

Digital literacy and Rural Self-employed Employment Groups: Survey Evidence from Rural China

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Abstracts: The digital economy has a huge impact on individual employment behavior, and numerous scholars have discussed the impact of the digital economy on employment. This paper empirically examines the impact of individual digital literacy on rural self-employment employment based on CFPS 2020 data. It is found that digital literacy provides the probability of self-employment employment for rural residents. Further categorizing self-employment into subsistence self-employment and entrepreneurial self-employment, it is found that digital literacy increases the probability of subsistence self-employment and entrepreneurial self-employment, with a greater impact on subsistence self-employment. The article's recommendations to address self-employment, implement employment security, and promote the transformation of digital technology into practical benefits have some practical reference value and policy implications.

Keywords: Digital Literacy; Informal Employment; Self-Employment; Digital Divide

1. Introduction

With the continuous promotion of the construction of "Digital China" and the rapid development of China's Internet technology, people rely more and more on the use of digital technology, and the digital divide caused by the differences in digital literacy has become an important topic for research. The 14th Five-Year Plan for the Development of

the Digital Economy clearly states that the development of the digital economy is bringing visible and tangible benefits to the public. Theories on the digital divide often address the unequal access to information and the ability to utilise it. The digital divide specifically encompasses three levels of meaning: accessibility of use, reflecting differences in access opportunities; depth of use, reflecting differences in digital literacy in use; and tangible results of use, reflecting differences in access to digital resources^[1,2]. On the flip side, the digital economy does not create value per se, differences in individual digital literacy lead to a secondary digital divide, which further affects access to digital benefits for those who do not have access to and utilise digital technologies, leading to differences in tangible outcomes. The inclusive nature of the digital economy is reflected in the ability of individual residents to access digital dividends through their own capabilities. The digital divide is widespread across countries, regions and urban and rural areas. Since 2020, a total of 55.75 million rural people have been completely lifted out of poverty. This historical experience provides an important reference for poverty reduction in other countries. The centre of China's future efforts has shifted to reducing unbalanced and insufficient relative poverty. In the phase of relative poverty management, expanding rural employment channels and upgrading the employability of rural residents are important issues that cannot be escaped.

Digital literacy is an indispensable part of exploring the digital economy. Since Tapscott (1996) proposed the concept of digital economy, many institutions and scholars have

explored digital economy from different perspectives. On the one hand, the emergence of the digital economy has dramatically reduced search costs, and Internet platforms have brought together business users and logistics companies, enabling the establishment of direct links and effectively alleviating the problem of information asymmetry. The emergence of a new generation of information technology has given rise to the digital economy, and the new development pattern has promoted the upgrading of employment quality. Utilising the digital economy to achieve high-quality employment is a practical way to achieve common prosperity. On the other hand, digital literacy has become a new demand for workers and consumers. In the era of agricultural and industrial economy, most consumers have low or no literacy requirements, and even if there are some literacy requirements for labourers, they are limited to a specific job position. In the era of digital economy, both consumers and workers need to have certain digital literacy. It can be said that digital literacy is a basic human right in the era of digital economy and a key element for individuals to participate in the social connection, and Sen (2009) argues that viability not only applies to micro-individuals, but also extends to the level of socio-economic development^[3]. Digital literacy not only enhances the wealth and income of the population, but also helps to optimise the structure of income distribution, which has a significant characteristic of benefiting the poor (Shan Depeng et al., 2022)^[4]. Improving digital literacy is beneficial to both digital consumption and digital production, and is a key element and important foundation for the development of the digital economy.

He Zongyue and Song Xuguang (2020) found that the digital economy has a significant positive effect on informal employment, especially entrepreneurship^[5]. Zhang Kangsi et al. (2018) found that employment discrimination is prevalent in the informal employment market^[6]. He Wenjiong argues that informal employment brought about by the digital economy, with changes in hiring methods, has yet to be revisited in terms of employment security coverage^[7]. Derek Yang and Qi Zhou (2023) found that individual ability in the digital economy significantly

affects the wage difference between informal and formal employment^[8]. Based on this, the existing literature has examined the impacts of the digital economy and entrepreneurship, but has not considered the differences in self-employment, such as the existence of differences in the essential attributes of different human capital groups engaging in self-employment, and the social security system adapted to the digital economy needs to correspond to the details of employment. Accordingly, this paper focuses on the impact effects of digital literacy and self-employment in the context of rural self-employment.

2 Research Design

2.1 Data Sources

This paper uses data from the 2020 China Family Tracking Survey (CFPS), which incorporates the latest 2020 data on economically connected households, and screens for samples aged 16-64. After deleting invalid samples, 2318 cross-sectional data were finally obtained. In order to improve the accuracy of the research conclusions, the data were processed in a relevant way, including the elimination of missing values and invalid values, and the assignment of values to the corresponding variables according to the variable definitions.

2.2 Model Design

In order to study the impact of digital literacy on self-employment employment, the following benchmark model is set:

$$\Pr(SI_{ij} = 1) = \Phi(\beta_0 + \beta_1 Power_{ij} + \sum_{\delta=1} \lambda_{\delta} CV_{ij} + \mu_j + \varepsilon_{ijt}) \quad (1)$$

Where SI_{ij} is a dummy variable for whether or not an employed person is engaged in self-employment; $Power_{ij}$ is the core explanatory variable of this paper, i.e., personal digital literacy; CV_{ij} is a series of control variables affecting an employed person's self-employment; μ_j is a city fixed effect that does not change over time; and ε_{ijt} is a random perturbation term. Probit regressions were used using 2020 cross-sectional data and the explanatory variable self-employment employment being a binary variable.

2.3 Selection of Variables

The explanatory variable is digital literacy. Digital literacy measures the individual ability of individual workers to be able to reasonably use digital tools and devices and to use digital technology for activities such as socialising with others, business practices and learning. Referring to the definition of Wang J. et al. (2022), the identification of digital literacy is divided into two steps: firstly, rural residents are judged to be able to use mobile phones and computers normally, and if the answer is no, the value is assigned as 0. Secondly, the ability to use digital technology is defined in five dimensions, namely, learning literacy, work literacy, social literacy, recreational literacy, and life literacy. In the database, "the importance of Internet use for learning", "the importance of Internet use for work", "the importance of Internet use for socialising", "Importance of Internet use for entertainment", "Importance of Internet use for daily life (shopping, etc.)", ranging from "not important" to "very important". The importance of the five dimensions ranges from "not important" to "very important", and the entropy weighting method is used to reduce the dimensionality of the five dimensional indicators.

The explanatory variable is self-employment employment. Self-employment is all jobs in all non-farm industry sectors working for themselves as opposed to being employed (Shi Danzhe and Lai Desheng, 2013) [9]. In this paper, self-employment employment is defined as private firms, self-employed and other job types where other self-employment exists. Further based on firm size, firms with

less than six employees are defined as survival self-employment and those with more than six employees are defined as entrepreneurial self-employment. Where the variables do not include urban samples.

Control variables: based on three levels: individual characteristics, household characteristics, and regional dummy variables. Individual characteristic variables include age, gender, health status, education, skill level, and household registration. For gender status, male = 1, female = 0; the age level incorporates the squared term; for years of education from illiterate, primary school, junior high school, high school, junior college, bachelor's degree, master's degree, doctoral degree are assigned in order of 0, 6, 9, 12, 15, 16, 19, 22; the health status is assigned from unhealthy and very healthy in order of 1 to 5; the household characteristics include the household size, risk appetite, whether to join the social organisations and social donations, etc. Risk preference is based on whether to hold financial products, yes=1 otherwise 0, social organisation is based on whether to join social organisations or groups or trade unions, yes=1, no=0, and dummy variables are set for the eastern, central and western regions respectively. Specific variable definitions, assignments and descriptive statistics (see Table 1). In the sample, the per capita age at employment was 35.39 years, the share of self-employment was 16.9, the mean household size for eating at the same stove was 4.6, and the average income was 20,400 yuan per year.

Table 1. Descriptive Statistics

variable name	observed value	average value	standard deviation	minimum	maximum
Self-employment	2318	0.169	0.375	0	1
digital literacy	2318	0.775	0.163	0.200	1
Individual's age	2318	35.39	10.18	18	64
Individual age square term	2318	1356	792.1	324	4096
personal education	2318	9.742	3.633	0	19
personal health	2318	3.366	1.061	1	5
Personal marital status	2318	0.758	0.428	0	1
Family size	2318	4.602	2.095	1	13
Number of children in the household	2318	1.577	1.488	0	10
Per capita household income	2318	20409	23909	0	350,000
social organisation	2318	0.726	0.446	0	1
eastern part	2318	0.331	0.471	0	1

3. Empirical Analyses

Table 2 reports the regression results from the full sample regression and the post classification regression respectively. In particular, in terms of statistical significance, column (1) shows that digital literacy has a significant positive effect on self-employment of rural residents at the 1 per cent statistical level. After further categorising self-employment into subsistence and entrepreneurial self-employment based on workplace population, the data in Columns (2) and (3) show that digital literacy has a significant positive impact on both subsistence and entrepreneurial self-employment, with the impact on subsistence self-employment being greater than entrepreneurial self-employment. In terms of economic significance, when rural residents' digital literacy increases by one point, it corresponds to a 14.5 per cent increase in the probability of rural residents choosing survival self-employment and a 7.3 per cent increase in the probability of choosing entrepreneurial self-employment. Thus, digital literacy increases the probability of self-employment for rural residents in a significant economic sense. The current Internet usage rate of rural

residents has been significantly improved, but there are differences in the purpose of individual Internet usage, and rural residents' Internet usage tends to sink to short video platforms such as Jitterbug and Shutterbug. Digital literacy is further disaggregated into different subsections to analyse the impact of different dimensions of digital literacy on rural residents' self-employment. Referring to Wang J. et al. (2022), digital literacy was divided into five dimensions, specifically reflecting digital learning literacy, digital work literacy, digital social literacy, digital entertainment literacy, and digital life literacy, and the five sub-dimensions of digital literacy were regressed on self-employment employment using the Probit model respectively (see Table 3)^[10]. The results show that digital learning literacy, digital work literacy, and digital life literacy play an important role in rural residents' choice of self-employment employment, and, the order of magnitude of the role is digital life literacy > digital work literacy > digital learning literacy. The reason why digital life literacy has the highest role may be because, for rural residents, good digital life literacy means a more convenient lifestyle and a more efficient household business model, which may directly affect the probability of choosing self-employment.

Table 2. Differences by Type of Self-employment

	(1)	(2)	(3)
	Full sample of self-employment	Survival self-employment	Entrepreneurial self-employment
digital literacy	0.204*** (0.05)	0.145***	0.073***
control variable	Controlled	Controlled	Controlled
Province dummy variable	fixation	fixation	fixation
N	2318	2318	2092
LR chi2	135.96	130.28	44.33
Log likelihood	-988.66	-894.17	-242.97

Table 3. Differences in Self-employment Across Digital Literacy

	(1)	(2)	(3)	(4)	(5)
	self-employment	self-employment	self-employment	self-employment	self-employment
Learning	0.016**(0.01)				
Work		0.022*** (0.01)			
Social			0.013 (0.01)		
Entertainment				-0.001(0.01)	
Lifestyle					0.041***(0.01)
control variable	Controlled	Controlled	Controlled	Controlled	Controlled
Province dummy	fixation	fixation	fixation	fixation	fixation

variable					
N	2318	2318	2318	2318	2318
LR chi2	124.13	132.75	120.27	118.32	153.48
Log likelihood	-994.58	-990.27	-996.51	-997.48	-979.91

4. Conclusions and Recommendations

This paper explores the impact of digital literacy on self-employment using CFPS 2020 data and finds that (1) digital literacy increases the probability of an individual being self-employed. (2) Digital literacy increases both subsistence and entrepreneurial self-employment probabilities, and promotes subsistence self-employment more than entrepreneurial self-employment. (3) Digital life literacy plays the greatest role in promoting self-employment among rural residents.

Based on the above findings, this paper proposes the following policy recommendations:

First of all, rural self-employment should be squarely addressed. Self-employment of rural residents is a spontaneous market with its own regularity, and it is important for improving the quality of employment of rural residents, especially for the survival-type self-employment group. In the process of rapid urban development, subsistence self-employment has to a certain extent alleviated the employment conflicts caused by technological progress. It is also an important source of income for rural residents. Therefore, the right of vulnerable groups to self-employment should be respected, and because of the inherent disadvantages in the human capital of rural residents, the behaviour of a large group of rural subsistence self-employed persons, such as itinerant traders and kiosks, should be guided rather than simply regulated or replaced.

Secondly, in terms of guiding rural residents to employment. It is recommended that existing policy measures on self-employment be refined and implemented and regulated. At present, in the context of the development of the digital economy, rural residents are in a disadvantaged position because of their low level of human capital, and social security in the transition to the digital economy is a major challenge, and adaptive reforms of social insurance should be promoted. In order to promote the participation of rural residents in self-employment, local governments should

start from the source, implement educational equity, integrate high-quality educational resources, and reduce intergenerational inequality in education. At the same time, for rural residents who are already in the labour force, special skills training, the provision of fast and convenient financial services, the improvement of the quality of rural cadres, and the improvement of relevant laws and regulations are all conducive to the development of self-employment among rural residents.

Finally, promote the translation of digital technologies into real-life benefits. Rural residents should be guided to actively use online resources and digital literacy should be strengthened for people of all ages. The government level is actively leading the self-employed to develop a sense of self-learning, so that the rural underclass can feel tangible convenience and improved quality of life through Internet connectivity. This is especially true for internet usage and digital literacy among the middle-aged and elderly and rural household population. To this end, new values and concepts need to be developed to ultimately promote the sharing of the fruits of the digital economy for all.

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