Gender, Capital Endowment and Digital Exclusion of Elderly in China

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In the era of rapid pace of population aging and progress of information and communications technology, smart electronic use can improve elders' quality of life by helping them to stay connected, active and independent, which may increase their overall happiness and sense of social belonging. Taking a gender perspective, this paper aims to understand variations in digital exclusion among the elderly. Preliminary findings from the 2016 China Longitudinal Aging Social Survey suggest that digital exclusion varies by gender, and that rural female elders are most excluded, possibly due to their low capital endowment. The gender difference in digital divide is even more salient when other things being equal. Digital exclusion in the information era may exacerbate gender inequality, particularly for those already most vulnerable. Since digital inclusion is somewhat inherent in the concept of intelligent old-age support, solutions to help the elders be familiar with digital products will be identified.

In concordance with the global trend, China has experienced both rapid pace of population aging and high-speed progress of information and communications technology (ICT) in the past decade. The size of elderly population aged 60 or above increased from 10 percent in 2000 to over 17 percent in 2017. Meanwhile, China had only about 100 million internet users in 2005, while it increased to over 772 million by the end of 2017, accounting for 55.8 percent of China's total population (CNNIC, 2018). "Surfing the Internet," a new thing a decade ago, has become a regular and inseparable part of daily life. Nevertheless, while over half of the Chinese use internet, tremendous gap exists among sub-populations: Only 209 million rural people use internet, accounting for 27 percent of rural residents (CNNIC, 2018), and only 5.2 percent of elderly use internet among all internet users (iimedia Research, 2018). Although the national reports do not provide information on internet use by gender among the elderly, it is envisioned that the users' rate of female elderly, especially rural female elderly, may be lower given their lower level of capital endowment, due to the triple properties of being elders, females and rural-ers.

Being excluded from the internet will render the elders, who are already more vulnerable than younger people, to be further isolated from social progress in general and ICT development in particular. They may lose control over their financial resources and independence since they may have to rely on children or others for monetary management or transaction. More importantly they could encounter new types of inequality and poverty in the era of ICT. Studies in the west have pointed out that the digital divide gradually transforms into digital inequality since it is the skills, the autonomy, and especially the perceived usefulness that enables and sustains the usage of ICT in a meaningful manner. Competences with ICT services are not only useful to successfully

participate in a changing society, but also provide a great chance to improve an active, healthy and successful aging process.

Nevertheless, while the relationship between internet use and intelligent old-age support (or smart senior care) has caught much research attention in the west, and a hot topic in recent years in China, some very basic knowledge and understanding on digital exclusion has been entirely absent in academia and the society in China. What is the popularity of digital exclusion among the elderly? What are the differences between male and female elderly, and what will happen when gender and rural-urban *hukou* (household registration system) intersect in this regard? How may capital endowment modify the gender relations to digital exclusion? Lack of understanding of the current situation and important associates of digital exclusion would impede the process of digital inclusion of the elderly and better serving their needs in daily life, making them even more vulnerable.

This study attempts to raise attention to the interaction between the elderly and new digital technologies. Based on a national survey data conducted in 2016, it addresses the above research questions. First, it paints a picture on the latest status, characteristics and associates of digital exclusion among the elderly from the perspective of gender inequality. Second, it investigates the patterns of digital exclusion in relation to both gender and urban-rural *hukou* types, and determines whether rural female elders are the most disadvantaged. Third, it explores how capital endowment of the elderly is related to digital exclusion.

In doing so, this work will shed valuable insight into digital exclusion among (rural) female elderly. With the progress of science and technology, digital inclusion has become more and more important in individual's daily life. In the context that family structure has been largely reshaped

in size and living arrangements due to both the restrictive fertility policy and large-scale geographic mobility which relocates adult children, face-to-face contacts between the elderly and their children has greatly reduced, but their life quality do not need to decline, and their social network can even be strengthened with the development of modern technology. As an important channel for the elderly to readapt to changes in the family and society, digital inclusion will provide convenient ways for them to keep contact with distant family members and friends, maintain and expand their communication space, get needed support when facing difficulties, pay bills, call taxi and order takeout, among others. Digital inclusion is thus somewhat inherent in the concept of intelligent old-age support. Since China share similar trends in both population aging and progress of ICT, research findings on digital exclusion or inclusion of the elderly emerging from this analysis may have implications for contexts with different social, cultural and economic background.

Background of population aging and internet use in China

Profiles of population aging

Population aging in China has been characterized by rapid pace, large size, regional imbalance, and discordance with the level of socioeconomic development. China has become the first and only country with an elderly population exceeding 100 million, regardless of the definition of aging (e.g., age 60 or age 65). According to the National Aging Working Commission, the size of the elderly population ages 60 or older reached 221 million in 2017, and those aged 65 or older was 158 million, accounting for 11.4 percent of China's total population, as Figure 1 depicts. The huge size and rapid increase of elderly population present tremendous demands and challenges for

public support. It also calls for innovations in methods of elderly support in the context of substantially weakened capacity of informal care.

(Figure 1 about here)

In his address at Ceremony Launching the International Year of Older Persons, Kofi Annan (1999) rightfully pointed out that "There is also a significant gender dimension to this portrait of humanity's 'coming of age.' Women nearly everywhere are living longer than men. Women are more likely than men to be poor in old age. They face a higher risk of chronic illness and disability, discrimination and marginalization." Female elderly in China is also much more disadvantaged compared to male elderly. The long history of patriarchic construction, featured by the norms of "females are inferior to males," makes them subordinated to the dominant male culture without equal opportunity of formal education and thus lacking independent and stable economic resources. The low capital endowment could have an inverse impact on digital inclusion, and digital divide may generate new type of or further exacerbate existing social inequality between male and female elderly.

Information and communication technology

The progress and development of ICT have provided a new way to meet the demand of elderly. The scale of internet users in China continues to grow steadily. As Figure 2 illustrates, as of December 2017, the number of internet users in China reached 772 million, and the total number of new Netizens increased by more than 4 million throughout the year. Internet penetration rate was 55.8 percent, a 2.6 percentage-point increase from the end of 2016.

(Figure 2 about here)

The continuous innovation of ICT, the acceleration of online and offline service integration and the acceleration of online public service have become the driving force for the growth of internet users. The importance of the internet in economic and social development has been repeatedly mentioned in the report of the First Plenary Session of the Nineteenth Congress of the Communist Party. Internet, digitization and popularization of information services have promoted the upgrading and transformation of traditional way of life, and improvement of public service level.

As Figure 3 shows, among all internet users, the number of mobile phone users continue to rise, reaching 753 million by the end of December 2017. The proportion of internet users who mainly use mobile phones to access the internet reached 97.5 percent in 2017. In other words, the increase of internet uses mostly rely on the users of mobile phone.

(Figure 3 about here)

Nevertheless, there is great variability between urban and rural areas, by age, and to some extent by gender in the general population, according to CNNIC (2018). While increasing over time, rural internet users in 2017 accounted for 27.0 percent, 209 million in size, which is in sharp comparison with urban internet users: 563 million in size, accounting for 73.0 percent. With regard to age, it has been found that internet users are mainly concentrated between ages 10 to 39, accounting for 73 percent of the total internet users. Although the internet continues to penetrate into the elderly population, there are only about 5.2 percent of people aged 60 or above who use internet. The sex ratio of Chinese Netizens was 52.6 percent to 47.4 percent in 2017, with the share of men slightly higher than that of women.

Conceptual framework

It has been found that digital exclusion is closely linked to socio-demographics, health statuses, financial resources, skills and accessibility, attitudes and values, as well as other related factors. Among them, capital endowment might be particularly important. Unlike social capital whose relationship to internet use might be non-recursive, human capital (e.g., formal education and physical health such as medical conditions or disabilities) and financial capital are exogenous to digital exclusion. However, capital endowment of the elderly are endogenous to gender and urban-rural hukou. Figure 3 depicts the preliminary conceptual framework of this analysis:

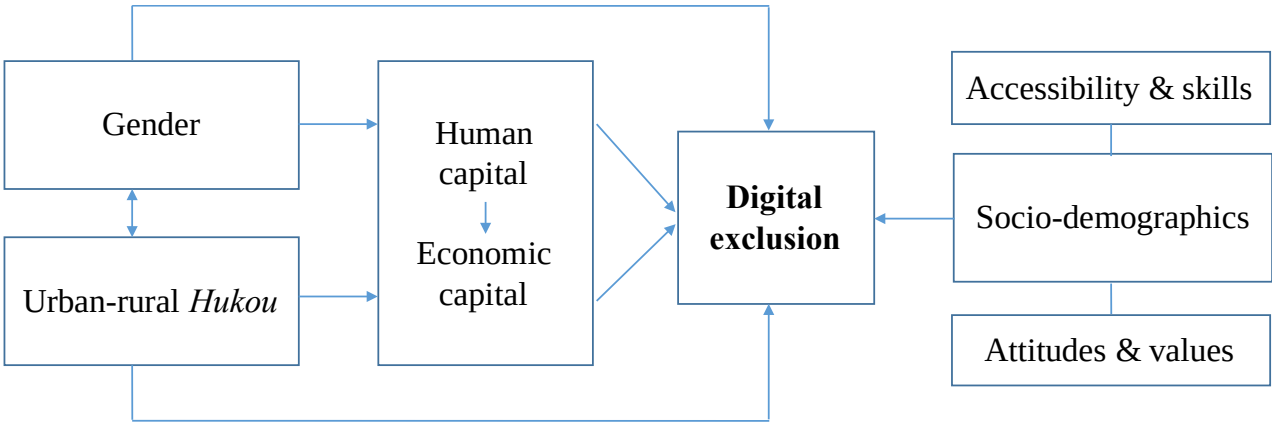

Figure 3 Gender-*Hukou*, Capital Endowment and Digital Exclusion

Usage of digital products and smart electronics use requires certain knowledge, competence and monetary investment. Among multivariate forces, we focus on gender and the interaction of gender and *hukou* system given China's dual social structure, as well as capital factors. We argue that gender and *hukou* affect digital exclusion directly and indirectly through human capital and economic capital. Both gender and *hukou* system shape and reshape the acquisition of the human capital and economic capital, which in turn affect digital exclusion. The current elders were all

born prior to the late 1950s, and most of them have only primary school or lower level of education. This is particularly so for elders in the countryside due to urban-rural divide, and female elders due to traditional gender norms. When gender and *hukou* intersect, rural female elders may have a particularly low capital endowment. Human capital, when referring to formal education, determines individuals' skills and ability of internet use, and affects their desire, motivation and capacity to learn to use smart electronics when referring to physical health. Human capital also affects financial resources, which in turn affect elders' accessibility to and training of internet.

Gender and *hukou* are also directly linked to digital exclusion beyond capital endowment.

Given these, we propose the following hypotheses:

H1: Female elders and rural elders are more vulnerable in digital exclusion compared to male elderly and urban elderly.

H2: Rural female elders are most disadvantaged in digital exclusion among urban male, urban female, rural male and rural female.

H3: Better capital endowment is associated with lower risk of digital exclusion compared with elders with lower level capital endowment.

Data and Methods

This paper draws on data from the 2016 China Longitudinal Aging Social Survey (CLASS), conducted by Renmin University of China, to explore gender inequality and the possibly triple vulnerability of rural female elderly in digital exclusion. As a longitudinal survey, the CLASS was

first implemented in 2014, and followed up in 2016. Since the 2014 survey did not provide information on smart electronic use, this paper only uses the 2016 survey.

A stratified multi-stage probabilistic sampling method has been adopted to extract samples in the 2016 survey. It was implemented in 462 villages and urban communities in 134 county-level administrative units. About twenty-five elders are interviewed in each community, which gives rise to a total sample of 11,494 respondents aged from 60 to 96 years old. Excluding cases with missing values in variables used in this analysis, mostly in education, the final sample is 8029 respondents.

Dependent variables

The CLASS asks respondent elderly several internet-related questions, including access to internet and the purpose of use. In this paper, we narrow down digital exclusion to whether or not the respondent possesses smart cellphone (also call intelligent mobile phone or smartphone). Possession of smartphone is coded dichotomously where 1 indicates yes and 0 otherwise (which suggests digital exclusion). It can be a good measure of digital exclusion because, as aforementioned in Figure 3, over 97 percent of internet users use mobile phone to surf the internet. Having a smartphone may boost the use of the mobile phone and other smart electronics or devices, which will provide much convenience to contact with the digital world and receive support from their communities. Conversely, their online and offline activity space would be largely constrained. In addition, since the elderly are less mobile and more frugal than younger generations (and thus less likely to use internet except for free use), having a smartphone reflects elder's desire and behavior to learn new things and to some extent, ability to master new electronics, and provides insights on the micro environment of internet coverage at home.

Key predictors and control variables

This paper features gender inequality in later life and the possible triple vulnerability of rural female elders in digital exclusion, focusing on capital endowment, defined in this paper as human capital and financial (economic) capital. As such, seven key predictors are identified to reflect gender-*hukou* and capital factors:

(1) Gender: coded as 1 if respondents are female elders;

(2) Urban-rural *hukou* type: coded as 1 if respondents have a rural *hukou*;

(3) The composite measure of gender and *hukou* type, which has four categories: urban male, urban female, rural male and rural female;

(4)-(5) Formal education and self-reported physical health: which are the most important indicators of human capital. Education is gauged as four categories: no schooling, primary school, middle school and high school or above; the latter is coded as very good, good, so so and not so good (including bad health status).

(6)-(7) With regard to financial capital, we also use two variables to gauge its relationship to digital inclusion. While income is the most important financial capital, its creditability has always been a big concern, especially for rural elderly. Given this, this paper utilizes number of houses or apartment and access to pension to measure economic capital. The former is coded as three categories: 0, 1 and 2 or more, while the latter is dichotomously coded where 1 indicates have pension and 0 otherwise.

To explore the net relationship between key predictors and the response variable, we also control for respondents' socio-demographics (e.g., age, marital status, working status and occupation in the past and present, and attitude on sons for old-age support), household context

(e.g., generations living in the same household, whether the home has shower facility, and has internet coverage). Additionally, community context, i.e., location of community, is also held constant.

Analytical strategies

This paper first describes the status quo and characteristics of smartphone possession among the elderly. Regression models are then applied to explore the net associates with or the independent effect of key predictors on digital exclusion. Since the dependent variable is a dichotomous one where 1 means the respondent is digitally excluded, binary logistic regression technique is appropriate.

However, because the survey was conducted using a stratified multi-stage probabilistic sampling method, the data is of a hierarchical structure where the elders from the same community or village are nested together and share more similarities than samples from different communities. This clustering feature violates the two most important assumptions of the conventional regression model (that is, the independence among the samples and among the random error terms), which could downwardly bias model results. Multilevel modelling technique has been designed to deal with such data structure by correcting possible biased parameter estimates by taking into account the clustering feature, and is thus a more suitable modeling technique for this analysis.

Before applying multilevel modeling technique to the data, we first fit an empty model to see if the nested feature of the data is indeed a source of variation of the dependent variable. If so, random intercept models will then be sequentially utilized. Sampling units (e.g., communities and villages) will be treated as the upper level unit where individual elders, treated as the lower level unit, are nested.

Preliminary findings

Univariate and bivariate analysis

To begin with, we first describe the current status of having a smartphone for total sample and by sex, and hukou status of respondents. In the total sample, about 16 percent of elderly have a smartphone. About 48 percent of the sample are females, and 51 percent with a rural hukou. The samples also vary substantially by human capital and economic capital, as column 2 in Table 1 shows, and by control variable, as depicted in Table 2.

The correlation between the possession of smartphone and key predictors is presented in the third column in Table 1. While men and women do not differ much, 18.2 percent for men and 17.4 percent for women in having smartphone, there is great gap between urban and rural areas, namely 28.71 percent and 7.35 percent, respectively. Hence it is clear that *hukou* divide is more salient than gender gap in this regard. When it comes to the composite measure of gender and *hukou*, a gender gap has emerged such that rural female elders have the lowest rate of smartphone possession, not only lower than their male counterparts, but also than their urban female peers. Without taking into account other variables, the bivariate associations between the dependent variable and key predictor, except for the independent measure of gender, is highly significant.

(Tables 1 and 2 about here)

Multilevel modeling results

Table 3 lists results from baseline or empty model, and two partial models with only gender and *hukou* type, measured independently (Model 2) or compositely (Model 3). It can be seen from the empty model (Model 1) that, based on the community random parameter estimate which is

highly significant, community is indeed a significant source of variations in having a smartphone among the elderly, and therefore, multiple models are more appropriate for model analysis.

Prior to fit Model 2, another multilevel model containing only gender is fitted (results not shown in the table). The coefficient and standard error from this model are of 0.350 and 0.074, respectively, highly significant without considering other factors. Such finding differs from bivariate analytical results presented in Table 1, where no gender difference is detected. However, taking into account community heterogeneity, gender gap shows up. This further confirm the suitability of multilevel models for this data.

Even if urban-rural divide is controlled for, gender inequality in digital divide holds. Model 2 adds gender and *hukou* into the equation. While *hukou* is more important in predicting smartphone possession than gender, gender is also a highly significant associate of the dependent variable holding constant *hukou* status. By fitting model 3, we see that rural female elderly are most excluded from the digital world.

(Tables 3 about here)

In Model 4, the indicators of capital endowment are added into the equation. While the inclusion of capital variables attenuates the size of the coefficients of the composite measure of gender and *hukou*, it remains a strong predictor for smartphone possession, and rural female elders remain the most disadvantaged in the digital society. Meanwhile, both human capital and economic capital are significantly related to the outcome variable.

When it comes to the full model with all control variables, models 5 and 6, the pattern detected in previous models retains although the size of coefficients has been further attenuated. All else equal, gender inequality persists, while urban-rural gap disappears, as Model 5 exhibits.

When comparing rural female elderly with other three categories in this composite measure, it is clear that they are most digitally vulnerable and excluded, even if their socio-demographic characteristics, household and community contexts are equal.

(Tables 4 about here)

Preliminary summary and conclusion

Technological advancement, growth of internet and changes in lifestyle have led more and more people to access the internet, by a variety of reasons ranging from searching for fun to easier monetary transactions. In the context that more elders stay at home in old ages, access to the internet and smart equipment will bring more convenience to the service industry for the aged and the safety of the elderly themselves. In other words, the possession and then the use of smartphones among the elderly could open an extra window, which can expand their living space, extend their social networks or means of external communication and interaction, and help to improve their mental health and social adaptation.

While further analysis is still ongoing, we may tentatively draw the following conclusions based on preliminary data analysis:

First, digital exclusion has been indeed observed among the elderly. While over 55 percent of the Chinese population uses internet, and the proportion of people with a smartphone is even much higher, only 16 percent of the elderly surveyed possess a smartphone, although 41.6 percent of the elders in the CLASS sample have internet access at home. Furthermore, the findings may even have downwardly biased digital exclusion, because having a smartphone does not necessarily mean that the elderly use it frequently. In the same data we have found that less than 10 percent of

the elderly surf the internet regularly, and they still rely heavily on television for daily life and contact with the outside: more than 90 percent of their information comes mainly from television and less than 5 percent from the internet (result not shown here).

Second, basic conditions for digital exclusion vary substantially between urban areas and the countryside, between males and females, and across human capital and economic capital endowment, among others. Generally speaking, the difference between urban and rural areas is greater than that between the sexes when other things are not considered. The rate of urban elderly having smartphone is significantly higher than that of rural elderly. This might be due to the differences in internet penetration between urban and rural areas, the importance of the internet in daily life, as well as variations in education and financial resources between urban and rural elderly. Indeed, better human capital, higher level education and better health status, and better economic security are positively associated with the response variable, possibly by motivating elderly's desire to learn new technology and enable them to access the internet. Similarly, the gender gap is also salient, particularly when other things are equal; that is, controlling for other factors, female elderly remains disadvantaged compared to their male counterpart.

Finally, rural female elders are most excluded digitally. Their education endowment, health status and financial security are the lowest, rendering them to have a lower demand for smartphones and networks, as well as a lower capacity to use the internet. Indeed, the majority of them still live in a relatively closed and traditional life in the digital world.

Such findings would have profound policy implications. While currently, a new way of elderly support, intellectual old-age support or smart senior care, has been vigorously promoted in China, most of relevant products and practices tend to target on elderly with health problems,

especially those demanding for long-terms care. Health is, of course, the most important concern of the elderly, but the majority of them are still able to take care of themselves. Hence, practice of intelligent old-age support should go beyond the limits of medical devices.

In the process of implementing intelligent old-age support, emphasis should be placed on expanding elders' accessibility to smart electronic products, and nurturing and directing elders' abilities in the use of these products, including smartphone and other digital tablets. It should be realized that the popularization of intelligent old-age support is neither simply the construction of information platform at the community level, nor the development of intelligent technology and products of other hardware; it must solve the "last mile" problem of intelligent old-age support. That is, mobilizing elders' desires to access to smart products, cultivating their ability to use intelligent electronics, helping them familiarize with the intelligent products and operate them correctly and skillfully in emergencies and in regular lives. This can be done through training and intervention programs, which will equip them with necessary skills, regardless of their level of education. It is also important to increase free internet coverage for the aged given that they are less willing to use the internet when it costs.

Reference

iiMedia Research. 2018. Monitoring Report on "Internet Addiction" Hot Spots of Chinese Elderly. Available at http://www.iimedia.cn/62211.html, accessed in September 11, 2018

CNNIC (China Internet Network Information Center). 2018. China's Internet Users Reach 731 Million Equivalent to Europe's Population. Available at http://www.isc.org.cn/zxzx/gzwm/listinfo-34893.html, accessed in September 11, 2018

Table 1 Distribution of dependent variable and key predictors, and their associations (%)

	Percent	Use smartphone
Full sample		16.000
Female	47.820	
Male		18.200
Female		17.410
Rural	50.960	
Urban		28.710
Rural		7.350
Gender and hukou		
Urban male	24.550	27.530
Urban female	25.440	26.620
Rural male	26.900	9.020
Rural female	23.110	5.840
Human capital		
Formal education		
No schooling	24.500	7.120
Primary school	36.050	9.860
Middle school	23.770	26.980
High school or above	15.680	35.670
Health status		
Very good	8.440	28.090
Good	37.830	22.540
So so	34.560	13.430
Not so good	19.180	9.450
Economic capital		
Number of houses		
0	7.630	7.180
1	87.470	17.250
2 or more houses	4.900	44.670
Have pension		
No		8.650
Yes	59.640	23.160

Source: 2016 CLASS.
Note: N = 8029.

Table 2 Distribution of control variables

	Mean/percent	SD
Socio-demographics		
Age	69.640	7.173
In marriage	71.270	
Currently working	12.740	
Occupation in the past or present		
Office work	16.900	
Ordinary worker	32.830	
Farmer	50.270	
Attitudes on sons for old-age support		
Agree	58.910	
Depending	28.110	
Disagree	12.980	
Household context		
Generations		
1-generation	56.290	
2-generations	17.030	
3 or more generations	26.680	
Home has shower	53.600	
Home has internet coverage	41.590	
Location of community		
County/district seat	39.090	
Outskirt of county/district	8.400	
Joint area of city and countryside	8.340	
Town	4.850	
Countryside	39.330	

Source: 2016 CLASS.
Note: N = 8029.

Table 3 Multilevel Random Intercept Logistic Model Results of Having Smartphone (baseline models)

	Model 1 (empty model)			Model 2			Model 3		
	Coef.	SE		Coef.	SE		Coef.	SE	
Fixed effect									
Female	-	-		-0.331	0.074	***	-	-	
Rural	-	-		-1.206	0.121	***	-	-	
Composite measure of gender and *hukou*									
Rural female (=ref)									
Urban male	-	-		-	-		1.578	0.148	***
Urban female	-	-		-	-		1.293	0.151	***
Rural male	-	-		-	-		0.442	0.136	***
Intercept	-2.474	0.113	***	-1.647	0.120	***	-1.670	0.123	***
Random parameters									
Community intercept	3.570	0.403	***	2.543	0.304		2.540	0.304	

Source: 2016 CLASS.

Note: N of elders are 8029; N of communities are 414.

Table 4 Multilevel Random Intercept Logistic Model Results of Having Smartphone (Partial and Full Models)

	Model 4			Model 5			Model 6		
	Coef.	SE		Coef.	SE		Coef.	SE	
Female	-	-		-0.249	0.092	**	-	-	
Rural	-	-		-0.326	0.170		-	-	
Gender and *hukou*									
Rural female (=ref)									
Urban male	0.920	0.160	***	-	-		0.641	0.201	***
Urban female	0.868	0.159	***	-	-		0.478	0.199	*
Rural male	0.254	0.142		-	-		0.444	0.161	**
Human capital									
Formal education									
No schooling (=ref)									
Primary school	−0. 046	0. 126		-0.280	0.142	*	-0.298	0.142	*
Middle school	0. 910	0. 130	***	0.268	0.150		0.247	0.150	
High school or above	1. 231	0. 143	***	0.522	0.167	**	0.507	0.167	***
Health status (Very good =ref)									
Good	−0. 293	0. 126	*	-0.181	0.147		-0.175	0.147	
So so	−0. 843	0. 136	***	-0.515	0.158	***	-0.513	0.158	***
Not so good	−1. 193	0. 163	***	-0.728	0.186	***	-0.729	0.186	***
Economic capital									
Number of houses (0=ref)									
1	0. 127	0. 204		-0.024	0.232		-0.033	0.232	
2	1. 170	0. 246	***	0.777	0.279	**	0.771	0.280	**
Have pension	0. 340	0. 107	**	0.130	0.128		0.133	0.128	
Socio-demographics									
Age	-	-		-0.101	0.008	***	-0.101	0.008	***
In marriage	-	-		0.045	0.114		0.050	0.114	
Currently working	-	-		0.375	0.128	**	0.368	0.128	**

(Table 5 continued)

	Model 4			Model 5			Model 6		
	Coef.	SE		Coef.	SE		Coef.	SE	
Occupation in the past or present									
Office work (=ref)									
Ordinary worker	-	-		-0.374	0.117	***	-0.378	0.117	***
Farmer	-	-		-0.859	0.178	***	-0.858	0.178	***
Attitude on sons for old-age support									
Agree (=ref)									
Depending	-	-		0.250	0.105	*	0.251	0.105	*
Disagree	-	-		0.246	0.131		0.246	0.131	
Household context									
Generations									
1-generation (=ref)									
2-generations	-	-		-0.304	0.120	**	-0.300	0.120	*
3 or more generations	-	-		-0.666	0.112	***	-0.662	0.112	***
Home has shower	-	-		0.565	0.122	***	0.567	0.122	***
Home has internet coverage	-	-		2.359	0.110	***	2.361	0.110	***
Community context									
County/district seat (=ref)									
Outskirt of county/district	-	-		0.201	0.261		0.207	0.261	
Joint area of city and countryside	-	-		-0.563	0.270	*	-0.559	0.270	*
Town	-	-		-0.266	0.351		-0.271	0.351	
Countryside	-	-		-0.173	0.229		-0.186	0.229	
Constant	-2.203	0.280	***	4.052	0.674	***	3.375	0.664	
Random parameters									
Community intercept	2.150	0.261	***	2.196	0.275	***	2.192	0.275	***

Source: 2016 CLASS.

Note: ***p<0.001; **p<0.01; *p<0.05.

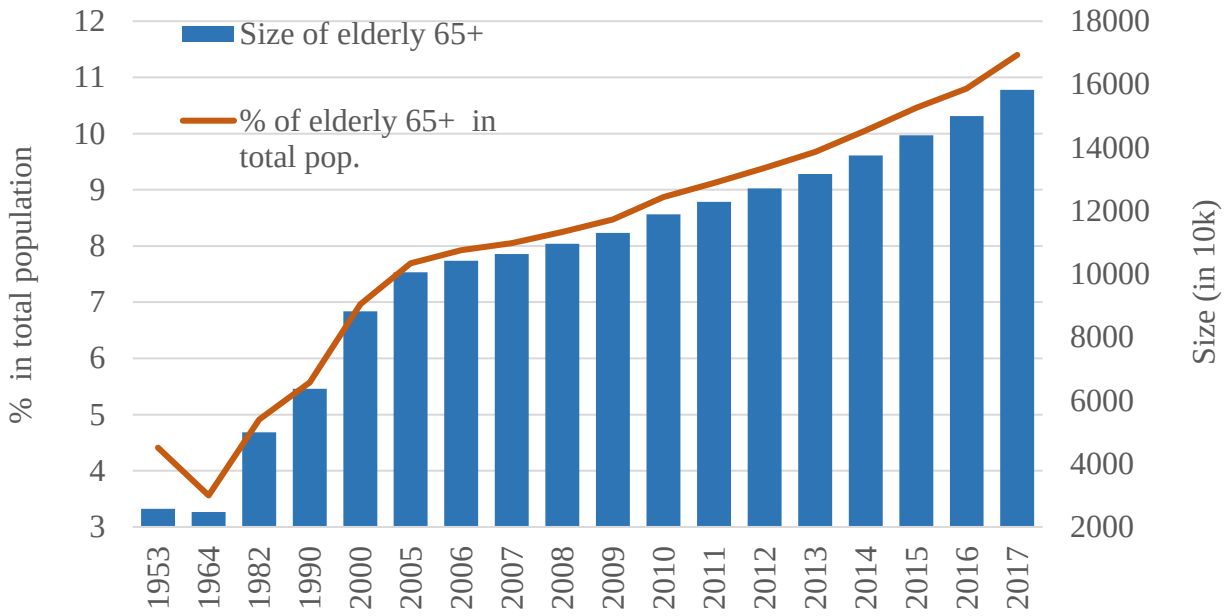

Figure 1 Trend of Population Aging: China 1953-2017

Source: Yang (2018).

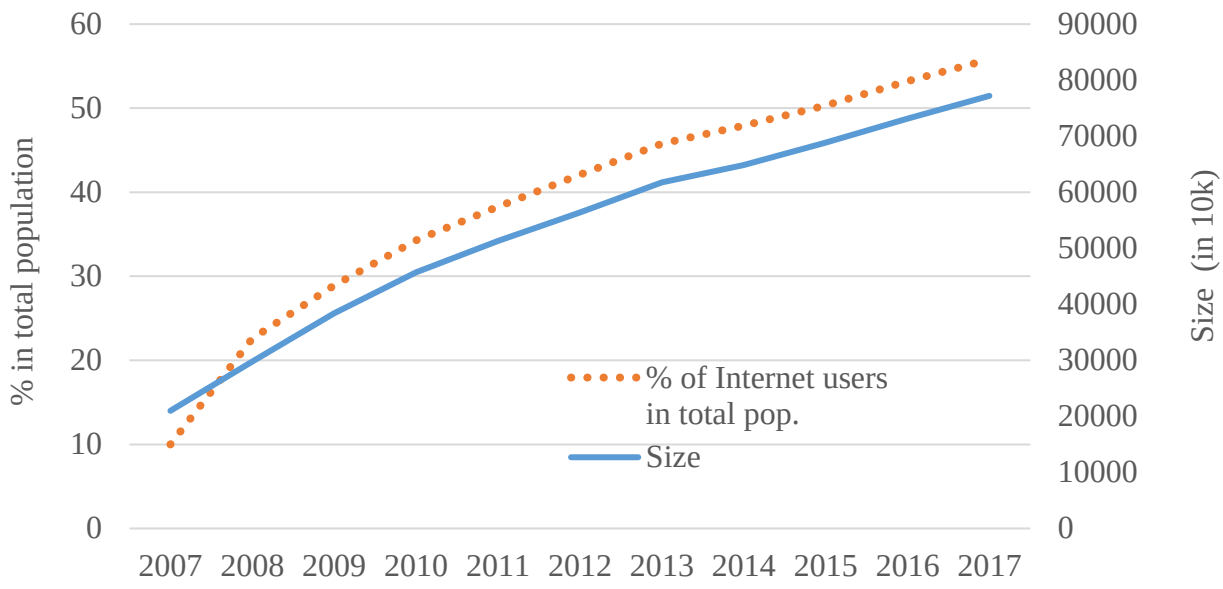

Figure 2 Trend of Internet User: China 2007-2017

Source: CNNIC (2018, created from Figure 21).

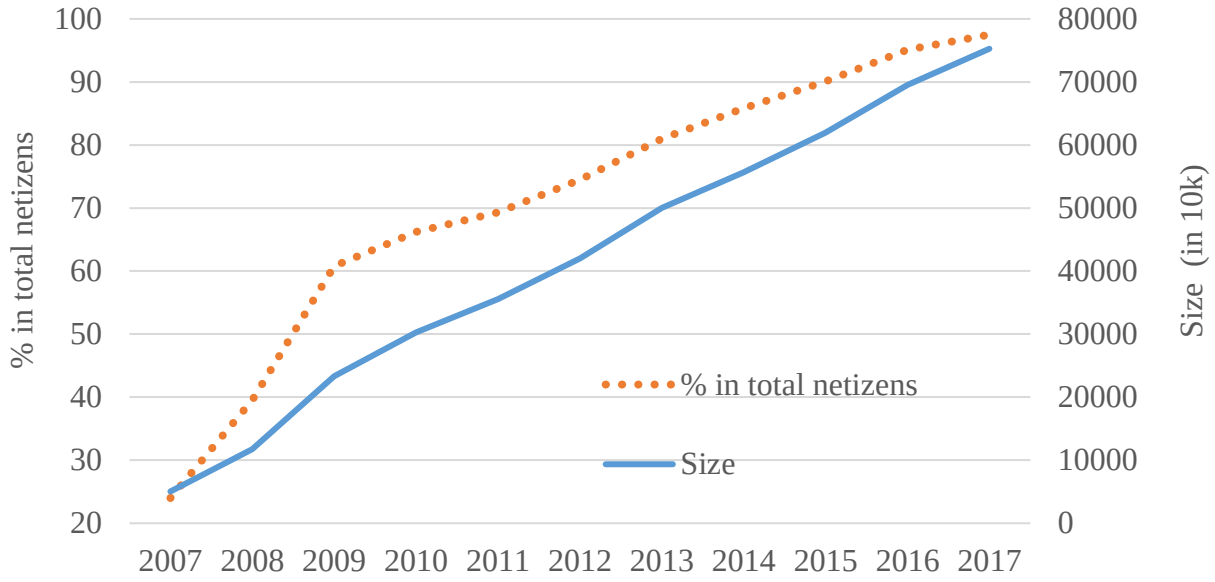

Figure 3 Trend of Mobile Internet User: China 2007-2017

Source: CNNIC (2018, created from Figure 22).