Research Article

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Does the Different Ways of Internet Utilization Promote Entrepreneurship: Evidence from Rural China

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Abstract: Entrepreneurship is widely recognized as a key driver of both innovation and economic growth. It comprises two essential components: (i) discover entrepreneurial opportunities and (ii) accumulate entrepreneurial capital. Based on the Chinese Family Panel Studies in 2018, we consider online information acquisition and online learning to be important ways of discovering entrepreneurial opportunities. Additionally, we regard online social engagement and online businesses as essential channels of entrepreneurial capital accumulation. The study reveals that entrepreneurship is positively affected by online information acquisition, online learning, online social engagement, and online businesses. The robustness of our results has been confirmed in terms of model misspecification and the reverse causality of entrepreneurship to Internet utilization. Furthermore, evidence indicates that the impact of online learning on entrepreneurship is negatively moderated by human capital. Additionally, social capital and financial capital play a role in mediating the causal pathway linking online social engagement and online businesses to entrepreneurship.

Keywords: internet utilization, entrepreneurship, information acquisition

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1 Introduction

Despite the positive role of entrepreneurship in driving innovation and economic growth, the level of entrepreneurship in rural areas remains significantly lower compared with that in urban areas, especially under the impact of the COVID-19 pandemic on entrepreneurship. Previous research has investigated the factors that determine entrepreneurship from various perspectives such as capital and individual characteristics (Gedajlovic et al., 2013; Nick et al., 2020; Susanne et al., 2018). Scholars have also addressed the impact of Internet utilization on entrepreneurship (Bhimani et al., 2019; Jarwar et al., 2017; Zhao, 2020). For instance, Barnett et al. (2019) found the positive impact of cell phone and Internet utilization on entrepreneurship, as well as the role of social networks and online information acquisition in mediating the impact of information and communications technology utilization on entrepreneurship. According to Tan and Li (2022), the Internet primarily facilitates entrepreneurship by making it easier for entrepreneurs to access information and secure informal financing. Moreover, the study by Liu et al. (2022) demonstrated that the determinants of necessity entrepreneurship are different from those of opportunity entrepreneurship, with the former being more likely to be impacted by Internet utilization than the latter. However, there is a lack of literature on how the different ways of Internet utilization will impact entrepreneurship, especially in terms of discovering entrepreneurial opportunities and accumulating entrepreneurial capital, which are critical components of entrepreneurship. Therefore, this research gap should be filled because the findings from China could be generalized to other similar economies as well.

Using data from the Chinese Family Panel Studies (CFPS) in 2018, our study contributes to the current literature in the following ways. First, we found that the different ways of Internet utilization can positively affect entrepreneurship. In the stage of discovering entrepreneurial opportunities, an average of 4.25 (2.96)% more people who acquire information online (or learn online)

experience a transition to entrepreneurship than those who do not. In the stage of accumulating entrepreneurial capital, the likelihood of switching to entrepreneurship for those who engage in online social activities (online businesses) was, on average, 4.00 (5.79)% higher than that for those who do not. These results are robust in terms of model misspecification and the reverse causality of entrepreneurship to Internet utilization. Second, referring to the sustainable livelihood framework (Markley & Low, 2012), we explored the relationship between the different ways of Internet utilization and entrepreneurship by considering livelihood capital. Our findings reveal that the impact of online learning on entrepreneurship is negatively moderated by human capital, while social capital and financial capital play a role in mediating the causal pathway from online social engagement and online businesses to entrepreneurship.

This article is composed of six sections. Section 1 is the introduction. Section 2 presents the theoretical framework for this study and a set of hypotheses. Section 3 provides a detailed description of the data and variables adopted in the analysis. Section 4 elaborates on the empirical results regarding the relationship between Internet utilization and entrepreneurship. Section 5 involves a discussion about the findings of the study. Section 6 offers concluding remarks.

2 Theoretical Model and Hypotheses Development

In this section, we aim to review related research that serves as a foundation for this study and develop a vision of several mechanisms underlying how different ways of Internet utilization would impact entrepreneurship. Based on this review, we proposed a theoretical model and four hypotheses.

2.1 Discover Entrepreneurial Opportunities

Some studies have shown the positive impact of opportunity discovery on entrepreneurship mainly because discovering entrepreneurial opportunities is the first step in entrepreneurship. According to Shane (2000), there are two major integral elements of the identification of entrepreneurial opportunities: (i) adequate information triggering an entrepreneurial conjecture and (ii) cognitive properties that find its value.

2.1.1 Trigger an Entrepreneurial Conjecture

First of all, the process of discovering entrepreneurial opportunities requires access to adequate information, which can trigger an entrepreneurial conjecture. Therefore, those with more information are more likely to become entrepreneurs than those possessing less.

As an important ingredient of Internet applications, the search engine can be instrumental in enabling potential entrepreneurs to obtain abundant information online, thus facilitating the discovery of entrepreneurial opportunities. Tan and Li (2022) also suggested that the Internet can facilitate communication and lessen information asymmetry during people's decision-making regarding entrepreneurship. Based on the aforementioned reviews, online information acquisition may help individuals to discover entrepreneurial opportunities and thus promote entrepreneurship. Therefore, we put forward H1.

H1: Online information acquisition has a positive impact on entrepreneurship.

2.1.2 Find Value

Second, apart from access to adequate information, the process of discovering entrepreneurial opportunities also requires access to prior knowledge of cognitive properties. For instance, Karlan and Valdivia (2011) found that entrepreneurship teaching can improve the individual's entrepreneurial activities. Arentz et al. (2013) indicated that an entrepreneur's prior knowledge plays a critical role in enabling him/her to exploit entrepreneurial opportunities. Therefore, if individuals possess more knowledge, they will be more likely to become entrepreneurs than those who do not.

Knowledge acquired from online applications and platforms can enrich cognitive properties, which may be essential for potential entrepreneurs. Based on the aforementioned reviews, online learning may help individuals to discover entrepreneurial opportunities and thus promote entrepreneurship. Therefore, we put forward the following hypothesis.

H2: Online learning has a positive impact on entrepreneurship.

2.2 Accumulate Entrepreneurial Capital

The ability to discover entrepreneurial opportunities is not adequate for one's engagement in entrepreneurship. Entrepreneurial capital is also essential for the process of

grasping entrepreneurial opportunities. Therefore, accumulating entrepreneurial capital is extremely crucial for potential entrepreneurs' success.

2.2.1 Social Capital

Social capital is mostly focused on familial ties and friendships, which are connected via both formal and informal connections. Existing studies have demonstrated a positive impact of social capital on entrepreneurship. For example, Arafat et al. (2020) found that people who are socially connected to entrepreneurs are more likely to engage in entrepreneurial activities in the agricultural sector. Khoshmaram et al. (2018) indicated that social capital can directly and positively affect Iranian farmers' entrepreneurship. Some studies have shown that the main advantage of social capital lies in its positive role in helping potential entrepreneurs acquire entrepreneurial funding through informal financing (Gedajlovic et al., 2013; Nick et al., 2020).

The Internet is profoundly changing the way people communicate. In comparison with face-to-face interaction, technological communication is more convenient, which maintains and enlarges an individual's social capital (Wang et al., 2022; Zhao, 2020). To sum up, online social engagement may help individuals to expand social capital and thus promote entrepreneurship. Therefore, we put forward H3.

Table 1: Hypotheses and the expected results

Hypotheses	Expected results
H1	Online information acquisition has a positive impact on entrepreneurship
H2	Online learning has a positive impact on entrepreneurship
H3	Online social engagement has a positive impact on entrepreneurship
H4	Online businesses have a positive impact on entrepreneurship

H3: Online social engagement has a positive impact on entrepreneurship.

2.2.2 Financial Capital

As a matter of fact, potential entrepreneurs are often constrained from engaging in entrepreneurship by a lack of funds (Paulson & Townsend, 2004). Due to limited collateral, people in rural China often struggle to secure adequate entrepreneurial funding from financial institutions.

Online businesses constitute a necessary component of remote transactions as they provide the infrastructure and technology needed to facilitate secure and efficient exchanges. Existing literature suggests that online businesses have a positive impact on entrepreneurship (Luo & Zeng, 2020; Vong et al., 2012). According to the findings of some studies, the main reason is that online businesses can create a huge development space for the reduction of financial transaction costs and the relief of financing constraints (Tan & Li, 2022). Based on the aforementioned reviews, online businesses may help individuals to obtain financial capital and thus promote entrepreneurship. Therefore, we proposed the following hypothesis.

H4: Online businesses have a positive impact on entrepreneurship.

Table 1 shows the four hypotheses proposed.

With all these discussions, the theoretical model is shown in Figure 1.

3 Data and Variables

3.1 The Data Source

CFPS refers to a nationwide household survey conducted by Peking University every 2 years. Additionally, CFPS provides a rich dataset for both academic research and policy

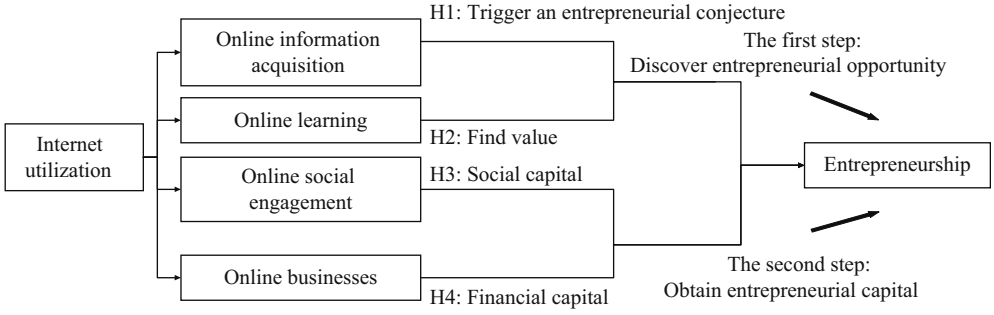

Figure 1: The theoretical model.

analysis. Starting in 2010, the baseline survey of CFPS covers around 15,000 households and 30,000 individuals. We used data from the 2018 survey, which covers around 14,218 households and 37,354 individuals from 31 provinces (cities, or autonomous regions) excluding Hong Kong, Macao, and Taiwan, by matching samples and restricting the analysis to rural areas while excluding observations with missing values. The results in the final dataset contain 6,036 observations, providing a panorama of economic behavior and outcomes among rural households in China.

3.2 Variables

3.2.1 Dependent Variable

Serving as an indicator variable of an entrepreneur, the dependent variable was defined according to the engagement of family members in entrepreneurship in CFPS. If family members engaged in entrepreneurship, the value of the dependent variable is one. Otherwise, it is zero.

3.2.2 Independent Variables

In this study, we divided the independent variables into four groups:

(1) Online information acquisition. The independent variable was defined according to the question of whether the Internet is important for information acquisition in CFPS. If the answer is yes, the value of the variable is one. Otherwise, it is zero.
(2) Online learning. The independent variable was defined according to whether the interviewee used the Internet to study in CFPS. If the answer is yes, the value of the variable is one. Otherwise, it is zero.
(3) Online social engagement. The independent variable was defined according to whether the interviewee used the Internet to socialize in CFPS. If the answer is yes, the value of the variable is one. Otherwise, it is zero.
(4) Online businesses. The independent variable was defined according to whether the interviewee used the Internet to conduct commercial activities in CFPS. If the answer is yes, the value of the variable is one. Otherwise, it is zero.

3.2.3 Control Variables

Many individual and household variables that could impact entrepreneurship were also considered in this study, including variables of individual characters and variables of household characteristics, such as age, gender, health, marriage, family scale, and household wealth, as suggested by Zhang and Pan (2012).

3.2.4 Moderating Variable

The moderating variable refers to education, which is the proxy variable of human capital.

3.2.5 Mediating Variables

(1) Social network. The mediating variable was defined according to the total household expenses of gifts for maintaining social relations in CFPS. In rural China, family relationships and friendship are the basis for

Table 2: Definitions of variables

Variables	Definitions
Entrepreneurship	Family members engaged in business operation = 1, otherwise = 0
Online information acquisition	Considered the Internet as an important source of access to information = 1, otherwise = 0
Online learning	Used the Internet for learning = 1, otherwise = 0
Online social engagement	Used the Internet to socialize = 1, otherwise = 0
Online business	Used the Internet to engage in commercial activities = 1, otherwise = 0
Male	Male = 1, otherwise = 0
Age	Age of household head
Health	Self-rated health condition being relatively healthy and above = 1, otherwise = 0
Married	Married = 1, otherwise = 0
Family scale	The number of family members
Household wealth	The total amount of household wealth
Education	Schooling year
Social network	The total amount of expenses related to the maintenance of social relations
Financial assets	The total amount of financial assets

Table 3: Descriptive statistics

Variables	Mean	Std.	Min	Max
Entrepreneurship	0.076	0.264	0	1
Online information acquisition	0.443	0.497	0	1
Online learning	0.140	0.358	0	1
Online social engagement	0.338	0.473	0	1
Online businesses	0.207	0.405	0	1
Male	0.562	0.496	0	1
Age	51.675	14.193	16	92
Health	2.837	1.281	1	5
Married	0.845	0.362	0	1
Family scale	3.840	1.981	1	21
Household wealth	10.145	1.409	0	14.286
Education	5.983	4.498	0	19
Social network	7.017	2.530	0	11.290
Financial assets	6.950	4.483	0	15.009

social networks. Therefore, social network was chosen as the proxy variable of social capital.

(2) Financial assets. The mediating variable was defined according to the total amount of financial assets in CFPS. Financial assets were selected as the proxy variable of financial capital.

Table 2 shows the definitions of the aforementioned variables.

Table 3 provides descriptive statistics. We can find that the percentage of entrepreneurship was around 7.6% in rural China, with the primary independent variables being the behaviors of Internet users. About 44.3% of rural households considered the Internet a critical source of information, while 14.0% used the Internet for learning purposes. Meanwhile, the proportion of households using the Internet for social activities reached 33.8%, while the proportion of households using the Internet for business was 20.7%. The final sample is composed of a total of 6,036 households.

4 Empirical Findings

4.1 Benchmark Regression

Table 4 shows the benchmark regression results. In the stage of discovering entrepreneurial opportunities, from column (1), the percentage of people who consider the Internet as a critical source of information was, on average, 4.25 points higher than those who do not, which was significant at the 1% level. Meanwhile, the percentage of people who use the Internet for learning was, on average, 2.96 points higher than those who do not, which was significant at the 1% level. In the stage of obtaining entrepreneurial capital, from column (2), the percentage of people who use the Internet for social activities was, on average, 4.00 points higher than those who do not, which was significant at the 1% level. The percentage of people who use the Internet for businesses was on average 5.79 points higher than those who do not, which was significant at the 1% level. Therefore, four hypotheses are validated, which supplement the conclusions of Liu et al. (2022) and Tan and Li (2022).

Table 4: Benchmark regression results

Variables	(1)		(2)	
	Entrepreneurial opportunity		Entrepreneurial capital	
Online information acquisition	0.642***			
	(0.120)			
Online learning		0.447***		
		(0.128)		
Online social engagement			0.604***	
			(0.125)	
Online businesses				0.881***
				(0.133)
Male	0.107	0.106	0.118	0.106
	(0.106)	(0.106)	(0.105)	(0.106)
Age	−0.013***	−0.018***	−0.011**	−0.006
	(0.004)	(0.004)	(0.005)	(0.005)
Health	0.008	0.005	0.005	0.011
	(0.043)	(0.043)	(0.043)	(0.043)
Married	0.300*	0.378**	0.323*	0.353**
	(0.179)	(0.180)	(0.179)	(0.179)
Family scale	0.066**	0.064**	0.068**	0.073***
	(0.027)	(0.027)	(0.027)	(0.027)
Household wealth	0.438***	0.451***	0.428***	0.413***
	(0.064)	(0.064)	(0.064)	(0.063)
Regional effects	Yes	Yes	Yes	Yes
Pseudo R^2	0.087	0.082	0.085	0.091
N	6,036	6,036	6,036	6,036

Note: ***$p < 0.01$, **$p < 0.05$, *$p < 0.1$.

4.2 Endogeneity Problem

The benchmark model indicates that the different ways of Internet utilization contribute to a higher likelihood of entrepreneurship. Nevertheless, the regression results may be affected by the issue of endogeneity. Given that people use the Internet because they are already involved in entrepreneurship, the benchmark model may suffer from a reverse causality issue.

Table 5: Impact of Internet utilization on new entrepreneurship

Variables	(1)		(2)	
	Entrepreneurial opportunities		Entrepreneurial capital	
Online information acquisition	0.609*** (0.181)			
Online learning		0.516** (0.194)		
Online social engagement			0.651*** (0.190)	
Online businesses				0.698*** (0.203)
Control variables	Yes	Yes	Yes	Yes
Regional effects	Yes	Yes	Yes	Yes
Pseudo R^2	0.074	0.071	0.075	0.075
N	4,792	4,792	4,792	4,792

Note: ***$p < 0.01$, **$p < 0.05$, *$p < 0.1$.

Table 6: Robustness check

Variables	(1)		(2)	
	Entrepreneurial opportunities		Entrepreneurial capital	
Online information acquisition	0.045*** (0.010)			
Online learning		0.041*** (0.015)		
Online social engagement			0.039*** (0.013)	
Online businesses				0.063*** (0.016)
Control variables	Yes	Yes	Yes	Yes
Regional effects	Yes	Yes	Yes	Yes
N	5,986	5,986	5,986	5,986

Note: ***$p < 0.01$, **$p < 0.05$, *$p < 0.1$.

Based on CFPS data in 2016, we introduced the variables of new entrepreneurship, namely the households that engaged in entrepreneurship in 2018 but not in 2016. Table 5 shows the findings of the impact of the Internet on new entrepreneurship. From columns (1) and (2), we can see that the coefficients of independent variables are still statistically positive at the 1% level of significance.

4.3 Robustness Check

The benchmark model indicates that the different ways of Internet utilization can raise the likelihood of entrepreneurship. However, the regression results may be biased. Therefore, referring to the method of Barnett et al. (2019), we used the propensity score matching (PSM) method to lower the risk of model misspecification.

We matched the individuals who do not acquire information (or conduct online learning, online social engagement, and online businesses) via the Internet to the comparison group by using the nearest neighbor matching algorithm ($n = 4$). Table 6 shows the estimated average treatment effects on treated, which are almost consistent with the results of the benchmark model. The percentage of the individuals who use the Internet for information acquisition (or online learning) was 4.5 (4.1) points higher than that of the individuals who engage in entrepreneurship. The percentage of the individuals who use the Internet for online social engagement (online businesses) was 3.9 (6.3) points higher than that of those who engage in entrepreneurship. Next, we compared the distribution of covariates in both the treatment and comparison groups before and after matching. The results of the balancing test suggest that the matching process is of high quality.

4.4 Moderating Effects

In the stage of discovering entrepreneurial opportunities, both online information acquisition and online learning positively affect entrepreneurship. Referring to the sustainable livelihood framework (Markley & Low, 2012), we explored the relationship between Internet utilization and entrepreneurship by considering human capital and found that the impacts of online information acquisition and online learning on entrepreneurship are moderated by human capital.

Table 7 shows the results of the moderating effects of human capital. From column (1), we can find that the impact of online information acquisition on entrepreneurship is not moderated by education. The coefficient of online information acquisition × education failed to pass the significance test. From column (2), we can find that the impact of online learning on entrepreneurship is negatively moderated by education. The coefficient of online learning × education was negative, suggesting that individuals with lower levels of education will be more likely to engage in entrepreneurship after using the Internet for learning.

Table 7: Results of moderating effects

Variables	(1)		(2)	
Online information acquisition	0.864***	0.622***		
	(0.206)	(0.212)		
Online learning			1.859***	1.433***
			(0.287)	(0.297)
Education	0.080***	0.050**	0.116***	0.077***
	(0.020)	(0.021)	(0.015)	(0.156)
Online information acquisition × Education	−0.010	−0.010		
	(0.025)	(0.026)		
Online learning × Education			−0.137***	−0.118***
			(0.030)	(0.030)
Control variables	No	Yes	No	Yes
Regional effects	Yes	Yes	Yes	Yes
Pseudo R^2	0.062	0.091	0.059	0.091
N	6,036	6,036	6,036	6,036

Note: ***$p < 0.01$, **$p < 0.05$, *$p < 0.1$.

4.5 Mediating Effects

In the stage of obtaining entrepreneurial capital, we consider social networks and financial assets as the proxy variables for social capital and financial capital (Liu et al., 2022). We focused on examining whether social capital and financial capital mediate the causal pathway from online social engagement and online businesses to entrepreneurship. We first explored the expansion effect of increased social networks established by online social engagement on entrepreneurship. Then we tested the mediating role of social networks, which is to examine the impact of social networks on entrepreneurship. Similarly, we first explored the expansion effect of increased financial assets accumulated through online businesses on entrepreneurship. Then we tested the mediating role of financial assets, which is to examine the impact of financial assets on entrepreneurship.

Table 8 shows the regression results of the mediating effects of entrepreneurial capital. From column (1), we can find that in comparison with the individuals who do not use the Internet to socialize, those who use the Internet to socialize seem to have stronger social networks. The coefficient of social networks remained positive and was significant at the 1% level, suggesting that stronger social networks are more likely to increase the probability of entrepreneurship, which is in line with the conclusion of Barnett et al. (2019). From column (2), we can find that in comparison with the individuals who do not use the Internet for business, those who use the Internet for business are likely to possess more financial assets. The coefficient of financial assets remained positive and was significant at the 1% level, suggesting that more financial assets are more likely to increase the probability of entrepreneurship, which is consistent with the conclusion of Luo and Zeng (2020).

5 Discussion

Previous studies have shown that Internet utilization can promote entrepreneurship in rural areas (Barnett et al., 2019; Tan & Li, 2022; Zhao, 2020). There are obvious limitations of research exploring the impact of different ways of

Table 8: Results of mediating effects

Variables	(1)		(2)	
	Social network	Entrepreneurship	Financial assets	Entrepreneurship
Online social engagement	0.621***	0.582***		
	(0.144)	(0.126)		
Online businesses			0.488***	0.828***
			(0.100)	(0.134)
Social network		0.068**		
		(0.028)		
Financial assets				0.057***
				(0.014)
Control variables	Yes	Yes	Yes	Yes
Regional effects	Yes	Yes	Yes	Yes
Pseudo R^2	0.144	0.087	0.063	0.097
N	6,008	6,008	6,008	6,008

Note: ***$p < 0.01$, **$p < 0.05$, *$p < 0.1$.

Internet utilization on entrepreneurship. The findings generally lag behind theoretical and empirical development. Therefore, our study aims to describe how different ways of Internet utilization may impact entrepreneurship. Through the lenses of discovering entrepreneurial opportunities and obtaining entrepreneurial capital, we explored the impacts of different ways of Internet utilization on entrepreneurship according to the CFPS dataset in 2018. Our study is expected to make several contributions to the body of knowledge.

First, by addressing several mechanisms underlying how different ways of Internet utilization would impact entrepreneurship, the findings of this study contribute to the growing body of knowledge about entrepreneurship in the Internet age. Drawn on the views of discovering entrepreneurial opportunities and obtaining entrepreneurial capital, the hypotheses formulated from the theoretical model are supported by the findings of empirical studies. The results highlight the positive effects of online information acquisition, online learning, online social engagement, and online businesses on entrepreneurship, which may supplement the existing literature (Shane, 2000).

Second, the findings of this study contribute to the existing literature by exploring the moderating effects of human capital. In the stage of discovering entrepreneurial opportunities, we detailed the relationship between online learning and entrepreneurship by taking into account human capital. Generally, the more educated an individual with a higher level of education is, he/she is more likely to engage in opportunistic entrepreneurship (Figueroa-Armijos et al., 2012). The main reason is that education is closely related to the individual's ability to identify opportunities. However, according to the analysis results of the moderating effects of human capital, individuals with lower education will be more likely to engage in entrepreneurship after using the Internet for learning. One possible explanation is that individuals with lower education can narrow the gap in their entrepreneurial ability through online learning, while individuals with higher education generally have been able to earn money and thus do not necessarily engage in entrepreneurship. Therefore, from this perspective, one of the main implications for the government is to provide low-education individuals, especially in rural areas, with more online learning platforms that can boost the probability of their engagement in entrepreneurship.

Another noticeable aspect is that in the stage of obtaining entrepreneurial capital, the analysis results of the mediating effects of social and financial capital indicate the role of social capital and financial capital in mediating the causal pathway from online social engagement and online businesses to entrepreneurship, respectively. This linkage has also received support from the findings of existing studies (Barnett et al., 2019; Luo & Zeng, 2020; Wang et al., 2022). One possible explanation is that in rural areas, social capital and financial capital can provide abundant entrepreneurial resources. In the Internet age, online social networks and online businesses can provide more channels for potential entrepreneurs to tackle social and financial constraints, thus promoting entrepreneurship. The validated results would provide practitioners and policy-makers with plenty of materials for thought so that they could contribute useful input to guide potential entrepreneurs as to how they can make full of the Internet to achieve the best entrepreneurial results.

6 Conclusion

While earlier studies have found the positive impact of Internet utilization on entrepreneurship, few studies have explored the influence of different ways of Internet utilization on entrepreneurship in terms of discovering entrepreneurial opportunities and accumulating entrepreneurial capital. Additionally, when considering livelihood capital, the relationship between Internet utilization and entrepreneurship has not been thoroughly discussed.

A theoretical model validated empirically using the data from CFPS in 2018 has been employed to explore this impact in terms of discovering entrepreneurial opportunities and accumulating entrepreneurial capital. The results highlight that the different ways of Internet utilization have positive effects on entrepreneurship. Specifically, in the stage of discovering entrepreneurial opportunities, the likelihood of switching to entrepreneurship was generally 4.25% higher for people who acquire information online (or learn online) than that for those who do not. In the stage of accumulating entrepreneurial capital, the likelihood of switching to entrepreneurship was generally 4.00% higher for people who engage in online social activities (online businesses) than that for those who do not. We have immunized our results from the reverse causality of entrepreneurship to the different ways of Internet utilization. Furthermore, we have used the PSM method to lower the risk of model misspecification.

When considering livelihood capital in examining the relationship between Internet utilization and entrepreneurship, we have found that the impact of online learning on entrepreneurship is negatively moderated by human capital, whereas the impact of information acquisition on entrepreneurship is not moderated by human capital. Evidence also suggests that social capital and financial capital play a role in mediating the impact of online social engagement and online businesses on entrepreneurship.

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References

Arafat, M. Y., Saleem, I., Dwivedi, A. K., & Khan, A. (2020). Determinants of agricultural entrepreneurship: A GEM data based study. *International Entrepreneurship and Management Journal*, *16*(1), 345–370.

Arentz, J., Sautet, F., & Storr, V. (2013). Prior-knowledge and opportunity identification. *Small Business Economics*, *41*(2), 461–478.

Barnett, W. A., Hu, M., & Wang, X. (2019). Does the utilization of information communication technology promote entrepreneurship: Evidence from rural China. *Technological Forecasting and Social Change*, *141*, 12–21.

Bhimani, H., Mention, A. L., & Barlatier, P. J. (2019). Social media and innovation: A systematic literature review and future research directions. *Technological Forecasting and Social Change*, *144*, 251–269.

Figueroa-Armijos, M., Dabson, B., & Johnson, T. G. (2012). Rural entrepreneurship in a time of recession. *Entrepreneurship Research Journal*, *2*(1), 1–27.

Gedajlovic, E., Honig, B., Moore, C. B., Payne, G. T., & Wright, M. (2013). Social capital and entrepreneurship: A schema and research agenda. *Entrepreneurship Theory and Practice*, *37*(3), 455–478.

Jarwar, M. A., Abbasi, R. A., & Mushtaq, M. (2017). Communiments: A framework for detecting community based sentiments for events. *International Journal on Semantic Web and Information Systems*, *13*(2), 87–108.

Karlan, D., & Valdivia, M. (2011). Teaching entrepreneurship: Impact of business training on microfinance clients and institutions. *The Review of Economics and Statistics*, *93*(2), 510.

Khoshmaram, M., Shiri, N., Shinnar, R. S., & Savari, M. (2018). Environmental support and entrepreneurial behavior among Iranian farmers: The mediating roles of social and human capital. *Journal of Small Business Management*, *58*(5), 1064–1088.

Liu, Z., Ren, Y., & Mei, Y. (2022). How does internet use promote farmer entrepreneurship: Evidence from Rural China. *Sustainability*, *14*(24), 16915.

Luo, Y., & Zeng, L. Y. (2020). Digital financial capabilities and household entrepreneurship. *Economic and Political Studies*, *8*(2), 165–202.

Markley, D. M., & Low, S. A. (2012). Wealth, entrepreneurship, and rural livelihoods. *Choices*, *27*(1), 6–11.

Nick, W., Robert, H., & Piers, T. (2020). Entrepreneurship and social capital: Examining the association in deprived urban neighbourhoods. *International Journal of Urban and Regional Research*, *44*(2), 289–309.

Paulson, A. L., & Townsend, R. (2004). Entrepreneurship and financial constraints in Thailand. *Journal of Corporate Finance*, *10*(2), 229–262.

Shane, S. (2000). Prior knowledge and the discovery of entrepreneurial opportunities. *Organization Science*, *11*, 448–469.

Susanne, G., Simon, F., Alexander, B., & Tochukwu (Toby) Ugonna O. (2018). Small scale entrepreneurship–understanding behaviors of aspiring entrepreneurs in a rural area. *Competitiveness Review: An International Business Journal*, *28*(1), 22–42.

Tan, Y., & Li, X. Y. (2022). The impact of internet on entrepreneurship. *International Review of Economics & Finance*, *77*, 135–142.

Vong, J., Fang, J., & Song, I. (2012). Delivering financial services through mobile phone technology: A pilot study on impact of mobile money service on micro-entrepreneurs in rural Cambodia. *International Journal of Information Systems and Change Management*, *6*(2), 177–186.

Wang, J., Hu, Y., & Xiong, J. (2022). The internet use, social networks, and entrepreneurship: Evidence from China. *Technology Analysis & Strategic Management*, *34*(1), 1–15.

Zhang, Q. F., & Pan, Z. (2012). Women's entry into self-employment in urban China: The role of family in creating gendered mobility patterns. *World Development*, *40*(6), 1201–1212.

Zhao, J. M. (2020). Internet usage and rural self-employment in China. *Asian Perspective*, *44*(1), 77–101.