

**Pulling, encountering or through proxies?**

**Everyday life information seeking and the use of the Internet in China**

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## Abstract

Chinese Internet users have in recent years experienced increasingly diversified choices of information formats (text, short videos, and stream videos), information content (news, fictions, and lifestyle), as well as information platforms (news apps, search engines, and mobile social media). Chinese booming digital cultural industry has created a dynamic information ecology for grassroots Internet users. Meanwhile, Chinese Internet users have employed different approaches to collecting, distinguishing, and handling information available online, with some more sophisticated than the others in managing the massive amount of information and identify misinformation or disinformation. While previous empirical research on Chinese Internet has focused on the how the Internet has influenced economic activities, political participation, and social networks, yet little is known about how Chinese Internet users seek information on the Internet: What information sources do they trust? What information categories are considered essential for different user groups? What are the main concerns users have during the information-seeking process? Whether or not differentiated information-seeking practices could result in a new form of the digital divide? Answering these questions will help to build a deeper understanding of how Chinese users domesticate the Internet into users' daily lives as not only a tool of communication but also a gateway to information-seeking. In this paper, I will combine survey data collected from two randomly selected samples in a village (N1 = 128) and a factory (N2 = 229), 55 individual interviews, and four focus group studies, to study information-seeking practices in digital era among rural and urban Internet users in Central China. The paper will start with a quantitative analysis of information sources, information categories, and

information-seeking process and their relationship with demographic and Internet use variables. To understand different contexts in information-seeking practices, I will use qualitative data to focus on three approaches to information seeking, namely, pulling from search engines, information seeking through encountering, and information seeking through information proxies. I aim to explore how the Internet has embedded into individuals' everyday lives as an information channel, what different information-seeking approaches and strategies employed. Findings from this research will enrich the understanding of the complexities and nuances of using the Internet for everyday information-seeking practices in China and will also reveal how Chinese grassroots users perceive the Internet in a marketplace of digital information.

*Keywords:* everyday life information-seeking, the Internet, China, mixed methods approach

China over the past two decades has witnessed a period of rapid economic growth, as well as unprecedented development of information infrastructure, industry and technologies. With the exponential increase of information and communication technology, China has witnessed an era of internet-based prosperity. The penetration rate of the internet in China has reached 53.2% by the end of 2016 (CNNIC, 2017). To satisfy the increasing demand for internet services and products from the domestic market, Chinese internet companies such as Baidu, Alibaba and Tencent compete fiercely against each other for every slice of market share in the growing internet industry. Popular internet products enjoy unprecedented popularity and creep into every facet of Chinese users' daily life.

While much has been studied on Chinese Internet economy, Internet policies, and use of the Internet for social networking, there is still a lack of empirical studies on everyday information needs of Chinese information users and how the use of the Internet has influenced information seeking processes. Using both quantitative and qualitative data collected from fieldwork in Central China, Henan Province between 2017 to 2018, the research aims to understand the relationship between the use of the Internet, everyday life information needs, and everyday life information seeking practices. This study first explores what are the everyday life information needs of Chinese users and how different social groups vary in terms of their information needs. The research then examines the importance of the Internet as everyday information source in comparison to other information channels, as well as the demographic and Internet use factors that influence the use of the Internet for information seeking. Finally, I will compare different types of Internet users and how do various strategies of using the Internet as an information source result in success or failure in solving everyday problems users encounter.

## Literature review

### 1.1 Everyday life information seeking and encountering

#### 1.1.1 Theories of everyday life information seeking.

How does information users identify their information needs? How do users search information from the information system to satisfy general or context-specific information needs? Whether or not users' attempt in utilising information sources to satisfy their information needs is successful? These are the questions that have often been asked and explored by information science scholars who are interested in understanding human behaviours of seeking information. Studies of human communication behaviours, which often focus on how messages are successfully or unsuccessfully delivered from senders to the audience, have overlaps with research on information-seeking: communication channels are defined as information sources sometimes, and noises or disruptions in communication process could be interpreted as misinformation or disinformation. Meanwhile, comparing to communication studies, information-seeking research has more emphasis on the individual or environmental factors associated with information-seekers (message receiver or audience in communication studies) (Wilson, 1999). Thus, information-seeking research provides insights into the interaction between ICT users and digital technologies, with its focus on individual users' context and environment of information and communication practices, and intervening factors or barriers in the process.

Wilson (1997, 1999, 2006) proposed a model of information needs and information seeking. He argues that user's information needs situated at personal level, influencing by their physiological, affective, and cognitive states, and are also contextualised by users' social role and social, economic, political, and technological environment. Brenda Dervin's (1998) sense-making theory focuses on the complexities of user experiences in encountering problem-solving situations, and how information seeking process helps to bridge the gaps of

knowledge and make sense of the problems in such contexts. Sense-making is also a “methodological approach” in information research on studying information-seeking (Dervin, 1999, p. 728). Based on empirical studies of information-seeking practices, theoretical models were developed to summarise steps or stages involved in information seeking (Elis, 1993) or search processes (Kuhlthau, Heinström, & Todd, 2008), and with interfaces such as IR system mediating between information seekers and information objects (Ingwersen & Järvelin, 2005). Despite efforts in conceptualising human behaviours with theoretical models, such frameworks are often difficult to break down into testable hypotheses of the correlational or causal relationships between psychological, organisational, or social factors, information needs, and information sources (Järvelin & Wilson, 2003).

Savolainen (1995) first introduced the theoretical framework of everyday life information seeking (ELIS) in the study of human information behaviours in nonwork related contexts, for example, healthcare or hobbies. Comparing to information seeking in occupational or professional setting, everyday life information seeking is “less systematic and more intuitive” (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 life world, Savolainen constructed the framework of everyday life information seeking on the bases of “way of life”, “the basic context in which problems of nonwork information seeking will be reviewed”. Way of life 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 capitals, and their way of lives, which are shaped by personal values and beliefs. Meanwhile, empirical studies of information-seeking practices are often embedded in specific contexts of problem-solving situations, for example in music (Laplane & Downie, 2011), parenting (Loudon, Buchanan, & Ruthven, 2016), children development (Given et al., 2016), fiction books (Ooi & Liew,

2011), or healthcare (Yeoman, 2010). Savolainen also tries to distinguish the seeking of orienting information from practical information, with the former describes a more passive exposure to information than the later but constitutes a major part of daily information seeking scenarios. When comparing the information seeking practice of middle-class and working-class users, Savolainen found that workers seem to depend more on immediately available information sources than the middle-class users, which might be problematic since information accessibility does not necessarily translate into information quality.

McKenzie (2003) 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. Comparing to Savolainen's model, McKenzie gave equal importance to active and non-active information seeking, and therefore broadening the context of the concept. In this research, we ask questions about users who engage in active information-seeking online.

**Research Questions 1:** *Which social groups are more likely to use search engines or other search functions within apps to actively or purposefully seek for information online? In addition to demographic factors such as age, education level, and gender, do users' experiences with the Internet influence the use of search engine for information-seeking?*

### **1.1.2 Information encountering or serendipity.**

While information-seeking practices are prevalent in everyday life, with the increasing diversity of information available on the Internet, users sometimes encounter useful and interesting information without purposefully seeking for it. Such unexpected encounter or discovery of information is called "information encountering" (p. 25), which

occurs when users bump into information in their daily routines (Erdelez, 1999). The experience of information encountering is sometimes termed as serendipity by information scholars, which defines both the condition and the strategy of the knowledge creation process when users' mental efforts lies on the significance of a piece of information. However, unlike information encountering, serendipity could "go beyond accidental" and could be "actively sought" (Foster & Ford, 2003, p. 336).

Comparing to information-seeking practices, in which locating useful information is often the purpose of an information activity, information encountering is often the by-product of other everyday activities. Similar to information-seeking practices, there are different types of information users when it comes to their experience of information encountering, with some more aware of information acquisition through information encountering than others. Research shows that information users who are active in purposive information seeking are also active in information encountering, and those who are passive information users in purposively seeking information are also passive in the other information scenarios (Pálsdóttir, 2010).

Higher sensitivity to information encountering benefits individuals by increasing the diversity of their information channels, particularly through making unexpected connections between existing information sources such as persons, events, locations, or subjects, and users' informational or non-informational need (Makri & Blandford, 2012a, 2012b). To benefit from information encountering, researchers identify that the user has to be open-minded towards new channels and also be willing to accept new information (Foster & Ford, 2003).

Digital platforms differ in their potential in facilitating information encountering. Researchers compared digital environments for their role in support serendipity and found that platforms that are *trigger-rich*, *enables connections*, and *leads to the unexpected* have

higher potential to support information encountering (McCay-Peet, Toms, & Kelloway, 2015). Social media outperform other digital environments to increase users' chances of information encountering, with the following features embedded 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 empirical studies have studied the complexities of information encountering or serendipity experience; nevertheless, there is a lack of research on how different types of information users, with various strategies in information encountering and differentiated levels of digital skills, will be influenced by this means of information acquisition.

## **1.2 The use of the Internet and everyday life information seeking.**

Previous research on everyday life information seeking has found that with the adoption of information and communication technologies, the Internet or mobile phones have become one of the most important information resources (Agosto & Hughes-Hassell, 2005; Savolainen, 1997). Information from social networks still play important roles 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, crossing the boundaries between offline and online social networks, and find information from sources beyond users' immediate social circle. Researchers found that SNS platforms such as Facebook are valued by users more than a tool for social networking, but also for seeking information to meet information needs (Sin & Kim, 2013). As Spink and Cole (2001) argued, the Internet has an interactive potential and could bring hybrid information source to a wider audiences across more diverse social sectors.

Meanwhile, the huge amount of information and information sources available on the Internet creates challenges for some users to fully benefit from using the Internet for information seeking. For example, Savolainen and Kari studied the conceptions of the Internet by information users and found that many users have difficulties in define the Internet, with some of them view the Internet as indefinite and information sources “poorly organised”(Savolainen & Kari, 2004, p. 225). Difficulties in acquiring relevant information needed also lead to a critical repertoire view of the Internet among users who are interested in information seeking for self-development purposes (Savolainen, 2004). An important barriers identified in empirical studies is the difficulty to identify trustworthy information from conflicting information sources, as well as challenges in coping with anxieties and disorientations from receiving too much information (Loudon et al., 2016). Empirical research on the use of digital technologies for information seeking has also found that socioeconomic and demographic variables such as gender are associated with the outcomes of information seeking practices (Sin, 2016).

It is thus worth noticing the influence of digital technologies on facilitating everyday information practices, as well as the sociotechnical dynamics of differentiated affordance of information technologies. Given the prevalence of automatically generated and recommended information sources that have increasingly replaced traditional information sources, a reflexive analysis of such digital platforms is also necessary (Davenport, 2010). Therefore, there is increasingly a 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).

**Research Questions 2:** *What are the major barriers users have when seeking information online? For non-users of search engine or other search functions to navigate*

*information-seeking online, what are the technical or social approaches they adopt to find the information they need?*

## **Methods**

Empirical research on everyday life information seeking has mainly applied qualitative and field methods to collect user behavioral data from diverse groups of participants who seek information in a naturalistic settings (Carey, McKechnie, & McKenzie, 2001). However, most of the empirical studies in the field confines to qualitative approaches, for example, individual interviews, focus group studies, critical incident (CI) review, which leads to rich insights into individuals' emotions, feelings, subjective experiences in information seeking. Nevertheless, a lack of quantitative or mixed methods approaches means that much of the social, economic, and organizational characteristics of information seeking practices remains understudied.

### **2.1 Field sites: a village and a factory**

Ethnographic research on ICTs in China has focused either on rural (McDonald, 2016) or urban areas (Wang, 2016), while few compares the two communities. This article addresses the gap in empirical studies by studying both rural and urban sites in a county (Happy Valley County<sup>1</sup>) in Henan province. Fieldwork in a village and a factory each took 6 month and was conducted in 2017 and 2018 respectively. 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. According to the National Bureau of Statistics of China, Henan ranked in the middle among all provinces in consumption per capita, with on average 16,043

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<sup>1</sup> Fictional names were used for all field sites.

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). Second, I selected Henan rather than other Central China provinces because of my familiarity with the local accent and social environment.

## **2.2 Data collection**

Empirical studies of everyday life information seeking often use qualitative methods such as interviews to understand the cognitive and behavioural process involved in finding information for problem-solving. In this research, I applied a mixed methods approach that integrated surveys with in-depth interviews and focus group studies. The mixed methods approach also requires “connections, integration, or linking” (p. 50) of two perspectives, more than merely collecting two sets of data (Creswell, 2015). Therefore, quantitative and qualitative approaches in this study were used sequentially and with a retrospective and dynamic process to achieve a fully integrated mixed design.

### **2.2.1 Survey.**

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. The use of stratified sampling in this stage is advantageous for grouping individuals who shared similar residential or working locations, which made collecting survey data more efficient. At the first stage, each community was divided into different strata according to either the production teams or factory departments. At the second stage, within each stratum, a random sample of individuals was selected to participate in the survey. Instructions and survey questions were read to the respondents by me, with each took 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.

### 2.2.2 Structured interview and focus group studies.

In addition to 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. In Fossil village, 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 experience, 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. In Western factory, 30 survey respondents who are representative of different groups according to the variables as mentioned above were invited to participate in individual interviews. Four focus group studies, each consisting of four participants from different groups, were conducted to check if data saturation has been reached.

Table 1 Background information of two field sites

| Research Site             | Fossil Village  | Western Factory |
|---------------------------|-----------------|-----------------|
| Population                | 1025            | 8000            |
| Major industry            | Agriculture     | Manufacturing   |
| Basic unit                | Production team | Department      |
| Distance to county centre | 37.8 km         | 5.1 km          |

## Results

### 3.1 Descriptive data analysis

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

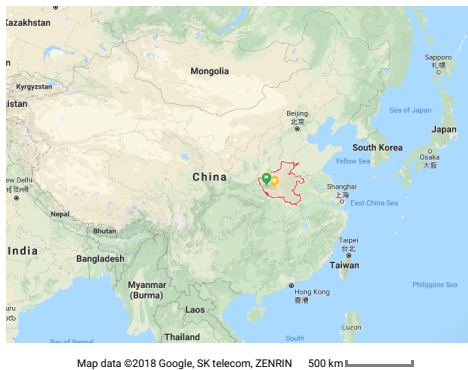


Figure 1 Location of Henan Province in China (Yellow label indicates the location of Fossil Village; Green label shows the location of Western Factory and Happy Valley County)

Figure 2 Picture of Happy Valley County Centre



Figure 3 Mobile payment QR code in a local bicycle repair shop

Figure 4 Electronic-bike sharing system (Picture source: Happy Valley official WeChat account)

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 occupational 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. 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 among the urban migrants. Rural migrant workers also tend to spend longer time working outside than their urban counterparts. The penetration rate of computers and mobile phone devices in the rural sample has reached 41.66 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.

Table 2 Descriptive statistics of demographic variables in Fossil Village and Western Factory sample

| Variable Name                                | Fossil Village (N <sub>1</sub> = 128) |                                                            |            | Western Factory (N <sub>2</sub> = 229) |                                                        |            |
|----------------------------------------------|---------------------------------------|------------------------------------------------------------|------------|----------------------------------------|--------------------------------------------------------|------------|
|                                              | <i>n</i>                              | Frequency                                                  | Percentage | <i>n</i>                               | Frequency                                              | Percentage |
| <b>Age<sup>a</sup></b>                       | 122                                   | Mean = 43.90<br>SD = 10.30<br>min = 18<br>max = 81         |            | 213                                    | Mean = 36.57<br>SD = 8.17<br>min = 23<br>max = 59      |            |
| <b>Gender</b>                                | 128                                   |                                                            |            | 222                                    |                                                        |            |
| Male                                         |                                       | 63                                                         | 49.22      |                                        | 99                                                     | 44.59      |
| Female                                       |                                       | 65                                                         | 50.78      |                                        | 123                                                    | 55.41      |
| <b>Marital Status</b>                        | 128                                   |                                                            |            | 222                                    |                                                        |            |
| Single                                       |                                       | 4                                                          | 3.12       |                                        | 26                                                     | 11.71      |
| Married                                      |                                       | 124                                                        | 96.88      |                                        | 196                                                    | 88.29      |
| <b>Have Child</b>                            | 128                                   |                                                            |            | 222                                    |                                                        |            |
| No                                           |                                       | 3                                                          | 2.34       |                                        | 36                                                     | 16.22      |
| Yes                                          |                                       | 125                                                        | 97.66      |                                        | 186                                                    | 83.78      |
| <b>Education</b>                             | 128                                   |                                                            |            | 226                                    |                                                        |            |
| Middle School (or below)                     |                                       | 99                                                         | 77.34      |                                        | 16                                                     | 7.08       |
| High School                                  |                                       | 23                                                         | 17.97      |                                        | 50                                                     | 22.12      |
| Occupational School                          |                                       | 4                                                          | 3.12       |                                        | 103                                                    | 45.58      |
| Undergraduate (or above)                     |                                       | 2                                                          | 1.56       |                                        | 57                                                     | 25.22      |
| <b>Monthly Disposable Income<sup>a</sup></b> | 127                                   | Mean = 2434.02<br>SD = 1280.012<br>min = 291<br>max = 8333 |            | 205                                    | Mean = 2274.39<br>SD = 964.92<br>min = 0<br>max = 5000 |            |
| <b>Migrant Experience</b>                    | 128                                   |                                                            |            | 221                                    |                                                        |            |
| No                                           |                                       | 99                                                         | 77.34      |                                        | 141                                                    | 63.80      |
| Yes                                          |                                       | 29                                                         | 22.66      |                                        | 80                                                     | 36.20      |
| <b>Migrant Location</b>                      | 29                                    |                                                            |            | 78                                     |                                                        |            |
| 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       |
| <b>Migrant Years<sup>a</sup></b>             | 29                                    | Mean = 4.55<br>SD = 4.24<br>min = 0.25<br>max = 17         |            | 77                                     | Mean = 2.68<br>SD = 3.23<br>min = 0.1<br>max = 15      |            |

<sup>a</sup> Age, Monthly Income, and Migrant Years are continuous variables, which are measured by years, Chinese Yuan, and years respectively.

Table 3 Descriptive statistics of ICT adoption and experience variables in Fossil Village and Western Factory samples

| Variable Name                         | Fossil Village (N <sub>1</sub> = 128) |                                                    |            | Western Factory (N <sub>2</sub> = 229) |                                                    |            |
|---------------------------------------|---------------------------------------|----------------------------------------------------|------------|----------------------------------------|----------------------------------------------------|------------|
|                                       | <i>n</i>                              | Frequency                                          | Percentage | <i>n</i>                               | Frequency                                          | Percentage |
| <b>Has PC</b>                         | 128                                   |                                                    |            | 224                                    |                                                    |            |
| No                                    |                                       | 67                                                 | 52.34      |                                        | 13                                                 | 5.80       |
| Yes                                   |                                       | 61                                                 | 47.66      |                                        | 211                                                | 94.20      |
| <b>Has Mobile Phone</b>               | 128                                   |                                                    |            | 226                                    |                                                    |            |
| No                                    |                                       | 5                                                  | 3.91       |                                        | 0                                                  | 0          |
| Yes                                   |                                       | 123                                                | 96.09      |                                        | 226                                                | 100        |
| <b>Mobile-Only User</b>               | 80                                    |                                                    |            | 225                                    |                                                    |            |
| No                                    |                                       | 18                                                 | 22.50      |                                        | 115                                                | 51.11      |
| Yes                                   |                                       | 62                                                 | 77.50      |                                        | 110                                                | 48.89      |
| <b>Has Mobile Internet</b>            | 123                                   |                                                    |            | 226                                    |                                                    |            |
| No                                    |                                       | 41                                                 | 33.33      |                                        | 0                                                  | 0          |
| Yes                                   |                                       | 82                                                 | 66.67      |                                        | 226                                                | 100        |
| <b>Has PC Internet</b>                | 61                                    |                                                    |            | 211                                    |                                                    |            |
| No                                    |                                       | 3                                                  | 4.92       |                                        | 5                                                  | 2.37       |
| Yes                                   |                                       | 58                                                 | 95.08      |                                        | 206                                                | 97.63      |
| <b>Has Internet</b>                   | 128                                   |                                                    |            | 227                                    |                                                    |            |
| No                                    |                                       | 33                                                 | 25.78      |                                        | 0                                                  | 0          |
| Yes                                   |                                       | 95                                                 | 74.22      |                                        | 227                                                | 100        |
| <b>PC Years<sup>a</sup></b>           | 57                                    | Mean = 6.18<br>SD = 3.82<br>min = 1<br>max = 22    |            | 209                                    | Mean = 8.42<br>SD = 3.68<br>min = 0.5<br>max = 20  |            |
| <b>Mobile Years<sup>a</sup></b>       | 119                                   | Mean = 11.42<br>SD = 5.05<br>min = 2.0<br>max = 27 |            | 225                                    | Mean = 11.67<br>SD = 4.31<br>min = 0.5<br>max = 25 |            |
| <b>Time Spent Online <sup>a</sup></b> | 80                                    | Mean = 2.23<br>SD = 1.81<br>min = 0.17<br>max = 8  |            | 217                                    | Mean = 3.22<br>SD = 2.56<br>min = 0.17<br>max = 14 |            |

<sup>a</sup> PC Years, Mobile Years, and Time Spent Online are continuous variables, which are measured by years, Chinese Yuan, and years respectively.

### 3.2 Modelling the information seeking practices in everyday context

Having collected random sampled quantitative survey data in Fossil Village and Western Factory. We first want to examine what demographic or sociotechnical factors influences the use of search engine and everyday life information-seeking practices. Dependent variables include frequency of using search engine; to what extent does the lack of information sources influences information seeking; to what extent does the difficulty to distinguish information users want to seek from advertisement influences information seeking; to what extent do users feel the lack of digital skills influences information seeking; to what extent do users feel overwhelmed by the massive amount of information; to what extent do users become Internet proxies for others.

As all dependent variables are ordinal, we applied ordered logistic regressions that generated 12 different models, each dependent variable has 2 models, with the first model fits only demographic variables and second one fits both demographic and Internet use variables. Odd ratios (OR) of coefficients in each model are calculated by exponentiating the values of estimates.

Model 2 shows that the odds of using search engine for users with education level at undergraduate and high school level are 6.277 and 2.963 times higher than users whose education level is below high school level. Older generation, male, and users with children (under 18 years old) have higher odds to use search engine than younger generation, female, and users without children. It is very interesting that once adding in Internet use variables, we found positive association between time spent online and the frequency of using search engine.

Demographics seem to be major factors behind information seeking practices. Comparing to users who attend academic-focused training programs, users who attend occupational schools have higher odds to be lack in information sources, so do older

generation users (Model 4). Model 6 suggests that older generation users and users with children have higher odds of lacking in skills to select information from advertisement and misinformation, also higher odds of failing to distinguish trustworthy information are users with education level below high school, as compared to users whose education level is above undergraduate. Model 8 shows that older generation users, users with children have higher odds to lack capacities to select trustworthy information from advertisements. Older generation users, users with children, and users who do not have migrant experience, users with lower education, and rural users have higher odds to lack skills in completing information seeking. It is also interesting to note that users who are less experienced with mobile phone and PC both have higher odds to lack information-seeking skills. Model 10 shows that users who have children have 1.542 times higher odds than users without children to feel information overload. Finally, we found that female users, users who have children, users with lower income level, users with higher education background and rural users are more likely to become other people's information proxy (Model 12).

Table 4 Ordered logistic regression models 1-12

|                               | Use of search engine |       |          |       | Information seeking_Lack Sources |       |          |       | Information seeking_Lack Selection |       |          |       |
|-------------------------------|----------------------|-------|----------|-------|----------------------------------|-------|----------|-------|------------------------------------|-------|----------|-------|
|                               | 1                    |       | 2        |       | 3                                |       | 4        |       | 5                                  |       | 6        |       |
|                               | OR                   | std.  | OR       | std.  | OR                               | std.  | OR       | std.  | OR                                 | std.  | OR       | std.  |
| Age                           | 0.959***             | 0.010 | 0.950*** | 0.015 | 1.043***                         | 0.010 | 1.065*** | 0.016 | 1.007                              | 0.010 | 1.035*   | 0.015 |
| Gender Female                 | 0.485**              | 0.225 | 0.418**  | 0.275 | 1.485                            | 0.232 | 1.474    | 0.273 | 0.973                              | 0.231 | 1.031    | 0.273 |
| Children Yes                  | 1.399***             | 0.075 | 2.572*** | 0.073 | 1.37***                          | 0.068 | 1.063    | 0.064 | 1.302***                           | 0.075 | 1.338*** | 0.064 |
| Migrant Worker Yes            | 1.758*               | 0.250 | 1.471    | 0.292 | 0.712                            | 0.239 | 0.689    | 0.278 | 0.625                              | 0.239 | 0.641    | 0.276 |
| Monthly Income                | 1.000                | 0.000 | 1.000    | 0.000 | 1.000                            | 0.000 | 1.000    | 0.000 | 1.000                              | 0.000 | 1.000    | 0.000 |
| Education High school         | 2.381**              | 0.254 | 2.678**  | 0.295 | 0.629                            | 0.253 | 0.926    | 0.290 | 1.003                              | 0.255 | 1.466    | 0.291 |
| Education Occupational School | 4.339***             | 0.182 | 2.963*** | 0.205 | 0.737                            | 0.182 | 1.562*   | 0.198 | 0.692*                             | 0.184 | 1.294    | 0.200 |
| Education Undergraduate       | 8.877***             | 0.205 | 6.277*** | 0.230 | 0.581**                          | 0.198 | 1.234    | 0.222 | 0.321***                           | 0.203 | 0.607*   | 0.229 |
| Residence Urban               | 1.654*               | 0.224 | 1.442    | 0.284 | 0.708                            | 0.205 | 0.555    | 0.266 | 0.869                              | 0.204 | 0.611    | 0.266 |
| Mobile Years                  |                      |       | 1.000    | 0.038 |                                  |       | 1.012    | 0.038 |                                    |       | 0.985    | 0.037 |
| PC Years                      |                      |       | 1.006    | 0.042 |                                  |       | 0.930    | 0.040 |                                    |       | 0.925    | 0.041 |
| Time Spent Online             |                      |       | 1.277*** | 0.063 |                                  |       | 0.928    | 0.059 |                                    |       | 1.001    | 0.059 |
| Mobile Only Yes               |                      |       | 1.081    | 0.289 |                                  |       | 1.106    | 0.281 |                                    |       | 0.971    | 0.287 |
| AIC                           | 662.751              |       | 518.133  |       | 575.334                          |       | 471.507  |       | 571.683                            |       | 474.351  |       |
| Residual Deviance             | 636.751              |       | 484.133  |       | 551.334                          |       | 439.507  |       | 547.683                            |       | 442.351  |       |
| Number of observations        | 263                  |       | 213      |       | 266                              |       | 216      |       | 267                                |       | 217      |       |

|                               | Information seeking_Lack Skills |       |          |       | Information seeking_Overload |       |          |       | Information seeking_Being proxy |       |          |       |
|-------------------------------|---------------------------------|-------|----------|-------|------------------------------|-------|----------|-------|---------------------------------|-------|----------|-------|
|                               | 7                               |       | 8        |       | 9                            |       | 10       |       | 11                              |       | 12       |       |
|                               | OR                              | std.  | OR       | std.  | OR                           | std.  | OR       | std.  | OR                              | std.  | OR       | std.  |
| Age                           | 1.057***                        | 0.012 | 1.11***  | 0.018 | 1.021*                       | 0.010 | 1.029    | 0.015 | 0.94***                         | 0.010 | 0.970    | 0.016 |
| Gender Female                 | 1.052                           | 0.236 | 1.158    | 0.274 | 0.913                        | 0.226 | 0.983    | 0.267 | 0.506**                         | 0.236 | 0.4**    | 0.276 |
| Children Yes                  | 0.953                           | 0.072 | 1.481*** | 0.066 | 1.196*                       | 0.072 | 1.542*** | 0.063 | 1.608***                        | 0.086 | 2.442*** | 0.078 |
| Migrant Worker Yes            | 0.323***                        | 0.249 | 0.453**  | 0.281 | 0.808                        | 0.240 | 0.798    | 0.275 | 1.082                           | 0.256 | 0.964    | 0.291 |
| Monthly Income                | 1.000                           | 0.000 | 1.000    | 0.000 | 1.000                        | 0.000 | 1.000    | 0.000 | 1.000                           | 0.000 | 0.99*    | 0.000 |
| Education High school         | 0.587*                          | 0.264 | 0.685    | 0.306 | 1.022                        | 0.254 | 1.327    | 0.298 | 1.613                           | 0.260 | 1.914*   | 0.305 |
| Education Occupational School | 0.35***                         | 0.192 | 0.602*   | 0.209 | 0.826                        | 0.181 | 1.094    | 0.196 | 3.51***                         | 0.185 | 5.258*** | 0.206 |
| Education Undergraduate       | 0.273***                        | 0.205 | 0.517**  | 0.227 | 0.59**                       | 0.198 | 0.687    | 0.220 | 2.229***                        | 0.199 | 3.751*** | 0.225 |
| Residence Urban               | 0.149***                        | 0.237 | 0.146*** | 0.290 | 0.892                        | 0.205 | 0.725    | 0.268 | 0.792                           | 0.228 | 0.537*   | 0.303 |
| Mobile Years                  |                                 |       | 0.92*    | 0.039 |                              |       | 0.955    | 0.037 |                                 |       | 1.007    | 0.038 |
| PC Years                      |                                 |       | 0.896*   | 0.043 |                              |       | 0.969    | 0.041 |                                 |       | 0.944    | 0.043 |
| Time Spent Online             |                                 |       | 0.954    | 0.060 |                              |       | 1.029    | 0.061 |                                 |       | 1.104    | 0.060 |
| Mobile Only Yes               |                                 |       | 0.710    | 0.287 |                              |       | 0.671    | 0.276 |                                 |       | 0.738    | 0.284 |
| AIC                           | 511.029                         |       | 420.537  |       | 587.813                      |       | 492.044  |       | 529.496                         |       | 441.3495 |       |
| Residual Deviance             | 487.029                         |       | 388.537  |       | 573.813                      |       | 460.0442 |       | 505.496                         |       | 409.3495 |       |
| Number of observations        | 269                             |       | 218      |       | 268                          |       | 217.000  |       | 259                             |       | 210      |       |

Note: \*p&lt;.05, \*\* p&lt;.01, \*\*\*p&lt;.001

### 3.3 Pulling: accessing and mastering search engine and in-app search

While the adoption of smartphones has reached more than 90 per cent in both of my field sites, users are profoundly divided in the types of Internet services they use on daily basis and the level of Internet skills they have. For users who have access to search engine, online information yields informational and sometime financial benefits. Hua's doctor once prescribed several medicines on the back of the hospital report. Hard to read some of the doctor's hand-writings, she looked for few recognizable characters on the prescription and found the full names, as well as effects of the medicines online. High competencies of utilizing search functions could assist daily management of e-commerce for rural entrepreneurs. Fangfang is a 30-year-old business owner of an Alibaba store, she sells home-grown mushrooms and other local agricultural products online. In April 2016, Fangfang participated in a workshop that aim to enhance villagers' e-commerce skills. One of the most important skills she learnt from the workshop, although not directly linked to e-commerce, is "how to make decisions of online purchases by comparing different products listed in search results on e-commerce platforms." Fangfang's own business also benefited from using online searches:

"When I sell mushroom to middlemen, I use both online and offline price information. For example, I would search for retailers on Taobao who also sell mushrooms nationwide and see what price they set. Depending on the quality of my mushroom, I either set the price much lower than the online price [as a promotion], or I divided the mushroom into different types and sell the high-quality ones more expensive [than the average market price]. I don't set the price of my mushroom the same price as the average [price online]."

Fangfang is not the only person who find in-app search on e-commerce platforms advantageous, Shi, 41, manages a construction team, he also enjoys gardening and growing flowers in his free time. His knowledge of plants mainly comes from searching for tips of growing different types of plants on Taobao. According to him, "information about plants, for

example, if they prefer direct sunlight or shades, is much useful and straightforward than [search results] on search engines.” A self-taught PC Internet user himself, Shi also uses search engine on computers to search for maps and project blueprints to assist his work, he also compares prices of raw materials from different factories online.

“To be honest, I never went to colleges, only [spent] two years in high school. I couldn’t do anything too [digitally] complex. By using online searches, I found blueprints online.

Fortunately, I learned to use PC back in 2000s. Now I search for every material my team needs online, from Baidu to Taobao to Sina. For example, I am looking for a handle for public toilet. I search for different products on all platforms to compare price and quality, and finally decide where [which factory] to purchase. Although online searches couldn’t provide detailed information about the materials I am looking for, but they provide all the background information to assist my decision making.”

For most information users who have experiences of accessing search engine, purposeful search for information is often embedded into daily life and sometimes even become unnoticeable. For example, many parents living in Fossil village use Baidu or Sogou to help their children in homework questions. Yan showed me how she helped her son to find adjectives to describe shadows on Baidu app on her smartphone. With many parents in Fossil village wish promising futures for their children through them achieving excellence in Chinese education, search engine’s potential in assisting education at home becomes one of the positive sides of technology adoptions in this rural community.

Search engines are useful information sources when users are faced with misinformation, especially when it is related to fraud that has spread across the country. However, even for frauds that has been reported by Chinese mainstream media, Baidu often fails to warn users of financial risks involved. Yu, 51, lived in the county but sometimes returned to Fossil Village on weekends, many of her neighbors has advocated for an organization called *Shanxinhui* (善心汇) and asked her to invest in the membership to receive

“high interests rates and monthly cash payment.” Yu has her doubts against the organization and searched on Baidu. The search results led to “controversial viewpoints” with some top ranked webpages promoting the organization and others reporting the organization as a Ponzi scheme. As of July 2017, after the individuals behind *Shanxinhui* were arrested on suspicion of financial fraud, Yu was still indecisive in whether or not to join in the membership. It is true that having access to search engine helped Yu to postpone her decision to join and might prevent her from being defrauded and becoming the last groups of targets. Nevertheless, lacking more information literacy to distinguish opinions on online forums from news reports from trustworthy news agencies also leave information have-less users like Yu still vulnerable to misinformation.

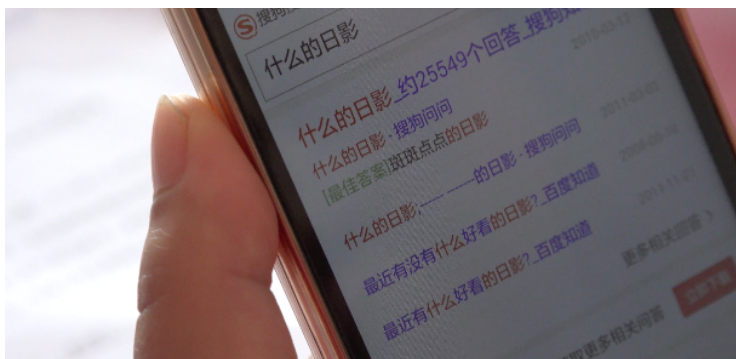


Figure 5 Yan use Sogou to find suggested word combinations for her son

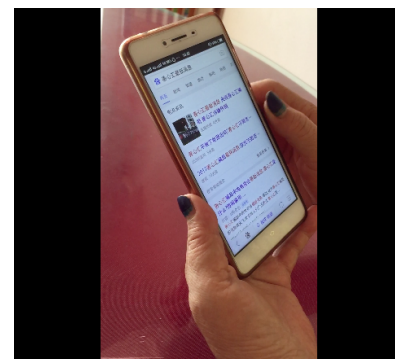


Figure 6 Yu found news reports of a fraud through Baidu search

### 3.4 Encountering: barriers to the use of search engine and information seeking through serendipity

Among interviewees in Fossil village, older generation Internet users, most of whom only recently learned to “play with” (玩 wan, or 扣 kou) smartphone, find search engine especially hard to adopt, comparing to other Internet functions such as social media such as WeChat or entertaining apps such as iQiyi. Barriers include lack of confidence to explore search engine apps, difficulties to describe information needs or input queries, and lack of interest in finding information beyond intermediate social circles.

Yue, aged 48, is a very outgoing housewife in Fossil Village. She only started using smartphone for less than 4 years, when her son taught her how to chat with friends and families and read Tencent news on WeChat. She also downloaded a dancing app, Tangdou Group Dance (糖豆广场舞 *tangdou guangchangwu*), and a card game app, fighting the landlord (斗地主 *dou dizhu*), by “randomly click on the advertisement below online videos of card games”. She found smartphone to be both “strange but delicate” (奇巧 *qiqiao*), because she was able to “find some things with ease”, but “difficult to repeat the same process the next time”. Yue has never used search engine or other in-app search functions, she has heard of Baidu and has seen the icon of the app on her smartphone, but she felt her “skills are not enough to use such functions”, even though she has great interests in topics such as women health and cooking skills. For Hong, on the other hand, spelling *pinyin* (拼音) is the most difficult part in using Baidu. In the walk-through demonstration, he showed me due to a misspell of character, from *xueya* (blood pressure) to *xieya* (the pronunciation of the same word in Henan dialect), he failed to find search results on how to decrease and manage blood pressure. Fang is 2 years younger than Yue, unlike Yue, her reason of not using search engine is to maintain her inner tranquility (六根清淨 *liugen qingjing*) and not to be disturbed by information from beyond the rural community:

“If you see too much [online] but you couldn’t satisfy your wishes, you will be depressed. I am satisfied with only socializing with a handful of people... I know that if I think too much, I will be disappointed, 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.”

When Yue discussed her lack of interest to use the Internet, she attributed her lack of interests for search online to her age and gender:

“I never search for anything on my smartphone. I am almost 50s, no longer a young girl or a man who still wants a life. My ‘Baidu’ are people living nearby. You need to know women in the village never overthin: we are too exhausted [with taking care of the families],”

However, there are some interviewees who despite their non-use of search engines or other search functions, still manage to ensure daily encountering of information through “pushed” information on news apps or social media. Nan, 48, performed in the village Henan opera team when she was young and had maintained a high interest for acquiring information from all sources available. She never used Baidu or other in-app search functions, but her view of information seeking is to “pay attention to any information” in her free time. Having a school-aged daughter, free time for her often means very short slots between school break and family chores. She benefits especially from WeChat moments, where friends and families share local news about “social instabilities” (社会不稳定因素, *shehui buwending yinsu*). Tencent news is also her main source of information, in addition to occasional newspaper reading and skimming through bulletin boards set up by the local government in the town centre. It is interesting that for Nan, although her active seeking of information through search engine is minimal, she is very careful to spend time only on “information that is locally relevant or about state affairs”. Another interesting skill she has is to use information collection functions on smartphones, which, after periods of collecting, becomes her own approach to finding and saving information she needs:

“Sometime when I see useful information such as healthcare on WeChat, I pressed the link and save it into my ‘favourites’. I also collect beautifully written articles about life or romance and read repeatedly whenever I have time... It helps with my own life: Sometimes the articles teach me how to handle intimate relationship with my husband, or, for example, how to control my bad temper. I now gradually realized that fighting [with my partner] is harmful for my children and for myself.”

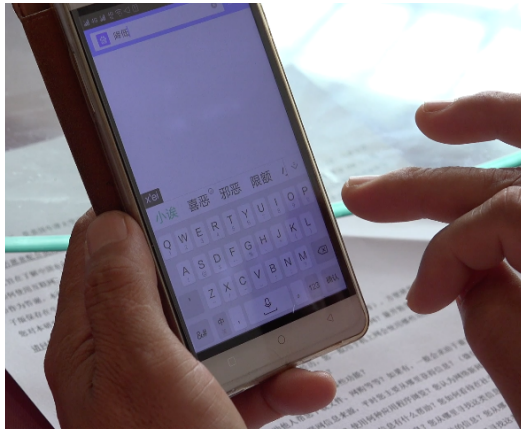


Figure 7 Hong's misspelling of blood pressure led to one unsuccessful search on Baidu



Figure 8 Nan's information encountering for romantic information through WeChat articles

### 3.5 Urban-to-Rural proxies: From providing device to information

For users to learn search engine and for users who prefer encountering information through pushed information to smartphone devices, we found that information proxies, those who introduce skills and knowledge about information seeking tools and trustworthy information sources are crucial. In many cases in the fieldwork, we found that users who have experiences living or working in urban areas are often information proxies for the rural community. This echoes what Oreglia (2015) observed a “sent-down” mobile phone, or a technology transfer from urban to rural China. However, different from Oreglia’s study, we found an increasing importance of such proxies in assisting online information seeking.

Bin, a young doctor who obtained his undergraduate degree from another city in Henan province is one of the few young generations who live in the village. He is also information proxy for many of his neighbours. With adult children working or living in other cities, his neighbours often need his face-to-face demonstration when it comes to technical or information help about the Internet. For example, one of his neighbours was looking for a new television and turned to him to search for different types of television on his smartphone to choose from. Yan also helps her neighbours to find information about weather online,

especially during winter when mushroom growing is most sensitive to the change of temperature.

Fact-checking or helping to distinguish trustworthy information source is another new role Internet proxy play in information seeking. For example, Liuliu studies in a neighbouring city in Henan. She once received edited videos of a dragon flying out of the pond in her family WeChat group, “they all believed the video apparently”, she said. Having knowledge about falsified videos and skills to search for news reports, she quickly replied in the group and listed her reasons of not believing in the video. When Yu received message on mobile news app that another severe earthquake will take place every 2 to 3 years in China, she forward the news through WeChat to her son, who runs a logistic company in the county, to double check. Her son later told her that online news, if written without journalistic evidence such as interviews or live videos, could also circulate rumours and misinformation.

However, information sharing from proxies via WeChat, which is one of the most important information sources for users who only seek information through encountering, is limited between different generation users. Liuliu describes the exchange of information between her parents and her:

“I shared news articles about health care and advancement in medicine [on WeChat], which I thought was extremely useful. But they [the parents] only shares dancing tutorials. When I asked them about the information I shared, they just laugh...I have a feeling that our values are so different that she could not understand these articles [I shared].”

## Discussions

Using data collected from extensive fieldwork in both rural and urban China, we explored the relationships between demographic and Internet use factors and information seeking practices in everyday life context. Modelling of the use of search engine for active seeking of information online, and information seeking practices in everyday life suggests that both demographic and Internet use factors are associated with the use of search engine and the lack of digital skills for information seeking. Echoing previous research on digital divides, we found that there is a generational and educational gap in many dimensions of information seeking practices in everyday life. We also found that gender and whether or not users have children under 18 years old might hinder the use of search engines or becoming information proxy for others. Users who have children are also more susceptible to information overload. More importantly, we found that the geographical mobility of having worked as migrant workers outside of the county is positively associated with having equipped with digital skills for information seeking.

The qualitative interview reveals the mechanisms behind barriers to the use of search engine and showcases how information have-less users, despite their lack of training or experiences of the information system, have developed new approaches towards finding the information they need. We also discuss the changing role of Internet proxies from bringing technological devices from urban to rural, to increasingly assist neighbours and families in the village in the information seeking practices, such as accomplishing information seeking tasks, fact-checking, recommending trustworthy sources and the like.

Through the triangulation of quantitative and qualitative data, we demonstrate the complexities and variances in users' everyday life information seeking practices. We also show that after achieving basic Internet access in rural and urban China, scholars need to focus on the increasing divides in how users handle the massive amount of digitalised

information available online, and how different approaches to seeking everyday information could lead to different outcomes of searches. Meanwhile, our study also reflects on the concept of digital divide itself: we found that non-users of search engines, who has been considered as lagging behind tech-savvy users in participating in capital-enhancing Internet activities, could potentially benefit from online information through individualised strategies that combines constant information encountering with information collection. Finally, we are concerned about the influence of misinformation in China, especially in rural China. Through cases of financial frauds, we found that lack of training or knowledge about the structure of search engine and background information about Internet sources such as forums, independent news media websites, and sponsored advertisement online, many rural users face risks of being recruited in online fraud or misled by online advertisements. While government-initiated training such as e-commerce workshops in Fossil village intends to facilitate business online, areas such as healthcare, personal finance, or education in everyday lives are often overlooked by top-down informatisation plans. We, therefore, argue for attention from both the academic and policy makers on the embeddedness of the Internet in routine, non-work related, and everyday contexts, which has already profoundly influenced individuals' wellbeing.

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