Grassroots information divides in China:
Theorising everyday information practices in the Global South

Abstract

The internet is becoming a major source of everyday information, yet existing research often focuses on specific information seeking contexts such as health, climate change, news, or hobbies. In this paper, we put forward a more holistic theoretical model of information seeking practices in everyday life that combines the social phenomenological perspective of Savolainen (2008) and the domestication framework proposed by Haddon (2004). We extend the cultural context to the Global South countries, where there is less research on "mobile first" societies centred on emerging mobile platforms. Based on extensive and mixed-methods fieldwork in rural and industrial China about everyday information seeking practices, the paper goes beyond previous research about digital divides in internet access and internet literacy. Instead, it focuses on divides in everyday information seeking practices. We argue that new divides are emerging between those with more restricted everyday internet uses and those with broader and more diverse ones. We compare everyday information practices and divides in China with those in India and show how a theory of digital divides in everyday information seeking practices can be applied beyond both countries to the Global South. Such a theory can also contribute to the design of informatisation policies.

1. Introduction

The internet is increasingly becoming an essential source of everyday information. In the Global South in particular, the rapid adoption of mobile internet and digital infrastructures are making social media, search engines, and news apps accessible to users' fingertips. However, this has also meant that new information divides are emerging, both between various demographic groups and between users who have more diverse as against those who have more restricted online information sources. In this paper, we examine everyday information seeking practices in two countries in the Global South. Like India, China is a "mobile first" society, and by examining everyday information practices in urban and rural areas and the digital information infrastructures of both countries, we will see that they hold broader lessons for information practices in the Global South.

Before we proceed with our account of everyday information practices, it will be useful to give readers who are not familiar with the context a brief overview of Chinese digital information infrastructures. In China, companies like Baidu (the equivalent of Google), Alibaba (eBay or Amazon), and Tencent (a mix between Facebook and Twitter) are as dominant as their equivalents outside of China. These services are ubiquitous in almost every aspect of daily life, from romance, shopping and commerce to health and education. A major difference from Western democracies is of course that the Chinese party-state is much more actively involved in shaping the digital infrastructure of these commercial providers and the government therefore shapes political information and news. Here, however, we are mainly interested in everyday life and information seeking that is not related to politics, formal work, or formal education. Instead, we focus on more private or domestic information practices. Nevertheless, as we indicate in the concluding section, these boundaries are sometimes blurred.

To return to the Chinese context, for mobile internet access, WeChat has become by far the most popular social media platform, adopted by more than 87.3% of Chinese internet users by the end of 2017 (CNNIC, 2018) with more than 938 million monthly active users.[1] This versatile and multi-functional app combines interpersonal communication, mass media broadcasting, and information seeking and sharing

functions (Chen et al., 2018). WeChat began mainly as a text messaging app, but it has become embedded in many aspects of everyday life, including information seeking, shopping, news reading, paying bills, and personal finance management [removed for review]. The most popular topics on "Public Accounts", WeChat's information channel service, are hobbies, lifestyle, and politics.[2]

Other popular platforms in China include Toutiao, often for news, and mainly in the form of short video clips. Douyin (TikTok's platform in the Chinese market) is also popular, recently surpassing global download figures for Facebook, Instagram, and YouTube. The video format is preferred particularly by rural users who have less experience with the internet. And apart from social media, a ranking of Chinese websites by Alexa shows that Baidu, Chinese biggest search engine, is ranked the most popular website in China. At the same time, traditional media such as Xinhua News Agency, People's Daily, and CCTV have seen increased visibility on digital media platforms, while government departments and agencies are also encouraged to have social media accounts. The co-evolution of official media and emerging digital media has created a multi-facetted information ecology on the Chinese internet (Yang, 2009).

A final distinctive feature of the internet in China is that access is primarily via mobile phones, as in much of the Global South. In both China and India, the decreasing cost of mobile data accounts for the popularity of mobile internet. The Mobile Connectivity Index provided by GSMA measures the affordability of mobile tariffs in different countries: Compared to UK and US, mobile tariffs in China and India used to be more expensive relative to the two countries' average income in 2014. But since then, the relative cost of mobile data in China and India has decreased and mobile tariffs were far cheaper in both countries than in the US in 2018. It will therefore be important to engage with the argument of Napoli and Obar (2014) that the mobile internet is inferior to desktop or PC internet in many aspects; or, in their words, that "mobile Web usage patterns related to finding and accessing information are significantly more constrained than PC-based Web usage patterns" (p.328). Hence, we will also make a brief comparison with India, another "mobile first" country.

2. Literature Review and Research Questions

2.1 Internet and information seeking in everyday life

Research on information seeking has emphasised information seekers - in contrast with communication studies which focuses on message receivers or audiences (Wilson, 1999). A prominent example of the former is Brenda Dervin's (1998) sense-making model, which "examine[s] the ways in which information helps rather than assuming, as most studies have, that help is inherent in information" (Dervin, 1999, p. 745). Järvelin has proposed combining such bottom-up approaches to information behaviour with top-down approaches such as experiments or simulations (Järvelin, 2016) and algorithmic sources, such as search engines, which could be included in such a model of information seeking (Ingwersen & Järvelin, 2005). Search engine practices have also been studied by means of triangulating search activity diaries and observation with in-depth interviews. Thus, Rieh (2004) conducted a qualitative study of user behaviours on search engines that showed how search engines were used for a variety of purposes in everyday life. Sundin et al. (2017) likewise analysed qualitative data collected from focus groups. They showed that search engines are becoming embedded in everyday lives to such an extent that the practice has become almost invisible to users. And for China, Jiang (2014) and Fuchs (2015) both examined the popular search engine Baidu from a political economy perspective.

But again, there is little scholarship that takes a more holistic of view of information seeking practices that extends beyond search engines and beyond academic and professional settings to everyday life. One of the main exceptions is Savolainen (1995) who first introduced the theoretical framework of everyday life information seeking (ELIS) for non-work-related contexts such as healthcare or hobbies. Savolainen draws on Bourdieu's sociological theory of habitus, which in this case refers to routine skills and knowledge in the individual's lifeworld or their "way of life". In communication science, a different framework, "domestication", has been developed to understand how digital technologies have become "tamed" as they move from early adopters and gradually become integral parts of everyday life (Haddon, 2004, p. 4). Berker, Hartmann, Punie and Ward summarise that "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

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for change is visible" (Berker et al., 2005, p. 14). Along similar lines, Ling (2012) has argued that the versatility of mobile phones has become taken-for-granted by users and become deeply embedded in everyday practices.

In the Chinese context, studies of everyday information practices include Zhang and Yu (2013), who reviewed empirical research on the information needs of the rural population. They highlight that these needs range from information about agricultural technology to market information, information about how to generate income, and policy information. Another survey of information sources among rural users in 2006 showed that relatives and friends as well as government promotion and TV were the most important information sources in rural areas (Hou et al., 2006). More recently, a survey of WeChat users found that its convenience for information seeking is among the most important reasons why people have adopted this mobile social application (Zhang & Liu, 2015). Drawing from a representative sample of elderly users in China, Sun and Zhou (2021) revealed that diversity in online activities and online social networks contributes to a more active social participation offline among senior netizens.

The domestication framework has also been used in China in ethnographic studies of rural households. McDonald and Oreglia, for example, examined the role of migrant workers in helping their families to become mobile internet users (Oreglia, 2013) and how different family members tailored internet uses individualised needs (McDonald, 2015). Beyond China, scholars who study developing countries have also examined the mundaneness and embeddedness of everyday internet uses in the Global South (Arora, 2019; Jeffrey & Doron, 2013). Finally, for our purposes here it is important to note that Zhang and Neyazi (2020) provide an overview of theories of digital media in the Global South from a communications perspective, focusing on India and China (see also removed for review).

When we turn to work on information practices and digital inequalities, both ELIS and domestication theoretical frameworks highlight the importance of understanding the adoption and use of digital technologies in everyday contexts. However, there is a lack of empirical evidence to help in theorising the various dimensions of everyday information contexts from a user-centric perspective. In other

words, what is needed is a theoretical framework which is 'bottom-up' and so combines domestication (examining settled habits rather than those of early adopters) with a phenomenological and everyday perspective (to capture information practices outside of work-related ones that are closer to user's actual needs). Our first research question therefore asks:

RQ1: What are the main dimensions of different types of everyday information that users seek online?

2.2 From access divides to everyday information divides

Answering this question will provide a baseline for probing further into the divides in information seeking. Here Donner (2015), who examined mobile internet uses in developing countries, suggests that, beyond the question of access, which dominated the early literature when few had access to mobile phones or to the internet, there are now new challenges for digital inclusion. The digital divides literature has thus shifted from the first level of digital divides (in the access and use of ICTs) to the second and third levels of divides in everyday internet usage and information practices (van Deursen & van Dijk, 2019). Digital divides are reflected in the fact that everyday information practices between rural and urban users are more unevenly distributed in developing countries than in developed ones (Robinson et al., 2020). Empirical studies on digital divides in the Global South countries have found, for example, that those who received lower levels of formal education, or in India, those with no or little of English, are more disadvantaged in adopting and using digital technologies (Rani et al., 2020). But there is a gap in uncovering which dimensions of these divides are strongest, and how this varies in different settings within and between countries in the Global South.

Information divides is an area well-known to information science scholars. Elfreda Chatman, for example, focused on the information world and information seeking behaviours of working-class and impoverished information users. She says that the information seeking experiences of the poor are that "they live in an impoverished information world" which is limited in "new possibilities" and which makes their "perceptions about reality…not adequate, trustworthy, and reliable"(Chatman, 1991, p. 440). Along similar lines, 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 indeterminate and finding information sources "poorly organised" (Savolainen & Kari, 2004, p. 225). At the same time, examining a broader population, Hargittai and Neuman's (2012) research on information overload found that while most of the users did not feel overwhelmed by the amount of online information, they were disappointed by the quality of some online information sources such as social media. Ragnedda (2018) defined digital capital as a combination of digital competencies plus digital technological resources, and he argues that digital capital connects the online and offline worlds. Hence individuals benefit most when digital capital works together with traditional Bourdieusian capital such as social or economic capital to improve their life chances, an argument that is close to the one we make here.

For China, an early milestone in the study of information divides was Qiu's book on have-less users in urban areas. More important than the cheap gadgets, he argued, are "the inferior market positions and the general lack of social power" among the have-less users to "better their life chances" using ICTs (Qiu, 2009, p. 235). Similarly based on fieldwork in urban China, Wallis (2013) focused on the use of mobile phones among female migrant workers in the service industry, which both empowered but also tethered them to their employers. Murphy (2010), on the other hand, found shrinking digital divides in China and that local governments, for example, have played an important role in providing training sessions for civil servants and setting up information centres that serve local farmer's agricultural needs. Education in digital skills in schools has also helped to bridge the digital gap between rural and urban areas. Thus Liangzhi Yu (2010) conducted a series of empirical studies on information poverty and information inequality in China, using interviews and diaries of information practices. In terms of information practices, Yu found that the practices of the information poor are circumscribed by mainly drawing on local information sources even if incidental encounters also lead to exposure to wider sources. Finally, Yu's review of theories on information inequality points to the need for theories that can bring together individual and society-level perspectives to

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develop an inter-disciplinary understanding of digital divides (Yu, 2011). Hence our second research question about information divides:

RQ2: What are the socio-economic and technological barriers in everyday online information seeking practices?

The theoretical contribution of the paper is threefold: we link the variation in everyday information seeking practices to different groups; we show the relation between divides in everyday information practices and larger social changes in urban and rural China; and finally, via comparison of China and India, we theorise digital divides in everyday information seeking in non-Western country contexts.

3. Methods

The fieldwork for this paper was carried out in two sites which, for the sake of anonymity, will be assigned the pseudonyms Fossil Village and Western Factory. Fossil Village and Western Factory in Central China were chosen because, unlike coastal urban and remote rural China, this partly urbanised and partly rural geographical area is more representative of recent transformations in the lives of the bulk of the population. The 15-month fieldwork was divided into three parts: an initial period of exploration during one month in the summer of 2016 and four months in 2017 in the county centre, Happy Valley[3], Henan Province. The main fieldwork was then conducted in Fossil Village between the spring and autumn of 2017 and the second in Western Factory from late 2017 to the late spring of 2018. Ethnographic research on the impact of technology in Chinese society has focused extensively on the prosperous coastal part of China (McDonald, 2015; Wang, 2016) and often overlooks the representative role of Central China. 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.

Fossil village and Western factory are both located in the county of Happy Valley. Western Factory manufactures Chinese medicine and is located in an industrial park two kilometres west of the seat of county's centre. Employees working in management and manufacturing at the factories vary in the way their salaries are calculated: management departments have fixed monthly salaries for different rankings, ranging from 2500 RMB ($400) to above 100,000 RMB ($16000) per month,

while workers in manufacturing departments receive basic monthly salaries of around 2000 RMB ($320), plus a performance-based bonus, per month. Fossil Village is located in a mountainous area which is 37.8 kilometres away from the county centre. The village has 1025 residents in 242 households and covers 9.6 square kilometres. Most of the households rely on mushroom-growing as the main source of their family income. Each household grows and maintains around 5000 to 10000 "logs" of mushrooms (logs are the units on which mushrooms are grown), making an annual profit of 10000 to 30000 RMB ($1600 to $4800) each year.

Our data collection used mixed methods (Greene, 2008; Tashakkori & Teddlie, 2010), combining surveys, interview, focus groups (Creswell, 2018) as well as video recordings of information seeking scenarios. In both field sites, data collection started with a randomly sampled face-to-face survey to map out the ICT development and information practices in each community.[4] First, each community was divided into different strata according to either the production teams in the village or factory departments.[5] In a second stage, a random sample of individuals within each stratum was selected to participate in the survey. The survey collected samples of 128 individuals from 128 households out of 234 households in Fossil Village. In the survey on Western Factory employees, 228 samples were collected out of 1404 employees who worked within the geographical range of Happy Valley county. In addition to demographic and socio-economic information of participants, the survey included questions ranging from the importance and trust of various information sources online and offline, to the relevance of different categories of information in everyday life, and further to experience with online information seeking practices and difficulties encountered during the practices. Survey data was used, first, to provide a categorisation of information contexts in everyday life through running an Exploratory Factor Analysis (EFA) to identify different dimensions in information contexts, and then multiple regression was performed on the identified dimensions of everyday information contexts in order to examine the importance of demographic and socio-economic variables on different information contexts. All the survey analysis was run using R.

Qualitative data were analysed to understand how villagers and factory workers made sense of various sources as part of their everyday information practices. <mark>In each field site, interviewees were recruited from survey respondents who participated in the survey study. We invited</mark> 25 villagers and 30 factory employees representing different social-economic backgrounds to participate in in-depth interviews and focus group studies. Each structured interview lasted 30 to 45 minutes and covered over 15 topics, including information needs, internet experience, information sources online and offline, information seeking in various everyday life contexts, misinformation and information overload. After the first round of interviews in Western Factory, further questions were identified that could provide greater depth and these questions were explored in four focus groups. These were conducted with different groups until it was felt that data saturation had been reached.

4. Results

4.1 Information dimensions and socio-economic variations in everyday information practices in China

To understand individuals' 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 topics surveyed included "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 1 provides a heatmap of all 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.

To identify the underlying categories of everyday information contexts among rural and urban survey respondents, we first ran an Exploratory Factor Analysis (EFA) with the psych package in R (Revelle, 2018, 2019) on questions about the importance of different types of information in everyday life. We then examined the socio-

demographic variables to explain the different information needs across various social groups.
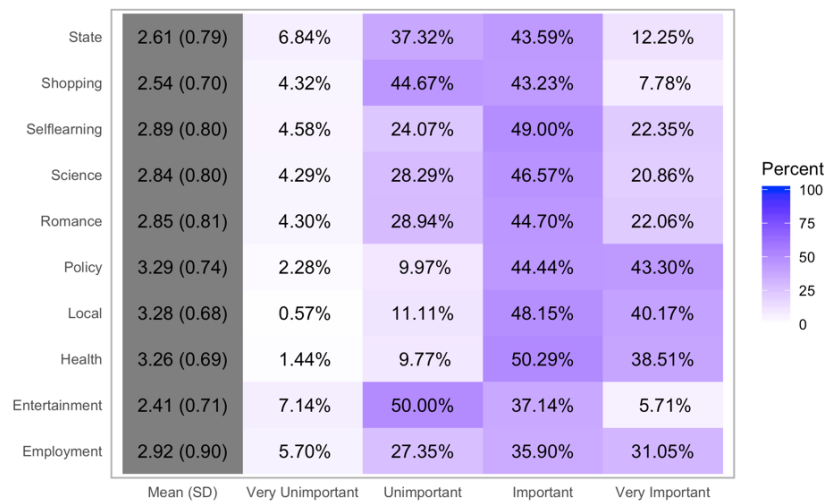

Figure 1. Heatmap of the importance of different types of information in everyday life

Before running the EFA, we first checked the Kaiser-Meyer-Olkin (KMO) measure of the sample, which was 0.78, higher than the middling sampling adequacy of 0.7. Bartlett's test of sphericity was significant (Bartlett's K2 (9) = 52.84, p < .001), rejecting the null hypothesis that variables are unrelated. We then conducted a parallel analysis, a method recommended by Thompson and Daneil (1996), as a more objective means for deciding the number of factors that should be extracted in the factor analysis. In the parallel analysis scree plots (see Figure 2), the point of inflection, the point where the actual data drops before levelling off on the tail, is between two and five. The parallel analysis result suggests that the number of factors is four. We therefore decided to use four factors.
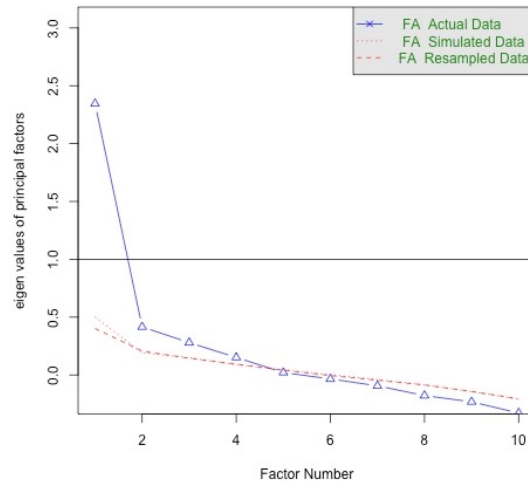
Figure 2. A scree plot of the parallel analysis

To extract factors, we performed variance maximising through the rotation of the variable space. We 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, we looked at the eigenvalues of each factor and selected those with a value above 1. After deciding on the number of extracted factors, we ran the factor analysis and rotated the factor structure using oblique instead of rotation. Oblique rotation with *oblimin* was chosen 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 1 shows, each of the four factors consists of at least one type of everyday information. Figure 3 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 1. Factor Loadings for Exploratory Factor Analysis with the oblique rotation of everyday information needs

Scale	Immediate Environment	Society State	Commercial & Cultural Consumption	Self Relationship
	MR1	MR3	MR2	MR4
Social Policy	.24	.43	-.06	.14
State Affairs	-.04	.74	.1	-.03
Employment	.22	.35	-.2	.28
Self-learning & 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				
<mark>Immediate Environment MR1</mark>	1			
<mark>Society State MR3</mark>	.39	1		
<mark>Commercial & Cultural Consumption MR2</mark>	.1	.16	1	
<mark>Self Relationship MR4</mark>	.57	.29	.14	1

<mark>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?</mark>
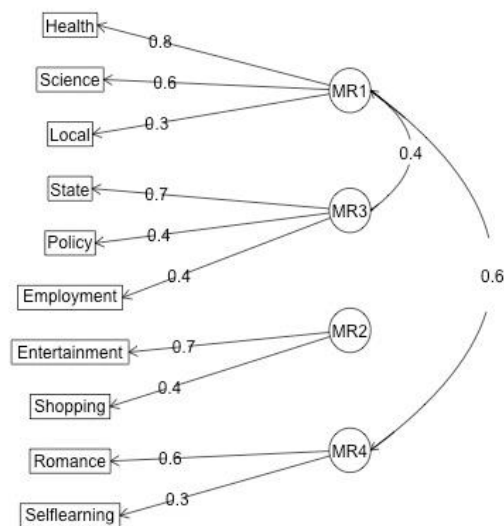

Figure 3. A path diagram of the four factors detected from the information needs questions.
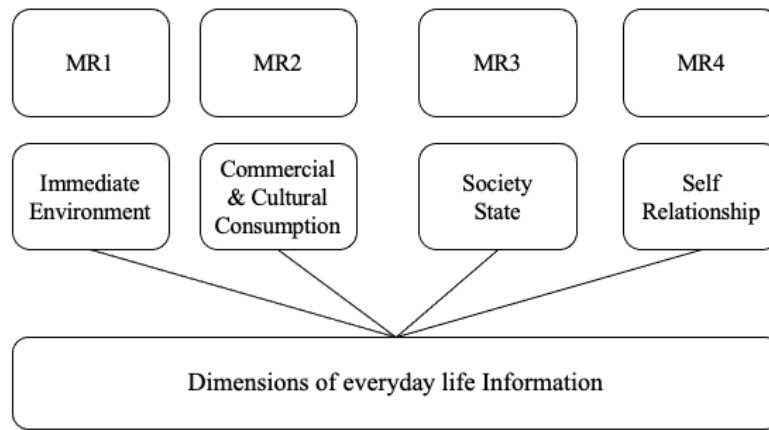
We can group the four underlying information dimensions (see Figure 4 for a diagram of the dimensions) into 1) information related to the self and relationships, including self-improvement and romance. 2) information about the immediate environment, including health, science and local events. 3) information about the government and public affairs, including political affairs, social policy, and employment. 4) information about commercial and cultural consumption, including shopping and entertainment.

We then used multiple regression on the four dimensions of everyday information contexts to examine demographic variables such as age, gender, marital status, number of children if any, monthly income, and residence as independent variables (see Table 2). 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 greater needs for information about commercial and cultural consumption (B = .47, p <.01) than do urban residents. This indicates that there is a gap in information provision in rural China on culture, leisure and commercial information in everyday life. The regression results also indicate a gender gap in information contexts whereby female users have higher needs for information about the immediate environment such as health or local events (B = .17, p < .01).

Table 2. Multiple regression results on four everyday information dimensions, with demographic variables as independent variables

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	Dependent variable			
	Self, Relationship	Immediate Environment	Society, State	Commercial, Cultural
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

Apart from urban-rural and gender divides, we can therefore see that the dimensions of information correspond roughly to Savolainen's conceptualization of the "horizons of everyday information practices", where there is the "world within actual reach...part of the lifeworld that is directly at hand...serving the needs of everyday projects", as against the "world within potential reach...objects of interest

that are not directly at hand and cannot be mastered, but that may be accessed if needed" (2008: 58). In other words, everyday information needs radiate outwards, from those closest to hand to those most distant, including the level of mastery or reachability. The difference between more locally constrained and more "cosmopolitan" information practices is not just geographic, however, but also, as we shall see, entails fewer and more single-stranded (from a few proximate relations) sources as against more multiplex (or multi-channel) and diverse sources: this contrast, in addition to urban-rural and gendered information divides, can now be pursued further by means of qualitative data.

4.2 Divides in everyday information practices in China

We can now examine the different dimensions of information seeking in more detail, beginning with personal relationships. Chinese society, and especially rural China, has a deep-rooted culture of social connections, or guanxi (关系) (Yan, 1996). Guanxi, which includes the connections related to extended families, schoolmates, and colleagues, consists of strong social networks that provide economic and political support. Managing these relationships in rural China is not only important for maintaining emotional bonds with extended family members or neighbours but also yields informational benefits such as opportunities for work, updates about local agricultural or health policies, and other informal tips that are useful for villagers.

We found that female villagers play a more active role than males in bonding with families and neighbours and take more interest in online information about interpersonal relationships than their partners. For many female villagers, WeChat, the most popular mobile social media in China, and mobile news apps, are the first sources they turn to for free articles about topics such as anger management or communication skills. Yue, a 48-year-old farmer, described her experience of learning about managing family relationships when reading online news as follows:

> *I learned how to manage family relationships by reading news articles about Liu Tao, 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 informative: When Liu Tao's husband had crippling debts, instead of*

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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.

By contrast, female interviewees who come from the village but work or study in the urban areas have more diversified information channels for such self-improvement issues. For example, Di, a 26-year-old middle school teacher who grew up in the village but now worked in the urban area, purchases and reads e-books on communication skills on the internet. Figure 5 provides a list of Di's favourite WeChat Public Accounts. Compared to female villagers who rely on random collections of articles about guanxi skills from "pushed" information on social media, she also integrates active searches on guanxi-related questions on Baidu with subscriptions to social media accounts that focus on personal relationships:

I subscribe to many accounts about social connections from WeChat Public Accounts, but there are some specific issues about self-improvement 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 5. Screenshot of some of Di's WeChat public accounts (account information 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.

Women villagers are not alone in turning to online information about social connections in everyday lives. The same applies to interviewees with a 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)".

Similarly, for many young migrant workers who only recently gained urban residency, active use of social networking apps can yield valuable information. Gui is one of the few employees in the urban factory who successfully found a part-time career in the digital economy. He worked both as a Didi[6] driver and a sales representative for a local alcohol manufacturer. He found business contacts through a WeChat group which consists of hundreds of volunteers in a local charitable organisation. He described how

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the opportunity "found" him because his business partner appreciated his active role in managing and organising the online group. Through participation in online social networking, in this way he "changed his old-fashioned perception of depending on a 'stable' salary and was encouraged to not only socialise online but build a career based on his online network."

However, despite the important role of the internet in providing information about managing or facilitating social connections in online groups, there is a gender gap in how much social capital can be cemented online. Rural female interviewees expressed their disappointment in urban-centric entertainment and consumption of cultural products online. Fang, a middle-aged female from the village explained why she thinks women in rural China are "better-off" avoiding "reading too much online":

> *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.*

Meanwhile, urban female internet users are also withdrawing from consuming online cultural products. Li, a female factory worker, fears that the representation of women online will have a substantial negative impact not only on her marriage but also her daughter's future:

> *I accept the fact that I live in a relatively conservative province, and my generation has been constrained in our role mostly as housewives. However, I am deeply concerned for my daughter, for she lives in a digital world that emphasises that "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 supports my belief, but on the contrary, I find a value crisis for Chinese women, especially for my daughter's generation.*

Paradoxically therefore, our interviews suggest that information seeking about social connections reflect increasing urban-rural disparities or gendered worldviews as well as providing useful sources for developing these connections.

Younger generation users in rural areas also benefit from seeking information about professional skills or life-long-learning on the internet. Bing and Di, two young professionals from the village who returned to their hometowns after graduating from universities, illustrate how the internet facilitates continued learning by providing resources for how to upgrade skills. Di teaches math in a middle school in the town neighbouring the village where she grew up. She graduated with a math major, and her first job was as a secretary in the county, but she soon found herself more enthusiastic about 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 needs, the internet not only helps by providing digitised exam results but also has free training materials about teaching and PC skills. She benefited particularly from a national informatisation project targeted at teachers in rural China:

> *All middle school teachers in rural areas have to participate in a 'national training program for teachers'⁷ 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, and practiced 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.*

Bing, who is the only full-time doctor in the village, is a keen online 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), developed by a private company in Shanghai called "The Medical Industry" (see Figure 6 a screenshot of the app on Bing'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 urgently needed medical training in 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 6. Bing demonstrates how he finds information on
medical training on a mobile app, the Doctor's Centre.

For rural younger people like Di and Bing, online learning from both national top-down informatisation projects and free information services provided by commercial companies offer valuable opportunities for upgrading skills and life-long learning. The online channels are particularly important for rural residents since offline training for professional skills or life-long learning are mainly organised in faraway urban areas.

Among urban younger people, there is also a pressing need to upgrade skills and to seek future career paths in the booming internet industry. Career paths for workers in manufacturing plants are 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 have not been selected from among experienced workers but instead chosen from employees in management departments with university degrees. Feeling insecure about the future, many younger workers we interviewed therefore considered starting a part-time career in the digital economy. For them, the internet provides not only resources for starting and managing businesses online but also provides leads for business opportunities and advice about entrepreneurial skills. Gui, for example, who was mentioned earlier as benefitting from his connections in online groups, had worked both as a full-time factory worker and a part-time digital entrepreneur for more than a year, but initially used the internet as a digital library for learning about other people's e-commerce experiences:

> *I have been a lurking learner on WeChat for years. I was particularly interested in Feng, the leader and organiser of an NGO, who shares updates on his e-commerce business in his WeChat timeline (Moments). I learned how he discusses the design of product logos within the NGO group, and how he plans the 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 the course of observing other people's success and selling different products on WeChat, Gui's online information sources on e-commerce broadened geographically, mainly through adding customers or manufacturers across the country:

> *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 are located on the banks of the Yangtze River and were only reachable by motorcycle.*

Gui's efforts in seeking new business opportunities across the country paid off. He has become a direct retailer of blood oranges after his visit and found this was more profitable than selling kiwi fruit (Figure 7 shows the WeChat-commerce group Gui joined on WeChat and his WeChat conversations with a customer). It is not a coincidence that Gui started his first e-commerce business on WeChat, the social media platform, instead of Taobao, Chinese biggest online shopping website. Gui has not used a PC since he graduated from university and after working on the assembly line since 2000. But while he attended most of the e-commerce training provided by the local government, he found that he could not keep up with these free training workshops due to his limited PC skills. He complained that:

> *My PC skills, including using software to document income 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*
> *keyboards on PCs.*

Against the background of these experiences, we can turn the similarly mobile-centric experiences with information practices in India.

Figure 7. Screenshots of Gui's WeChat group that consists of retailers of fruit around China (Left) and his conversation with a customer on WeChat (Right)

4.3 Everyday information practices in India

As in China, in India it is necessary to go beyond first-order (access) divides to explore second order digital divides in information practices, which have some similarities with China but which are also deeper. Moreover, these new divides relate specifically to information practices. Gender has been found to play a stronger role in India alongside socio-economic – or in this case primarily caste - divides. Jeffrey and Doron, for example, have shown how the gendered nature of mobile uses can be a double edged sword: on the one hand, especially for women in traditional rural and male-dominated households, women's use of mobiles generates mistrust since if information from inside the household such as gossip reaches the outside world, this "may threaten the reputation and honour of the household" (2013, p. 175). On the other hand, mobiles sometimes allow gender roles to be evaded: Jeffrey and Doron describe a young couple, for example, who carried out an illicit romance over several months via mobile phones. The couple, living 120 kilometres apart, had only been able to meet twice in person, under the strict supervision of parents, while their marriage was planned, but they were able to get to know each other better by means of lengthy mobile calls at night which their parents did not know about (2013, pp. 178-179).

There are similar findings in Tenhunen's (2018) ethnographic account of a village in Bengal. She shows how increasing smartphone uses provide advantages for those with more wealth and education rather breaking down the barriers of caste and gender. Although many in the village have access to smartphones, "only a small minority of the villagers are even aware of the possibility of browsing the internet directly with mobile phones" (2018, p. 162), mainly those with a college education. But for those that do, they "have found many uses for it"(2018, p. 163). Those from a lower socio-economic status are more restricted: for them, apart from a lack of education and of English, the main barrier is the cost of calling and data. They get around this by going to shops where music and movies (and religious content) can be downloaded and put on memory cards and hence onto their phones. But that means they are dependent on intermediaries and have little awareness of the range of materials that can be accessed online. While they enjoy being able to consume content during work

or in breaks, their use of online information and their range of content is severely circumscribed (2018, pp. 156-162).

Thus we move from gender to work, which for the vast bulk of those from lower socio-economic groups is in the informal sector. Malhotra and Ling (2020), who interviewed female domestic workers in Delhi, say that they were only modestly able to improve their life chances, if at all, using mobile phones. The ability to juggle various tasks in connecting with their families and their employers are reminiscent of the women studied by Wallis (2013) in urban China: they gain flexibility, but they are also tethered more to their employers' whims. And while they are now able to earn a livelihood, they remain doubly disadvantaged by gender and economic position. Thus, Malhotra and Ling also want to go beyond the ideas of "empowerment/disempowerment" and point to the fact that these women "are now heavily dependent on the device to conduct their familial and professional lives. As Usha, who worked as a cook in eight homes, put it, 'it has become a necessity. Just like food is necessary, the phone is also necessary'" (2020, p. 42).

Venkatraman (2017, pp. 136-196) also discusses informal practices related to work, in this case around personal connections for finding employment. He has provided a thorough ethnographic account of internet uses in Panchagrami in the state of Tamil Nadu and shows how young people from lower socio-economic backgrounds with modest (at most local college degrees) obtain entry level low-skilled word in IT companies such as record-keeping or data entry without government help. Social networks – here, shared caste background – are of central importance in finding this kind of work: Venkatraman details how two friends, having found work at an IT company through a connection, and once they had risen to a low management position, posted job openings on Facebook because they felt they could help their peers. In this way, they were able to obtain low level record-keeping positions for a number of young people in their community (recall the facilitation of connections for informal work that we documented in China). Similar networks operate at the level of middle management, where LinkedIn is a more common platform. Caste, kin and friendship networks play a central role in all these cases, and mutual help with

preparing CVs and advice is never simply work-based but rather invariably blurs the boundaries between work and informal personal connections.

Internet-related skills are regarded as a means of upward social mobility across different socio-economic or caste groups, but as in China, there are also contradictory attitudes, especially towards young peoples' internet uses (Venkatraman, 2017): upper middle class parents regard internet uses as distracting from homework and study, and so try to control their uses. Lower middle-class parents, on the other hand, encourage learning English, often online, since that is a prerequisite for IT-related work. But these skills are unlikely to be provided by formal schooling, so the young people will need to work hard to acquire them online. Thus Tamil-language-only youngsters teach themselves basic language and other skills from Khan Academy and other sources, though their upward mobility is restricted compared to more affluent students who have better educational resources and better smartphones and internet access.

Forging new connections can cut across social strata. Thus, Kumar (2014) has documented the non-instrumental Facebook uses among urban disadvantaged youth in Delhi. One of her informants says "On Facebook you meet a lot of new people, learn a lot of new things from them ... you get entertainment also. There were so many things I did not know about the world that I know now ... the world is so diverse, so big ..." (2014, p. 1130). These Hindi speaking youngsters use Google Translate to chat with and make friends with strangers in Brazil, for example. Hence she argues that Facebook allows "previously isolated users...the opportunity to be included in the process of globalization by connecting to others in a worldwide network...Facebook offers them the avenue to orchestrate cross-cultural encounters and generate international ties, changing their sense of the wider world and their place in it"(2014, p. 1134), though she notes that these possibilities are much more restricted for young women.

Such wider geographical connections are also made in rural Gujarat, studied by Pathak-Shelat and DeShano (2013), where young people seek to expand their horizons online: "Visits of relatives and friends who have migrated to North America, the Middle East, and Australia fuel the aspirations of young people to own the coveted

material goods, as well as new media gadgets that expats possess and the aspiration to 'conquer the world' as a global Indian" (2013, p. 995), though they note that the infrastructural capabilities of their access often hampers these aspirations, especially when it comes to more demanding applications such as video. But global aspirations are not just about consumerism and wider cultural horizons. Many of the young people described by Poonam (2018) are eager to start internet businesses. They mostly live in and around Ranchi, in the state of Jharkhand, which is one of the hundred cities targeted by prime minister Modi's smart cities programme, part of his drive for a "Digital India". Yet the young entrepreneurs that Poonam interviewed are not aware of this programme: they have often obtained their IT skills from local colleges or they are self-taught. And their businesses are far from the high-tech innovation envisioned by "Digital India", and include English language schools, companies engaging in internet scamming, and organizing talent contests, all created from the ground up and modest in their success. They are also part of the informal sector, which, again, make up the bulk of the Indian economy.

Examining everyday mobile uses thus reveals the constraints and opportunities outside of the formal digital economy. Kleibert and Mann (2020) have shown, on the macro-level, that the benefits of India's much advertised information technology enabled services sector mainly go to the urban well-educated middle class. That is because, compared to China, India's digital infrastructure is much weaker. Weaker infrastructure, in turn, is part of a longer-standing tradition of technological developmental in India, which, unlike in China, has not been characterized by the top-down push to create large scale technological systems that have characterized Chinese history, and that Xi Jinping is continuing with his informatization strategy. In India, instead, as Arnold (2013) has argued, small everyday technologies such as the spinning wheel and bicycles, have played a more prominent role. The mobile internet can be seen as such a small everyday technology, though as Rani et al. (2020) show, the lack of infrastructure in certain regions of India means that certain parts of the population in Rajasthan and Bihar are lagging behind, echoing the urban/rural divide in China.

What the comparison between China and India shows is that, despite much more systematic and well-resourced top-down digital infrastructure development in

China, in both countries, the grand ambitions of the government schemes are remote from peoples' everyday information seeking practices. On the ground, the divides in information seeking practices are shaped by the barriers of gender, caste, education, and socio-economic position, although these are also sometimes overcome, particularly by younger, urban, and English or Hindi speaking users. What we see are lingering first level divides (electricity and literacy are lacking in some parts of India), rapidly overtaken by second level divides which are also becoming more complex than basic social ones such as gender and socio-economic divisions and more to do with the diversity of everyday uses, which will be compared with a similar division in China in the conclusion. But the barriers to overcoming divides are also more obstinate in India, as with gender, and the more limited infrastructure also means that the opportunities in the new ICTs-enabled services economy are more restricted.
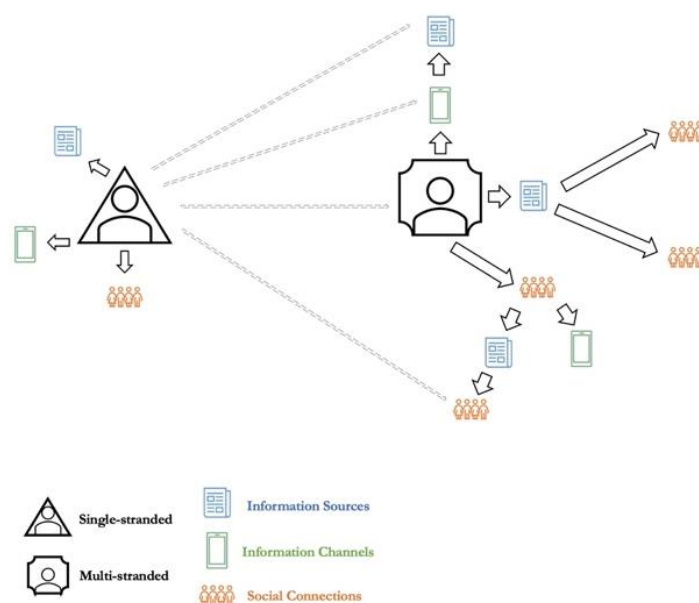
5. Conclusion

Figure 8 Diagram of the theoretical model. Dotted arrows represent channels to connect single-stranded users with diverse sources, channels, and social connections of multi-stranded users.

We found in our quantitative analysis that everyday information needs are different for urban and rural internet users, but also that there are gender, age and income differences in respect to these needs. From the qualitative analysis, we learned how information sources, channels, and social connections all shape successes and

failures in everyday information seeking practices. We have already mentioned that we therefore see a divide between two types of information-seekers: single-stranded and multi-stranded ones. What we call single-stranded individuals are those with strongly connected local information sources but restricted information channels and a limited number of far-flung ties. The multi-stranded individual, in contrast, has more geographically wide-ranging sources, more diverse channels, and a greater variety of thinner but wider-reaching social ties, both online and offline. This contrast, like all ideal types, is not black and white; there are many information seekers who share features of both (and they may be connected, as the dotted line between them indicates). Further, the contrast does not imply a straightforward disadvantage for the single-stranded individual and an advantage for the multi-stranded one: the information diet of the single-stranded individual may be more suited to the needs of the local context, giving the single-stranded individual an advantage in this context. The multi-stranded individual, on the other hand, has certain advantages such as seeking opportunities further afield and in finding e-commerce customers or new types of work via informal contacts through various channels. Both single-stranded and multi-stranded information seekers are thus advantaged and disadvantaged in relation to the context in which they operate. There is nevertheless a divide since multi-stranded information seekers have more diverse cultural and social capital – to come back to Savolainen's Bourdieusian terminology - in relation to a rapidly emerging and more complex mobile information-based society like China.

These findings, as we have seen, also apply to other countries where a mobile information-based society is taking hold, as is the case, though to a lesser extent, in India. The opportunities and constraints of single- versus multi-stranded diverse everyday online information seeking have a similar structure in both countries, but within the differing contexts: what has begun to happen to make diverse uses more essential for parts of the Chinese population and overcoming barriers is likely to be replicated, perhaps more rapidly, in India too. These similar structures and the barriers they entail would not be visible without the combination of a macro- and survey based perspective combined with the perspective of fieldwork - which highlights the concrete needs of mobile internet users, and how they can often

overcome barriers in and through their diverse relationships (or not, if they are restricted to single-stranded uses). We can also note the limitations of what we have done here: using the theoretical framework of information seeking that we have developed, work that systematically tackles these practices to extend this work to other parts of the Global South would require fieldwork in the manner of Miller et al.'s (2016) multi-sited project on social media. Such fieldwork would need to be done in a manner that also highlights the urban-rural and other divides specifically in information practices that we have unearthed for one country (our comparison is limited by the fact that it is based on secondary sources). It is only through work of this kind that the neglect in policy of everyday uses, which focuses on first level divides and on work-related information practices, can be overcome. In other words, a one-size-fits-all approach, as with Xi's 'informatization' strategy and Modi's 'Digital India', is likely to reinforce rather than overcome the inequalities of newer digital divides.

Among the various demographic and social-economic factors, we focused on gender partly because gender reinforces or obviates the difference between single- and multi-strandedness in both cases: a lack of mobile information seeking, for example in traditional Indian households, or tethering women to employers in China, can reinforce socio-economic divides. But it can also overcome these constraints when new long-distance opportunities for work elsewhere can be explored or relationships further afield can be maintained, as we showed in our Chinese examples. In personal development and in informal work, information is embedded in the context of domestic life and in personal relationships. Put the other way around, information needs are not so much tied to formal skills or digital literacy or ICT-driven economic and social development, but more in empowering individuals to develop their capabilities (Yan, 2003), even if individual flourishing is also embedded in strong solidaristic bonds. Enabling individual flourishing among grassroots internet users requires reliable and useful information; however, since rural and urban users have different everyday information needs, these needs often go unmet. New divides are created even as online information is also enabling, but to different degrees. The information divide is most acute where the information-have-less have fewer social

and technical resources. In this respect, we extend Elfeda Chatman's findings, mentioned earlier, that information poverty often leads to severe restrictions in everyday life.

We have seen that divides play out in different ways in relation to gender, opportunities in the informal economy, and in personal development. At the same time, the potential to overcome this divide, particularly through the efforts of the state at the level of local community efforts, are much greater in China than elsewhere because the government has traditionally been able to use the top-down development of ICTs to achieve developmental goals, also locally. In India, central and local governments are increasingly promoting ICT infrastructures and service provision for bottom-up informatisation, but within the constraints of weaker infrastructure development. In their informatisation or digital development policies, both governments will therefore need to ensure the accessibility, reliability, and relevance of online sources of information, and that the infrastructures providing these resources are tailored to both the needs of locally circumscribed (single-stranded) users and of those with wider (multi-stranded) information needs in different ways. The mismatch between service provision and grassroot practices, as we have seen, often accounts for failures in top-down, government-led informatisation projects (as, for example, with the e-commerce training Gui attended that relied heavily on PC skills).

Hence there is much that the government and platform companies could do to ameliorate divides between the information-have-more and the information-have-less. If they do not, these divides can persist or intensify in digitally driven economies. In the context of everyday life in semi-urban and rural China, ICT provision should mainly centre on practical grassroots information, tailored to the unique information contexts of information have-less users. Such efforts should not only be directed, as theories of ICT for development or digital divides in access would have it, at the macro-level of economic development and innovation or formal skills, but also at the level of promoting individual capabilities in the serious pursuits of everyday life (Scheerder et al., 2017). It has been argued that, driven by the developmental mindset, the Chinese party-state's political legitimacy rests on its performance of continued

economic growth (Zhao, 2009). It could similarly be said that its legitimacy rests on the performance of continued provision of reliable and useful information which go beyond simple livelihood and economic growth but consist of a wide range of changing everyday needs in mobile-centric society. Grassroots everyday information practices in China, and in other Global South countries more broadly, are profoundly shaped not only by the macro-level social-economic and socio-demographic divides, but also how information systems contribute to individuals' fulfilment and wellbeing.

Scholarship on information practices will increasingly extend to the mobile-centric countries of the Global South. As it does so, examining divides not just in access and relating to socio-economic development, but which also pays attention to everyday pursuits, will become ever more central. In this respect, we combined the theoretical frameworks of everyday information practices with those of information divides and put forward a means of understanding the divide between those for whom online information provides more far-flung and diverse sources and those with more restricted sources. Theorizing information practices and their social variations allows us to understand this divide as pertaining to the needs of different gendered and urban-rural contexts. Ensuring that everyone can potentially flourish in rapidly changing societies based on pervasive mobile uses is an urgent task that scholarship on information practices can make important contributions to if it pays attention to theorizing different information needs and contexts.

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Endnotes

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

[2] http://www.sohu.com/a/305492961_260616

[3] The name of the county is also pseudonym to protect the identity of informants in the study.

[4] Research plans and ethical issues in the project were reviewed before the fieldwork and data collection by the Central University Research Ethics Committee (CUREC reference number: SSH OII C1A 16 055 and SSH OII C1A 17 060).

[5] We acknowledge the village officials and factory managers who kindly provided an anonymised list of households or employees for the survey sampling process.

[6] China's Uber-like platform

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