users are left behind in the digital tidal flows of information, disoriented and over-whelmed by information yet uninformed about important everyday information such as dietary recommendations or food security. The danger, as shown in Chapter 6, is a social crisis of trust in the government's credibility as an information provider and widespread rumours on social media. Thus, the top-down informatisation plan has failed to satisfy Chinese grassroots users' needs for publicly available and trustworthy information in everyday life. This vacuum of everyday

information, if left unaddressed, will not only result in a widening disparity in information seeking but will also challenge the credibility of the Chinese government.

7.4 Everyday information seeking beyond China: Future research directions

One might argue that the Chinese Internet industry has a different ecology compared to the one in the West. However, the more I studied users in China and how they use social media, search engines, news apps, e-commerce platforms to find everyday information, the more I realised the similarities of Internet uses in everyday life across different countries. If we compare Chinese Internet users with global Internet users, some of the challenges and problems in the Chinese information ecology also exist in other developed and developing countries.

7.4.1 The changing global information landscape

Online information sources are often more commonly used than media reports and government guidelines in everyday life contexts. For example, Pew Research Centre (2017) analysed search engine queries during the Flint water crisis in 2015 and found that residents of Flint searched for information about water quality before the government launched public notices and conducted the investigation. During the public crisis incident, the first topics residents searched for were personal health and this continued to constitute the most significant percentage of all search activities in the area. The Pew report showed that during the social crisis incidents, American Internet users also have a stronger need for facts and data related to everyday life topics such as personal health.

However, some Internet users in developed countries also lack the awareness of algorithmic knowledge. I found that Chinese users face challenges in distinguishing ads from other search results on Baidu. Yet only 48 per cent of Internet users in the UK are aware that search results with the label "Ad" are top-ranked not because these are most relevant information but because they are sponsored (Ofcom, 2018). Widespread rumours

have also led to public health crises in the West. Anti-vaccination campaigns that claim the increased risks of diseases from vaccination have resulted in a rise of preventable diseases in many developed countries.[70]

Meanwhile, the increasing popularity of social media and algorithmic recommendation systems as news aggregators in the developed countries have also raised the issues of the echo chambers and filter bubbles. The Facebook-Cambridge Analytica data scandal in 2018 has revealed the danger of the manipulation of personal social media data for targeted political advertising. The discussions around sponsored political campaigns on social media resonates with the findings in this thesis about information diversity in everyday life. While some Chinese Internet users rely on WeChat Moments as their sole news platform, similar trends are taking place on social media in the West. Where Internet users in China witness conflicting viewpoints online, an empirical study on Facebook posts during Brexit showed that users were polarised into echo chambers with an increasing emotional distance on political issues (Del Vicario, Zollo, Caldarelli, Scala, & Quattrociocchi, 2017).

The thesis has shown that the study of online information ecologies should start with a comprehensive understanding of the processes, variances, and consequences of information seeking in everyday life. Future research projects could expand the geographical focus and understand the dynamics of information ecologies in different countries. In particular, comparisons of the Chinese Internet with that of other developed countries would help understand the different impact of government-led information policies and the influence of digital information platforms on seeking everyday information.

[70] https://www.bbc.co.uk/news/health-48585036

7.4.2 The Internet in the Global South and Beyond

The sharp contrast between the rural and urban digital economy in China and urban and rural Internet uses is also a reflection of global digital divides. The shift from access divides in Internet use to divides in information seeking practices in China is also taking place in other developing countries. The World Bank's database shows that 34.4% of India population has adopted the Internet. As Jonathan Donner found in his book, *After Access*, the widespread adoption of mobile Internet still leaves limitations in information seeking practices and can widen the digital divides between uses in the Global South and the Global North. Results in the thesis show that information seeking on the mobile Internet is indeed constrained for complex information tasks such as managing online stores on e-commerce platforms and conducting complicated searches for professional information. However, mobile-only users are still able to reconstruct mobile functionalities such as image search and location-based recommendation which facilitates their everyday information seeking practices.

Meanwhile, there is an increase of online misinformation in countries in the Global South accompanied by decreased trust in traditional media in developing countries. Malicious and hostile information that accused innocent individuals as human traffickers spread virally in group chats on mobile social media platforms (WhatsApp and Facebook) in India. False information has led to horrifying lynching deaths in India[71]. Similar to the Chinese government, the Indian government plans to tackle the spread of fake news by linking Aadhaar, individual's identity number, with social media accounts[72]. However, as this thesis has demonstrated, the spread of rumours on social media has also resulted from the lack of digital capabilities and user sophistication in handling a large amount of

[71] https://www.scmp.com/news/asia/south-asia/article/2155270/death-fake-news-indian-authorities-blame-irresponsible-and

[72]https://www.indiatoday.in/india/story/social-media-accounts-need-to-be-linked-with-aadhaar-to-check-fake-news-supreme-court-1582465-2019-08-19

online information. Without narrowing the information seeking divides and improving the quality of online information, such policy interventions have limited influence on misinformation.

Another alarming feature of online misinformation in developing countries is its connection with nationalisms and extremisms. In China and other developing countries, the circulation of fake news can ride on the public's emotions instead of facts. For example, I found fake videos widespread on Chinese social media that depict China's military conflict with Japan. Such manipulation of public sentiment is also common in India, where extremists share images and texts that list inaccurate facts and express anti-'other' sentiments.[73] While users in developing countries have not fully adopted the Internet in everyday life, the negative impact of massive online misinformation has already threatened social stability and challenged the credibility of governments in these countries.

However, Chapter 6 also showed how Chinese working-class and rural Internet users can bridge information divides through human and algorithmic proxies. Findings in this chapter have potential policy implications for other developing countries. For example, I showed that young generations, particularly professionals (teachers or doctors) living in these communities, played important roles as information proxies. As early adopters of the mobile Internet, they could not only teach other members of the community how to use mobile functions but could also help new Internet users to accomplish complicated information tasks online and fact-check misinformation from social media. Future research could compare information proxies across different developing countries through ethnography or in-depth interviews after assessing the scale

[73] A report by BBC news examined fake news in India: http://downloads.bbc.co.uk/mediacentre/duty-identity-credibility.pdf

of the challenges by means of quantitative research. Governments of developing countries could find ways to promote the use of information technologies through information proxies.

I also found that algorithms can assist disadvantaged information users through social tagging or content recommendation systems. However, most of the information services that used algorithmic recommendation systems in this research are developed by private Internet companies such as Bytedance. Yet the business models of these apps rely on constant refreshing of low-quality but eye-catching information for users to consume. Compared to commercial information services, public information services for agricultural, health, or education information in developing countries often lag behind commercial platforms in providing timely updates for users and fail to use technologies such as GPS sensors and users' browsing histories to recommend context-specific public information. Future research could focus on two topics related to algorithmic recommendation systems: First, how to avoid a decrease in information quality when implementing algorithmic recommendation systems on digital platforms? Second, how to use the strengths of algorithmic recommendation systems to deliver public information for disadvantaged Internet users in developing countries.

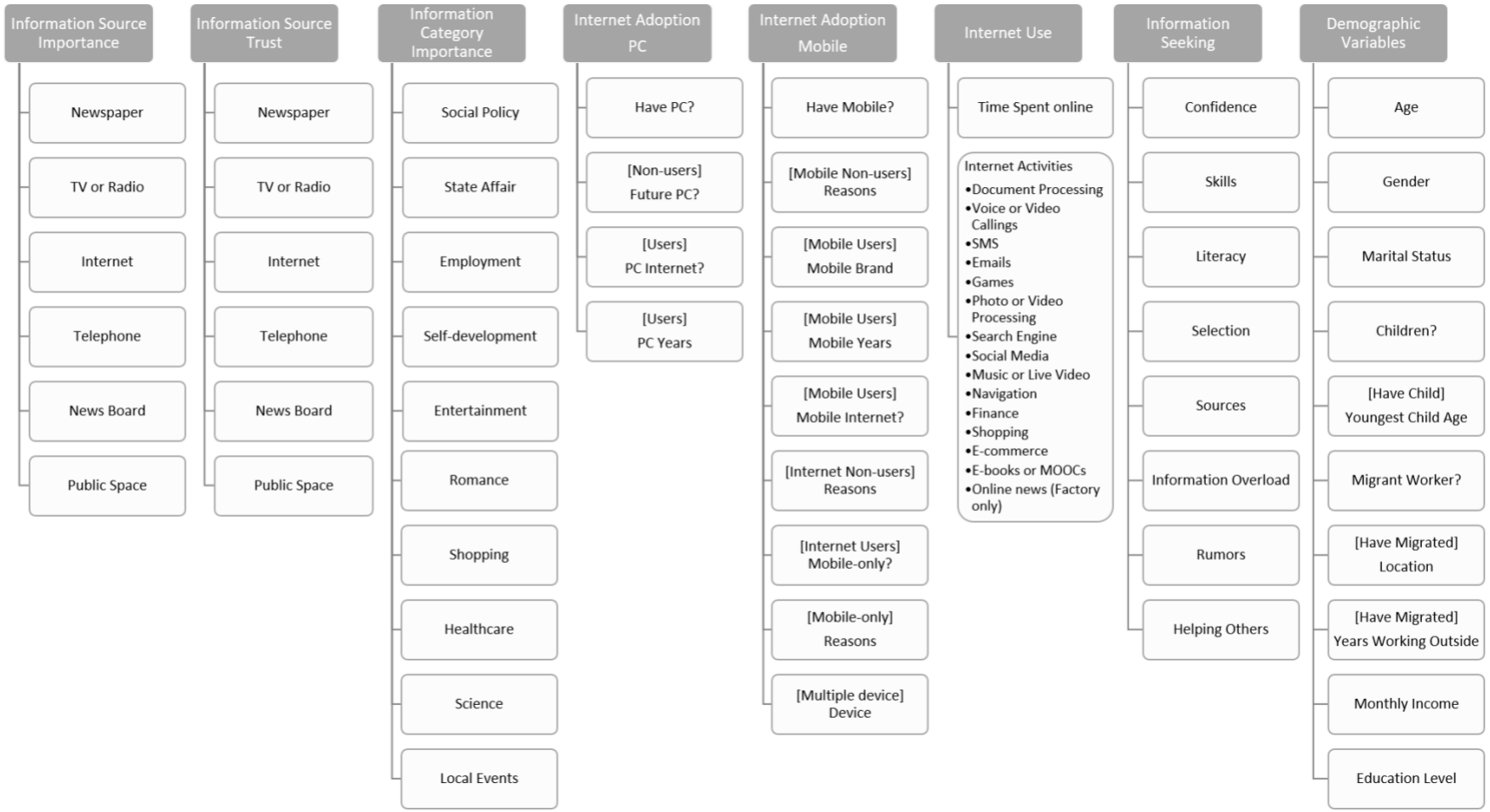
The thesis started with an introduction to the Chinese government's top-down informatisation strategy to build an information society. However, despite the government's efforts in providing ICT infrastructure and strengthening its dominance over the media system on digital platforms, I found that the shaping of the Chinese knowledge economy and the establishment of a healthy information space need the provision of accessible and reliable information in various domains beyond politics. I demonstrated the significance of everyday information, such as personal development for the upgrading of users' digital skills, which forms the basis of the e-commerce sector.

Also important is how users cope with the new information environment to identify misinformation, handle an overwhelming amount of information, and adapt to algorithmic information proxies. All of these challenges entail efforts not just from the Chinese government, but also the Chinese society as a whole. In this sense, the challenges identified in the thesis are not unique to China. The Global North could also learn from the Chinese leapfrogging informatisation process: the enhancement of everyday life is about more than just politics. The government, information providers, and the public could work together to address an increasingly widening information gap, help citizens upgrade their information skills, and improve the information quality on the Internet. With dominant digital platforms are grabbing attention, which has become a scarce commodity in the overall information ecology, Internet scholars in the West are concerned that high-quality peer production of information is increasingly subject to strong competition with the reconfiguration of major information providers (M. Hindman, 2018). Nevertheless, the results of this thesis demonstrated that there is a growing information need among Chinese users for expert and professional knowledge in everyday life topics such as health and childcare. The hope is that, through in-depth understanding of Internet users' niche but also diverse information needs, there will be opportunities for a variety of sources in the marketplace of information. This applies to societies in the Global South, but also to societies in the Global North which China is in certain respects – in terms of the amount and the types of practices that are conducted online – is starting to outpace, with all the novel challenges and opportunities attendant upon this outpacing.

At this point we can return to the survival challenge that took place in China in 1999. Looking across all ICT developments over the last 20 years, we can be confident in saying that Internet users in both urban and rural China could survive 72 hours through

the Internet as the Internet has information about almost all aspects of everyday life. However, before we get too optimistic about the future of the information society, should we expect much more than basic *survival* from the Internet? Once the challenge is to not only survive but also thrive in the digital era, we see multiple problems emerging from Chinese ICT development. First, the grassroots informatisation is not equally distributed across different social classes. There are also disparities in online information seeking amongst users with different level of technological sophistication. Second, users' information needs are not always satisfied due to the lack of trustworthy online information sources. The growing feeling of confusion in everyday topics such as healthcare and during controversial social issues has challenged the credibility of the government as an information provider. Third, Internet users constantly encounter pitfalls of misinformation in online information seeking and feel overwhelmed with irrelevant online information. The implementation of the algorithmic recommendation systems has assisted inexperienced Internet users in navigating information flow but also created new problems such as the decrease of information quality and the creation of filter bubbles. The new challenge, for academics, policymakers, and technology companies alike, is to build an accessible, diversified, and dynamic online information space where all users can seek information so that they flourish fully in their everyday lives.

Appendix A Survey structure



Appendix B Survey questionnaire (in Chinese)

No.

互联网与日常信息获取

您好，我是牛津大学互联网研究所的博士生闫蒲。非常感谢您在百忙之中抽空配合完成本问卷。我的博士研究旨在了解您在日常生活中如何通过互联网寻找信息。您的回答仅用于中国互联网研究，请您认真、如实作答。我将对您的答卷内容、您的个人信息严格保密。作为答谢，您可以通过回答问卷获得小纪念品一份或小额奖金。如果您对本研究有任何疑问，可以通过电话联系我：15136655506。

第一部分：信息渠道与信息需求这部分题目旨在了解您在日常生活中从哪里获得信息，需要哪些信息。您的答案没有对错之分，请结合您的体会选择适合您的答案。请在符合的选项上打“√”

1、请问以下信息渠道对您的日常生活有多重要？您可以选择非常不重要、不太重要、比较重要、非常重要（单选题）

	非常不重要	不太重要	比较重要	非常重要
报纸杂志	○	○	○	○
广播电视	○	○	○	○
互联网	○	○	○	○
电话或当面询问他人	○	○	○	○
公告栏	○	○	○	○
公共场所（比如食堂、广场）	○	○	○	○

2、请问您在多大程度上相信以下信息渠道的信息？您可以选择非常不信任、不太信任、比较信任、非常信任（单选题）

	非常不信任	不太信任	比较信任	非常信任
报纸杂志	○	○	○	○
广播电视	○	○	○	○
互联网	○	○	○	○
电话或当面询问他人	○	○	○	○
公告栏	○	○	○	○
公共场所（比如食堂、广场）	○	○	○	○

3、人们在日常生活中可能会关注不同种类的信息，请选择以下不同类型的信息对您的重要程度，您可以选择非常不重要、不太重要、比较重要和非常重要（单选题）

	非常不重要	不太重要	比较重要	非常重要
社会政策（比如，农村养老保险）	○	○	○	○
国家大事（比如，人大代表选举）	○	○	○	○
工作就业（比如，岗位招聘、工作机会）	○	○	○	○
技能学习 （比如，种植技术、农机修理）	○	○	○	○
文化娱乐 （比如，综艺节目、豫剧表演）	○	○	○	○

婚姻爱情（比如，寻找配偶、经营家庭）	○	○	○	○
消费购物 （比如，服装选择、美食推荐）	○	○	○	○
健康医疗 （比如，流感预防）	○	○	○	○
科学普及 （比如，转基因食品）	○	○	○	○
本地消息（比如，实时天气、交通）	○	○	○	○

第二部分：网络使用这部分题目旨在了解您是否使用互联网，如何使用互联网。您的答案没有对错之分，请结合您的体会选择适合您的答案。请注意，4、8、12 题选择不同选项后续问题有所不同。

4、您家里是否有电脑？（单选题）

○ 有（如果有，请只填写左下方题目）	○ 没有（如果没有，请只填写右下方题目）
5、您家里的电脑是否可以上网？（单选题） ○ 可以 ○ 不可以 6、您家中安有电脑有几年了？请在下方填入您初次购买电脑的年数，如“2 年”，小于一年请填入月数，如“2 个月”（填空题） _____	7、您家中是否会在近两年内购买电脑？（单选题） ○ 一定不会购买 ○ 可能不会购买 ○ 可能会购买 ○ 一定会购买

8、您是否有手机？（单选题）

○ 有（如果有，请只填写左下方题目）	○ 没有（如果没有，请只填写右下方题目）
9、请选择您的手机品牌（单选题） ○ 苹果 ○ 三星 ○ 华为 ○ 联想 ○ 诺基亚 ○ 索尼移动 ○ LG ○ HTC ○ OPPO ○ vivo ○ 魅族 ○ 中兴 ○ 小米 ○ 一加 ○ 乐视 ○ 酷派 ○ 金立 ○ 努比亚 ○ 摩托罗拉	11、请选择您不使用手机的原因（此题为多选题，请选择所有符合您情况的选项） □ 手机价格太高 □ 我不需要手机 □ 手机使用复杂我学不会 □ 担心健康隐患（影响视力、辐射） □ 其他原因 _____

○ 其他 10、您使用手机有几年了？请在下方填入您距离第一次使用手机的年份数，如“2 年”，小于一年请填入月数，如“2 个月”（填空题） _____	

12、随着移动互联网的普及，手机也可以连接互联网，请注意，使用 QQ、微信、网络广播、在线网游，联网应用程序（如导航等）都是使用互联网。请问您的手机是否可以上网？（单选题）

○ 可以（如果可以，请只填写左下方题目）	○ 不可以（如果不可以，请只填写右下方题目）
13、除了手机以外，家用电脑、公共电脑都可以连接互联网。请回忆您过去 7 天的上网经历，您有没有通过其他方式上网？（单选题） ○ 有（如选择有，请跳过第 15 题） ○ 没有（如选择没有，请跳过第 14 题） 14、如果您除了手机以外还有其他上网方式，请从下列选项中选择您最常用的其他上网方式（此题为多选题，请选择所有符合您情况的选项）（多选题） □ 自己的电脑 □ 公用电脑（如图书馆、社区活动中心） □ 网吧电脑 □ 单位或学校电脑 □ 朋友或家人的手机 □ 朋友或家人的电脑 15、您为何只用手机上网？（此题为多选题请选择所有符合您的选项） □ 其他上网工具，比如电脑，比较贵 □ 手机已经满足了我的所有上网需求 □ 我工作或学习忙碌，没有时间用电脑上网 □ 其他_____ 16、请回忆您近 7 天内的上网情况，您平均每天上网的时间是多久？（请注意，上网包括电脑上网与手机上网，使用微信、地图、网络新闻、网游等需要连接互联网的活动都算在上网时间内） 请在下方填入小时数，小于一小时可以填入分钟数并标明（填空题） _____	17、您不使用手机联网的主要原因是什么？（此题为多选题，请选择所有符合您情况的选项）（多选题） □ 我对互联网不感兴趣或不需要 □ 上网需要的技能比较难以掌握 □ 没有网络信号或网络信号差 □ 网络资费太高 □ 没有时间上网 □ 单位或学校不允许 □ 其他 _____ 18、如果您不使用手机上网，您会使用电脑上网吗？（单选题） ○ 会 ○ 不会 19、您是否需要他人帮助使用手机上网？（单选题） ○ 否 ○ 是，通过亲人帮助 ○ 是，通过朋友帮助 ○ 是，通过手机店、网吧或技术人员帮助 20、您未来是否打算使用手机上网？（单选题） ○ 是，有这个打算 ○ 否，不想

21、以下为有关于手机上网的一些描述，请根据您的使用感受评价是否符合您的个人体会。您可以选择非常不符合，不太符合、比较符合、非常符合。（矩阵单选题）

	非常不符合	不太符合	比较符合	非常符合
我有时需要借助他人完成上网活动（比如：下载大型文件、视频、音乐，网购等）	○	○	○	○
手机流量消耗快、资费贵影响了我的上网体验	○	○	○	○
相比手机，我更喜欢用电脑上网	○	○	○	○
在使用手机寻找信息时，我经常在不同应用程序之间切换（比如在微博搜索微信号，再回到微信号寻找文章）	○	○	○	○

22、请回忆您过去一个月的互联网的使用情况，请选择您使用以下功能的频率。您可以选择从不使用、很少使用、偶尔使用、频繁使用与几乎每次打开手机或电脑都使用 （很少使用=一个月以上使用一次；偶尔使用=每周使用一次；频繁使用=每天使用；几乎每次打开手机或电脑都使用）（单选题）

	从不使用	很少使用	偶尔使用	频繁使用	几乎每次打开手机或电脑都使用
文字编辑或数据管理（比如在线编辑文字）	○	○	○	○	○
接听或拨打电话（包含语音或视频通话）	○	○	○	○	○
接收或发送短信（包含微信或 QQ 消息）	○	○	○	○	○
接收或发送邮件	○	○	○	○	○
玩网络游戏	○	○	○	○	○
拍摄编辑照片或视频	○	○	○	○	○
使用搜索引擎	○	○	○	○	○
使用社交媒体（比如微信、QQ、微博）	○	○	○	○	○
听音乐或观看视频直播	○	○	○	○	○
定位或导航	○	○	○	○	○
使用理财金融工具（比如支付宝、微信支付）	○	○	○	○	○
使用电商平台购物（比如淘宝、京东）	○	○	○	○	○
使用电商平台销售（比如淘宝、京东）	○	○	○	○	○
看电子书或上网络公开课	○	○	○	○	○
浏览网络新闻	○	○	○	○	○

23、以下是关于使用互联网寻找信息的一些描述，请您按照您的个人体会评价这些描述是否符合您的使用感受。您可以选择非常不符合、不太符合、比较符合、非常符合。（单选题）

	非常不符合	不太符合	比较符合	非常符合
我对自己使用互联网寻找信息的技能有信心	○	○	○	○
用互联网搜集信息时，我不熟悉手机或电脑的操作	○	○	○	○
用互联网搜集信息时，我对信息内容的理解不够	○	○	○	○
用互联网搜集信息时，我不知道如何甄别有用和无用信息	○	○	○	○
用互联网搜集信息时，我不知道哪些是有效的信息渠道	○	○	○	○
我常常因为接触的互联网信息量太大而感到不适应	○	○	○	○
互联网上的信息谣言很多，让人难辨真假	○	○	○	○
我经常帮助他人使用互联网寻找信息	○	○	○	○

第三部分：基本信息这部分题目旨在了解您的个人情况，以帮助我更好地理解不同群体是如何使用互联网和获取日常信息的。请结合您的实际情况回答，我将对您的所有信息严格保密。

24、请填入您的出生年份 。请以“19”开头（例如：1993）（填空题）

_____

25、请选择您的性别（单选题）

○ 男
○ 女

26、请选择您的婚姻状况（单选题）

○ 未婚
○ 已婚
○ 分居
○ 离异
○ 丧偶

27、您是否有子女（单选题）

○ 有
○ 没有

28、如果您有子女，请在下方填入您子女的年龄，如有不止一个子女请填入最年幼子女年龄（填空题）

_____

29、您是否有过在西峡以外地区工作的经历？（单选题）

○ 有

○ 没有（如选择没有，请跳过 30、31 题）

30、如果您曾经在其他地区或其他企业工作过，请选择您工作的地点类型（单选题）
○ 北京、上海、广州、深圳等一线城市
○ 省会城市与直辖市（如西安、郑州、重庆）
○ 二线城市（如南阳、襄阳、宝鸡）
○ 其他县城（如淅川）

31、如果您曾经在其他地区或其他企业工作过，请填入您外出工作的时间长度（填空题）

_____

32、请回忆您现有的可支配收入，包括工资、奖金、房屋或店铺租金、退休或养老金、家庭补贴等，请问在扣除每月个人所得税、缴纳的社会保障金之后，您每个月可用来自由支配的收入是多少？ 请在下方填入数字（填空题）

_____

33、您的最高学历是？（单选题）
○ 初中及以下
○ 高中（包含中专）
○ 大专
○ 本科
○ 硕士及以上

34、请问您属于哪个部门？(填空题)

_____

35、请填入您的姓名及联系方式(填空题)

_____

36、感谢您参与本次问卷调查，本研究后期将组织为时半个小时左右的一对一访谈或小组座谈，和我分享您的互联网使用习惯和日常信息来源。访谈和座谈将在办公楼会议室举行，时间安排在您方便的时段。参与访谈者将获得现金奖励作为答谢。如果您愿意接受下一步访谈，请在下方填写您的姓名和手机号（填空题）

_____

Appendix C Interview framework

Internet Use		
1.1 Use/Non-use	Do you use the Internet?	
	Yes	→ go to 1.2
	No	→a) clarify **definition** of the internet (explain to the respondents: WeChat, internet radio, online gaming are **all** examples of using the internet); b) ask **why** he or she never used the internet, what are the **barriers** that stop you from using the internet? c) **proxy users:** ask whether or not there is a family member or a local service that may help? d) will you use the internet in the future? Why or why not?
1.2 Access	Whether or not have access to Net bar, Library/school Computer, home PC, Mobile Phone, or Tablets? How much do you pay for the internet each month (cable/mobile)?	
	Public PCs	→ a) **Experience** (when did you first use public PCs to get online? what was your motivation back then?); b) **Use** (how frequent, time spent, common internet activities on public PCs);
	Home PC	→ a) **Experience** (when did you first buy a home PC? what was your motivation back then?); b) **Use** (how frequent, time spent, common internet activities on home PCs);
	Mobile device	a) **Experience** (when did you first buy a mobile phone/tablets? what was your motivation back then? How many phones you have used? What is your current mobile phone/tablet brand?); b) **Use** (how frequent, time spent, common internet activities on mobile phones); c) Mobile **Data package** (how did you choose your current monthly plan?)
	Mobile-only (people who only have access to mobile internet)	→ a) **Productive use**: Have you ever asked for help from PC-users to accomplish informational tasks (example: using search engine, downloading a digital copy, finding a specific product)? b) **Metered-mind**: What would you do if you use up your data package? c) Have you considered **purchasing home PC**? Why or Why not?
1.3 Activities * (for each different devices)	How often do you use public PC/ home PC/ mobile phones/tablets for _____; Why do you like/dislike participating in _____;	
	a) Search engine	Searching information from the search engine (Baidu/Sogou)
	b) Emails	Sending or receiving emails
	c) Instant messaging	Sending or receiving instant message (WeChat, MOMO, or iMessage)
	d) news	Reading online news
	e) Microblogging	posting tweets on Microblogs (Tencent, Weibo) reading tweets on Microblogs sharing tweets on Microblogs
	f) WeChat	posting tweets on Moments reading tweets on Moments reading tweets from public accounts you subscribed sharing tweets on Moments sharing tweets to WeChat friends
	g) Entertainment	watching TV shows, soap operas online listening to streaming video downloading and listening to online music playing online games reading online fictions
	h) Shopping and online banking	online shopping online banking
	i) education and self-learning	taking online courses learning skills from online videos
Information Sources (Telephone, Ask a person, Go to a place, Find a book, Use PC, Use Mobile Phone/tablet, Ask others to search online)		
2.1 [internet as information source] How important is the internet as a source of information? How important is the mobile internet/broadband internet as a source of information?		
2.2 [information source for different needs] Where would you go first if you were looking for information about _____		
	a) Social Policy	i.e. the recent policy change on One Child Policy

	b) Political	i.e. the name of your local mayor
	c) Employment	i.e. Finding a job in a different city Changing your current job
	d) Self-learning	i.e. Solving problem with a product/service (i.e. fixing the mower, raising the chicken)
	e) Culture	i.e. A soap opera that you heard about
	f) Romantic	i.e. A partner for romantic relationship or marriage
	g) Shopping	i.e. A product that you need
	h) Health	i.e. Finding hospital/ medical care Food safety (genetically modified food)
2.3 [Perceived reliability of different media] How reliable would you rate the information found in_____? a) TV; b) Radio; c) Newspaper; d) Magazine; e) the Internet		
2.4 [Internet sources] Different groups of people publish content on the internet, please let me know how much would you rate the online information published or sent by the following group of people as reliable? a) Journalist from state media; b) journalist from private media; c) scientists/doctors/experts; d) people you know offline but are not your friends or relatives; e) your families; f) your friends or co-workers; g) people you only know online but are in the same online community with you; h) most people on the internet		
Information Practices		
3.1 When you look for information online, what is the first step of information seeking? Do you start from_____		
	a) search engine	→ which one do you normally use? → do you use several search engines? → do you use search engine on one of the Apps? How do you like the result?
	b) a web page that lists many online resources (i.e. hao123, a navigation website)	→ which one do you normally use? → When you go to a specific webpage is it mostly a page you found yourself, or mostly a page you received via an email, blog, or social network site
	c) a specific web page	→ When you go to a specific webpage is it mostly a page you found yourself, or mostly a page you received via an email, blog, or social network site
	d) social media	→ Which one do you normally use? → Would you ask questions in your Moments/ to your friends/ ask a question in a WeChat group?
	e) don't know	
3.2 When you read something that might be useful in the future, what do you usually do?		
	a) save it as a bookmark	
	b) save it in the app (on mobile)	
	c) save the information in a separate document	
	d) try to remember it by heart	
	e) do nothing	
3.3 How would you rate the importance of the internet in your everyday information practices? Have you experienced information overload? Do you feel bothered by the amount of misinformation online? How do you cope with information overload/misinformation?		
3.4 (optional) Is there any information you want to look for now? Would you like to show me how would you search for this information? 3.5 (optional) the information collected in your bookmark or within an app can demonstrate your information needs, would you like to show me your bookmark folder or your collected articles?		
Personal Information In what year were you born; Gender; Marital status; Education; Monthly income; How many members of your household use the internet; How many children live in your household and how old are they?		

Appendix D Summary of interviewee characteristics

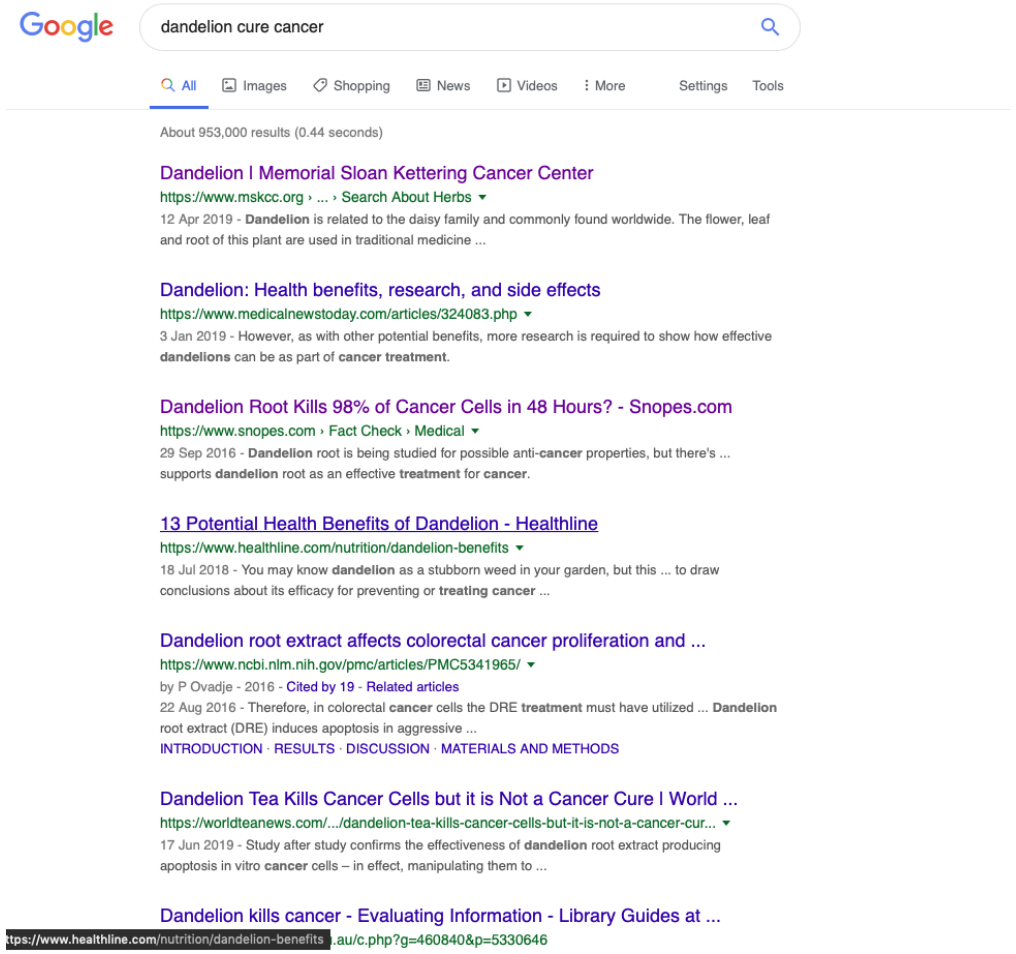
Table D1. Information about interviewees in Fossil Village

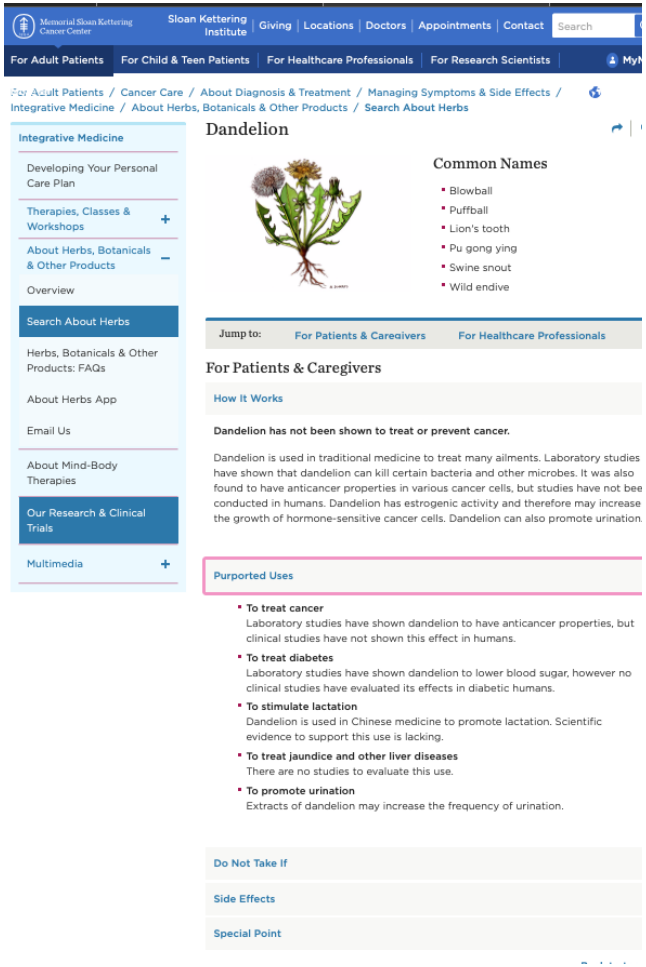
No.	Name	Gender	Age	Occupation	Internet experience
1	Ying	Female	18	Student	Learned to use PC in middle school in 2010; Mobile phones are restricted at high school
2	Yue	Female	48	Farmer	Does not know how to use PC; Learned to use mobile Internet since 2014
3	Qiang	Male	62	Farmer	Does not know how to use mobile phone; Watch CCTV news channel as main information source
4	Lanlan	Female	47	Caretaker	Wants to adopt mobile phone but do not have time to learn; Relies on her son as information proxy
5	Jing	Female	32	Entrepreneur	Learned to use PC since 2002; First used the Internet in Internet Café in PDS city
6	Shun	Male	63	Village head	Only uses WeChat on his mobile phone; Does not know how to use his office PC
7	Yanbo	Female	19	Student	Learned to use the Internet in 2010; Uses friends' PC to watch movies or do homework
8	Fang	Female	46	Farmer	Learned to use mobile phone in 2015; Only uses WeChat as Information source
9	Hua	Female	38	Farmer	Has a PC at home but never uses it; Learned to use mobile phone around 2011
10	Xiao	Male	38	Farmer	Uses PC at home, but only for important information search such as purchasing a car
11	Chufang	Female	30	Caretaker	Majored in computer science in vocational school; Familiar with many professional software
12	Yu	Female	29	Entrepreneur	Learned to use the Internet through online shopping; Has PC at home but only her husband uses
13	Zhou	Male	40	Farmer	Learned to use PC in 2010; First used PC for chatting online; Mainly uses mobile phones now
14	Hai	Male	41	Contractor	Learned to use PC from work in 2005; Uses PC to find working drawing for construction
15	Ji	Male	30	Worker	Learned to use PC from high school; Now mainly uses mobile phone
16	Haiyu	Female	51	Caretaker	Learned to use the Internet since 2012; Now only uses mobile phone
17	Hong	Male	46	Farmer	Learned to use PC since 2012; Learned to use mobile Internet in 2014
18	Yan	Female	35	Entrepreneur	Learned to use PC since 2014, by participating in the e-commerce skills training workshop
19	Ling	Female	47	Caretaker	Learned to use mobile phone in 2017 to accept mobile payment when selling lunchboxes to lorry drivers
20	Nan	Female	48	Farmer	Learned to use mobile Internet in 2016; Uses mobile phone to learn singing and dancing
21	Di	Female	26	Teacher	Has PC at home; Learned to use PC from primary school, 4th grade
22	Jie	Male	22	Student	Learned to use PC from high school
23	Liu	Female	20	Student	Does not have PC; Learned to use PC at her aunt's house
24	Bing	Male	28	Doctor	Learned to use the Internet on PC in 2014
25	Chang	Female	42	Farmer	Learned to use mobile phone in 2015; Only uses WeChat; Relies on her daughter as Internet proxy

Table D2. Information about interviewees and participants of focus group studies in Western Factory

No.	Name	Gender	Age	Occupation	Internet experience
26	Gui	Male	39	Manufacturing	Learned to use the Internet through smartphone; runs business on WeChat
27	Lijuan	Female	31	HR	Learned to use the Internet from high school
28	Pang	Female	40	Secretary	Learned to use the Internet through office computer since 2002
29	Yanyan	Female	39	IT	Learned to use the Internet through PCs in Internet café since 2000
30	Jun	Female	45	Communication	Bought a PC since 2003, but learned to use the Internet since 2006 when transferred to IT department
31	Li	Female	39	Warehouse	Learned to use the Internet from vocational school in 1998
32	Jun	Male	39	Secretary	Learned to use PC Internet from work; learned to use mobile Internet after downloading WeChat
33	Tao	Male	25	IT	Learned to use PC Internet from university; learned to use mobile Internet in 2010
34	Guo	Male	28	Management	Learned to use PC Internet since middle school; adopted mobile Internet since 2005
35	Han	Female	33	Manufacturing	Learned to use PC Internet since middle school; first learned to use mobile Internet through QQ
36	Mimi	Female	27	Manufacturing	Learned to use PC Internet from high school; started using mobile Internet since 2010
37	Hongyan	Female	41	Manufacturing	Learned to use PC in 2008 through home computer; first Internet activity was reading news online
38	Miao	Female	24	Manufacturing	Learned to use the Internet since 2008 by using QQ; learned to use PC in Internet cafe
39	Shan	Male	40	Mechanic	Learned to use PC Internet in1997 from university; Learned to use PC for work in Beijing since 1999
40	Dun	Male	43	Manufacturing	Learned to use PC Internet in 1998 from an IT skill training workshops for veterans
41	Changyou	Male	26	Manufacturing	Learned to use PC Internet from high school since 2008
42	Fei	Female	25	Manufacturing	First learned to use the Internet from school, but mainly uses mobile Internet now
43	Tao	Male	40	Industrial design	Learned to use PC Internet from middle school; learned to use mobile Internet through QQ
44	Gang	Male	39	Mechanic	Learned to use PC Internet in 1998 through reading news and playing games in Internet cafe
45	Jing	Female	42	Manufacturing	Learned to use PC Internet in 2004 through home computer; Fist Internet activity was online shopping
46	Yang	Female	44	Manufacturing	Learned to use PC Internet 4 year ago when helping her daughter to find resources for schoolwork
47	Long	Male	30	Manufacturing	Learned to use PC Internet at Internet cafe through QQ and online games
48	Wei	Male	46	Manufacturing	Learned to use PC Internet since 2008; First online activity was buying and selling stocks
49	Juan	Female	48	Quality Control	Learned to use PC Internet from work as part of professional skill training
51	Ping	Male	56	Manufacturing	Learned to use mobile Internet since 2014 through using WeChat and reading news
52	Zheng	Male	32	Manufacturing	Learned to use PC Internet since 2002 from Internet café; First Internet activities were QQ and games
53	Ai	Female	43	Manufacturing	Learned to use the Internet since 2009 through watching videos online; Only uses mobile Internet now
54	Hui	Female	30	Manufacturing	Learned to use PC Internet since 2004 from public computers at the university
55	Xia	Female	37	IT	Majored in computer science in undergraduate; learned professional skills by taking online courses

Appendix E Search results of “dandelion cure cancer” on Google and Baidu






Baidu百度
蒲公英能治癌症
百度一下
网页 资讯 视频 图片 知道 文库 贴吧 采购 地图 更多»
百度为您找到相关结果约4,520,000个
搜索工具
蒲公英能治愈癌症到底是不是谣言?肿瘤专家证实了! 搜狐健康_搜狐网
2018年4月16日 - 蒲公英可以治疗癌症!许多人开始在朋友圈中转发这类文章,它有这样的效果吗?事实上,蒲公英不仅是我们童年的玩伴,也是一种价廉物美的中草药。恭喜,获得抽红包机会!...
搜狐网 - 百度快照
蒲公英能治愈癌症是谣言?专家证实是真的有效!
2017年9月23日 - 蒲公英能治愈癌症是谣言?专家证实是真的有效! 百科名医 百家号17-09-2321:46 大家都认识蒲公英,很多人小时候还经常玩。记得以前脸上长痘痘,折下一个蒲公英,将流...
百科名医 - 百度快照
蒲公英可以治癌症吗? 39健康问答_39健康网
1个回答 - 回答时间: 2019年05月10日
最佳答案: 你好,目前存在的问题有咳嗽,咳痰,呼吸不畅,临床疾病诊断有肺部肿瘤咨询临床药物的应用,蒲公英是一种中药,有清热解毒,利尿散结的作用,临床要常常用于治...
39健康网 - 百度快照
蒲公英能治癌症吗? 爱问知识人
2018年12月4日 - 蒲公英能治癌症吗?:蒲公英对癌症是一点作用都没有.还不如盐水.?... 蒲公英对癌症是一点作用都没有.还不如盐水. ...问: 怎么用蒲公英治口疮? 答: 用蒲...
爱问知识人 - 百度快照
蒲公英能治愈癌症是真是假?专家终于将其证实了!
2018年7月21日 - 原标题:蒲公英能治愈癌症是真是假?专家终于将其证实了! 蒲公英的效果一直被大家吹捧着,关于它能治疗癌症的说法也是传遍了朋友圈,可是蒲公英真的有这样...
wemedia.ifeng.com/7020... - 百度快照
蒲公英治疗癌症吗_有来医生
2018年12月27日 - 蒲公英可以抑制幽门螺旋杆菌的产生,对幽门螺旋杆菌有一定的灭活作用。蒲公英常用于治疗消化道溃疡和胃癌,但目前没有明确的研究显示蒲公英具有抗癌作用,在治疗胃癌基础上...
https://www.youlai.cn/video/ar... - 百度快照
蒲公英能治愈癌症是谣言?专家证实是真的有效!_360doc个人图书馆
2017年9月23日 - 蒲公英能治愈癌症是谣言?专家证实是真的有效! 2017-09-23 | 阅: 转: | 分享大家都认识蒲公英,很多人小时候还经常玩。记得以前脸上长痘痘,折下一个蒲...
www.360doc.com/content... - 百度快照
相关植物
蒲公英茶
婆婆丁
药用蒲公
地丁草
北沙参
搜索热点
1 谢娜晒张碧晨合影
2 爱泼斯坦死亡之谜
3 哪吒票房超红海行动 新
4 洛瑞退出美国男篮
5 青岛市民捡海鲜
6 国泰CX899被禁入
7 英仙座流星雨
8 萧敬腾致歉 新
9 鞋王富贵鸟倒下
10 全球最难合体团


搜狐 新闻 体育 汽车 房产 旅游 教育 时间 科技 财经 娱乐 更多 登录狐友
抗癌卫士
2510 文章 1978万 总阅读
查看TA的文章>
蒲公英能治愈癌症到底是不是谣言? 肿瘤专家证实了!
2018-04-16 18:41
作为农村人,我们一定很熟悉蒲公英,我们会在小的时候拿起来轻轻地吹,像是天鹅绒的伞,很好看。长大了,蒲公英好像就没什么用了,但是你知道吗?它竟然还能治疗癌症!
蒲公英可以治疗癌症!许多人开始在朋友圈中转发这类文章,它有这样的效果吗?
事实上,蒲公英不仅是我们童年的玩伴,也是一种价廉物美的中草药。
蒲公英中含有蒲公英醇、蒲公英素、胆碱、有机酸、菊糖等多种健康营养成分。有利尿、缓泻、退黄疸、利胆等功效,治热毒、痈肿、疮疡、内痈、目赤肿痛、湿热、黄疸、小便淋沥涩痛、疔疮肿毒,乳痈、瘰疬,牙痛,目赤,咽痛,肺痈,肠痈,湿热黄疸,热淋涩痛。治急性乳腺炎,淋巴腺炎,瘰疬,疔毒疮肿,急性结膜炎,感冒发热,急性扁桃体炎,急性支气管炎,胃炎,肝炎,胆囊炎,尿路感染等。蒲公英可生吃、炒食、做汤,是药食兼用的植物。
蒲公英的食用效果
1、蒲公英全身都是宝,根也是可以泡着喝的,效果和咖啡或是茶差不多,同时也不容易给身体造成损害;
2、蒲公英花对身体调养也有很好的疗效,一般情况下是喝蒲公英酒;
3、蒲公英的叶子也是可以服用,还能够直接生吃。可以将蒲公英叶子进行凉拌,加入适量的食用油还有食醋,这样调味品的味道和蒲公英本身所带有的苦味混合,会产生一种非常奇妙的享受,适合在夏季的时候服用,具有开胃以及促进消化的效果;
4、蒲公英也可以用来做饭。常见的食谱包括蒲公英炒肉丝。它不仅做起来简单,而且能起到益气解毒的作用。
5、蒲公英芽可加盐腌制。经常使用能起到提神提神的作用,但一次不能过量服用,避免身体损伤。
研究发现,蒲公英对癌症的治疗非常有效。
当病人喝蒲公英根茶,四个月后,血压下降,癌细胞数量下降。
热门图集
央视一姐第三次癌症复发,再次离开
第三次癌症复发,央视一姐朱迅再次
癌症的元凶终于找到了,远离恶性肿
那些骂她丑的人,这次全都看走眼了
24小时热文
1 2019年云南首批79公斤松茸"飞"往日本 178万 阅读
2 年产值破万亿,森林旅游正成为林业第三个支柱产 178万 阅读
3 【特写】传销"反洗者" 179万 阅读
见证中美民间友好往来 上海举办主题图片展 177万 阅读
记者再走长征路·宁死不屈 红军英烈浩气长存 142万 阅读

Appendix F Consent Form



Consent Form

Survey

Hello, my name is Pu Yan. I'm currently doing a Ph.D. at the University of Oxford in the Oxford Internet Institute. My research is on the internet and everyday information practices. In my study, I want to investigate how internet users and non-users in China make sense of the internet in their everyday information practices. If you choose to be a part of this, you will spend approximately 10 minutes on a survey on everyday information seeking practices and Internet use. You can withdraw from the survey at any time. You will receive a gift as compensation for your time. I will also donate 10 RMB to local school on your behalf. No identifiable data (for example, name, family address, ID number) will be collected in the survey. The information you share with me will not be passed to any third party and will only be used in my doctoral thesis. On successful submission of the thesis, it will be deposited both in print and online in the University archives, to facilitate its use in future research. Further, the research will also be written up for articles to be published in academic and public journals. This research project has been reviewed and approved by the university's ethics committee. If you would like to speak to the University directly, I'll give you their postal address. Their email is ethics @medsci.ox.ac.uk / ethics@socsci.ox.ac.uk. Do feel free to contact me also. My mobile is 15136655506. You can also reach me at pu.yan@oii.ox.ac.uk. If you remain unhappy and wish to make a formal complaint, please contact the ethics committee.

I wondered if you'd be interested in being involved? (Yes/No)

Do you understand the research process and your own rights in this research, and would like to proceed to the survey? (Yes/No)

Do you have any questions? (Yes/No)

Interview

[To be asked immediately after the survey] Thank you for participating in the survey. I am also conducting interviews on information practices and Internet use. In the interview, I will ask detailed questions about your preferences of information sources, your mobile phone and PC uses, and the influence of digital technologies on your everyday information practices. No identifiable data will be collected in the interview, and you can withdraw from the interview at any time. You will receive a gift or 100 RMB as compensation for your time. The information you share with me will not be passed to any third party and will only be used in my doctoral thesis. On successful submission of the thesis, it will be deposited both in print and online in the University archives, to facilitate its use in future research. Further, the research will also be written up for articles to be published in academic and public journals. This research project has been reviewed and approved by the university's ethics committee. If you would like to speak to the University directly, I'll give you their postal address. Their email is ethics @medsci.ox.ac.uk / ethics@socsci.ox.ac.uk. Do feel free to contact me also. My mobile is 15136655506. You can also reach me at pu.yan@oii.ox.ac.uk. If you remain unhappy and wish to make a formal complaint, please contact the ethics committee.

Are you interested in participating in the interview? (Yes/No) Do you understand the research process and your own rights in the interview, and would like to proceed to the interview(Yes/No)? Do you have any questions? (Yes/No)

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united kingdom
tel +44(0)1865 287210 fax +44(0)1865 287211
enquiries@oii.ox.ac.uk
www.oii.ox.ac.uk

Consent Form

Are your interested in participating in the interview? (Yes/No)

Do you understand the research process and your own rights in this research, and would like to proceed to the interview? (Yes/No)

Do you have any questions? (Yes/No)

Mobile Logging Software

[To be asked immediately after the interview] Thank you for participating in the interview. To help me understand your daily information routine, I will use a mobile logging software, Aware, which is developed and co-supervised by Prof. Vassilis Kostakos (University of Melbourne, Australia) and Prof. Anind K. Dey (Carnegie Mellon University, USA), to document your daily use of mobile phones. In this Android-based application, your personal data, for example, phone numbers or contacts information, will not be tracked and logged. The App only monitor your mobile application usage, for example, name and type of Apps, frequency of opening Apps, time spend on different Apps, etc. You will receive a gift or 200 RMB as compensation for your time. No identifiable data will be collected in the mobile logging software, and you can withdraw from the study at any time. The information you share with me will not be passed to any third party and will only be used in my doctoral thesis. On successful submission of the thesis, it will be deposited both in print and online in the University archives, to facilitate its use in future research. Further, the research will also be written up for articles to be published in academic and public journals. This research project has been reviewed and approved by the university's ethics committee. If you would like to speak to the University directly, I'll give you their postal address. Their email is ethics @medsci.ox.ac.uk / ethics@socsci.ox.ac.uk. Do feel free to contact me also. My mobile is 15136655506. You can also reach me at pu.yan@oii.ox.ac.uk. If you remain unhappy and wish to make a formal complaint, please contact the ethics committee.

Are your willing to download the mobile logging software on your phone and participate in this part of study (Yes/No)

Do you understand the research process and your own rights in this research, and would like to proceed to the study? (Yes/No)

Do you have any questions? (Yes/No)

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Appendix G Everyday information sources and associated users

Table G1 Summary table of different information sources for everyday information seeking

Information dimension	Type of information	Information source	Associated users
Self and Relationship information	Manage *guanxi*	WeChat: Public Account	Female rural users
		WeChat: Group Chat with families	Female rural users
		Toutiao News	Rural users
		E-books	Rural users
		Baidu: Q&A Forum	Young female rural user
		Tencent videos: Online courses	Male urban user
	Hobbies and leisure	WeSing	Middle-aged female rural users
		Tangdou Square Dance	Middle-aged female rural users
		News app: personalised topics	Young urban users
		Baidu: image search	Middle-aged rural users
		Taobao: search function	Middle-aged rural users
	Professional skills	National training program for teachers	Young rural user
		Baidu: video tutorials	Young rural user
		Baidu: Wenku, document sharing	Young rural user
		7139 Math.com	Young rural user
		Doctor's Centre	Young rural user
Health Information	Everyday health	WeChat: Friends or Group Chat	Rural and urban users
		WeChat: Public Account	Rural and urban users
		Boohee	Young female urban user
		Keep	Young female urban user
		Yuxueyuan	Young female urban user
		WeChat: Paid Courses	Urban users
		Word-of-mouth-> Search engine	Rural users
	Prevention or treatment of disease	Baidu: Basic search	Urban and rural users
		WeChat: paid chat with specialist	Young urban user
		Baidu: Sponsored ads	Middle-aged rural user
		Human proxies: Village doctor	Migrant users from the village
		Online Forum	Urban users
		WeChat: QR Scanner to Search to identify fake medicine	Young rural user

Table G1 Summary table of different information sources for everyday information seeking (Continued)

Information dimension	**Type of information**	**Information source**	**Associated users**
Public affairs and the government	Agricultural information	Experts sent by the local government	All rural users
		Word-of-mouth	All rural users
		Department of Agriculture in the county government	Middle-aged rural user
		Experienced farmers	Middle-aged rural user
		Middlemen	All rural users
		WeChat: Chat with middlemen	Young rural users
		Search engine	Young rural users
		Taobao	Young rural users
	Business opportunities	WeChat: Group chats with business owners	Young male urban user
		WeChat: E-commerce on moment	Young urban users
		Friends' introduction	Young female urban users
		Training courses by multi-level marking companies	Young female urban users
		Baidu Baike: company profile	Young female urban users
	E-commerce skills	Training program on E-commerce by local government	Young rural and urban users
		Online forums	Young rural users
		Meituan	Young rural users
Shopping	Shopping	Digital skill training workshops	Young rural users
		Tmall, Taboao, Vipshop, Pinduoduo	Urban and rural users

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