Research article

How digital inclusive finance promotes social entrepreneurship: Evidence from 282 cities in China

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ABSTRACT

Social entrepreneurship (SE) plays a positive role in addressing a range of social issues, and thus it is essential to study how to promote SE. Using panel data from 282 Chinese cities from 2011 to 2021, this study explores the mechanism through which digital inclusive finance affects SE. The results indicate that digital inclusive finance has a positive impact on SE, which still holds after considering endogeneity and undergoing a series of robustness tests. In addition, mechanism analysis shows that digital inclusive finance affects SE by alleviating financing constraints and promoting common prosperity. Furthermore, the effect of digital inclusive finance is stronger in cities with a strong Buddhist culture and more judicially civilized. Policy recommendations are also proposed.

1. Introduction

Social entrepreneurship (SE) is perceived as an approach to address a wide range of social issues, especially poverty and discrimination [1,2], rural revitalization [3], and common prosperity [4]. Therefore, exploring effective methods to enhance SE is a highly meaningful topic. In the field of SE, institutional theory has received considerable attention. Previous studies have revealed that apart from certain formal institutions such as business friendliness [5], market inclusiveness [6], market support [7], government activities [8], and regulatory quality [9], which exert a significant impact on SE, informal institutions such as in-group collectivism [10], post-materialism [5,8], religion [11,12], and trust [13] are also crucial in nurturing or hindering SE. This study not only enriches the understanding of the antecedents of SE but also constitutes a response to the emphasis on interpreting social entrepreneurial initiatives within the framework of institutional theory [14,15].

In recent years, with the advancement of digital technology and the digital economy, digital inclusive finance has emerged as an emerging institutional arrangement that not only promotes economic growth but also reduces the deterioration of environmental quality. Digital inclusive finance curtails the surge in Carbon dioxide emissions [16–18] and exerts a threshold effect on economic growth [19]. Additionally, digital inclusive finance helps alleviate the financing void faced by SMEs [20], realizes inclusive economic growth [21], promotes urban innovation [22], encourages rural entrepreneurship [23], and reduces poverty [24]. However, despite digital inclusive finance being a formal institutional arrangement that shares a significant resemblance with the vision of SE, many existing studies have overlooked its impact on SE. Research on moral emotions indicates that individuals are motivated to engage in

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prosocial behaviors when they perceive the virtues or good deeds of others, and prosocial motivation is a pivotal driving factor for implementing SE. Therefore, this study aims to explore the following questions: can digital inclusive finance with a poverty-alleviating nature motivate individuals to engage in prosocial behavior, thereby promoting SE? If so, what is the mechanism? Answers to these questions not only contribute to expand the research on the positive effects of digital inclusive finance from an institutional perspective but also broaden the understanding of the antecedents of SE.

To fill the gaps in current studies, this study utilizes panel data from 282 prefecture-level cities in China from 2011 to 2021 to examine the effect of digital inclusive finance on SE. The contributions of this study are as follows. First, we conduct micro-level research on macro-level issues. From the perspective of moral emotions, the study explores the motivational mechanisms of digital inclusive finance for SE. In addition, this study reveals the micro-mechanisms of digital inclusive finance as an institution stimulating social entrepreneurial decision-making, which follows recent calls for greater consideration of research on microscopic investigation of macro-issues. Second, we expand the research on the positive effects of digital inclusive finance. Digital inclusive finance has a strong situational nature, and some studies suggest that its effectiveness is doubtful in the early stages of its development. Specifically, there is insufficient understanding of its effectiveness in developing countries. This study investigates the role of digital inclusive finance in China, the largest developing country. The findings suggest that, similar to developed countries, digital financial inclusion yields positive effects even in its nascent stages in developing country. Third, enriching research on the drivers of SE from an institutional perspective. Existing studies have examined the impact of various institutions on SE. However, the impact of digital inclusive finance, as an emerging institutional arrangement, on SE has been overlooked. This study is the first to explore the impact of digital inclusive finance on SE, enriching the research on the drivers of SE from an institutional perspective.

2. Research hypotheses

2.1. Direct impact effect

The logic of the decision-making and action of social entrepreneurs is often related to prosocial or other interests [25]; prosocial considerations are the primary rationale behind the decisions and actions of social entrepreneurs. The digitalization of inclusive finance enables individuals to have equal access to financial services, ensuring a sense of impartiality and prioritizing people's needs, ensuring a sense of fairness and people-oriented care, which can influence individuals' moral sentiments and prompt moral elevation, with which individuals' prosocial motivation increases, thus facilitating engagement in social entrepreneurial activities.

It has been shown that moral emotions are often associated with engagement in SE [26,27]. Moral enhancement occurs when individuals witness others excelling in virtues and thus feel inspired and warmed [28]. Consistent with the AET framework, we consider elevation to be a context-specific affective state induced by an event [29]. In particular, elevation is a prototype of the moral emotion of praise from others, triggered when observing others' good deeds that benefit social welfare [30]. For example, social entrepreneurs often use narratives to generate emotional energy among their audiences and encourage their social entrepreneurial engagement [26], simply because the social framing they use engenders their audiences' moral elevation. Exposure to entrepreneurial social framing induces a discrete emotional state of moral elevation, ultimately leading to social entrepreneurial intentions [31]. In summary, witnessing someone's ethical conduct, even if one is not the direct recipient, triggers an elevation, which is a positive moral sentiment, "which is triggered by the good or admirable behavior of others and motivates people to do good or admirable behavior themselves" [32]. Moral elevation encourages people to engage in behaviors that improve the welfare of others, whether aiming at a few individuals or society as a whole [33]. Thus, the role of digital inclusive finance in reducing poverty and bridging the urban–rural gap will stimulate moral elevation in individuals and contribute to SE.

H1. Digital inclusive finance promotes SE.

2.2. Effect of financing constraints

SE aims at addressing social issues and pursuing the creation and balance of economic and social values, with considerable operational difficulties and operating costs. Moreover, SE generally faces the dilemma of poor pro-profitability and lack of legitimacy, which directly leads to SE facing a more significant obstacle than commercial entrepreneurship since its inception, particularly in terms of financial constraints. This is a major reason why SE is stumbling. Digital inclusive finance effectively lowers the threshold for accessing credit, mitigates the issue of financial resource misalignment, and provides another way to address the funding dilemma of SE. Digital inclusive finance utilizes big data and other technologies to reduce the cost of data collection and processing, resolve information asymmetry between borrowers and lenders, and enhance the risk control capabilities of financial institutions, which effectively reduces the barriers to credit. Meanwhile, digital inclusive finance has promoted the development of internet finance [4], alleviated issues such as financial resources' mismatch, and better addressed the issue of financing constraints for various startups. Hence, the digital inclusive finance could potentially incentivize financial institutions to extend loans, reduce the borrowing threshold and facilitating increased access to capital for a greater number of businesses. For example, digital inclusive finance alleviates the financing constraints for household entrepreneurship [34], offering financial support for business innovation [35]. This is particularly evident in facilitating funding access for the entrepreneurial endeavors of rural mothers [36] and women entrepreneurs [37]. Similarly, the evolution of digital inclusive finance also provides a way for SE to address the issue of financing constraints. As the financing constraints faced by social entrepreneurs are alleviated, it will inevitably promote social entrepreneurial activities.

H2. Digital inclusive finance promotes SE by alleviating financing constraints.

2.3. Effect of common prosperity

Digital inclusive finance has the potential to promote common prosperity by lowering the credit barriers, promoting innovation and entrepreneurship, and narrowing the urban–rural and income gaps. Common prosperity can stimulate the prosocial motivation of individuals; therefore, digital inclusive finance promotes SE through common prosperity. First, common prosperity can improve individuals' sense of fairness and stimulate prosocial behavior. Individuals' perceptions of inequality tend to diminish people's willingness to cooperate and collaborative efforts among individuals [38], as inequality may not only reduce prosocial behaviors [38,39] but also lead to anti-social behavior [40]. Higher levels of common prosperity enable individuals to experience a greater sense of fairness, which not only inhibits anti-social behavior but also stimulates prosocial behavior.

Second, common prosperity can also improve individuals' subjective social status perceptions. Common prosperity reduces income and urban–rural gaps, thereby elevating individuals' economic and social status. Individuals with lower subjective status, constrained by limited personal resources, tend to perceive greater injustice in society [41]. Based on the warm glow of success, individuals who perceive their status to be higher will develop positive emotions and increase empathy [42]. Social status demonstrates a positive association with prosocial behavior, where individuals with higher social status are more inclined to engage in charitable donations, allocate a higher proportion of their household income to charities, display a greater willingness to assist others, and exhibit higher credibility in economic activities [43]. In summary, individuals with higher social status show more prosocial behavior [44].

Third, common prosperity promotes just-world beliefs. Just-world beliefs refer to the "contracts" that individuals make with themselves using the principle of realism. This involves the belief that their social environments are fair and that people can get what they deserve for their efforts [45]. Just-world beliefs are critical to individual behavioral development and social justice [46]. The justice motive theory suggests that individuals with higher just-world beliefs are more likely to attribute fair to the goodness of others and believe that they should reciprocate to others after they feel treated fairly [47], such as helping others [48,49].

H3. Digital inclusive finance promotes SE by promoting common prosperity.

3. Research design

3.1. Sample and data sources

The study selects a sample of 282 prefecture-level cities in China from 2011 to 2021. The digital inclusive finance index is obtained from the Peking University digital inclusive finance index (2011–2021), and SE business data is extracted from the Enterprise Search "Qichacha" database, an enterprise information inquiry platform (www.qcc.com, accessed on December 11, 2022). We manually collected information and data relevant to newborn social enterprises per year, whose business scope encompasses environmental protection, education, social security, occupation, poverty alleviation, and rural revitalization. The data for other variables are obtained from the China Statistical Yearbook and the EPS database.

3.2. Variable definition

3.2.1. Dependent variable
The dependent variable is the number of SEs. Two methods are used to measure the dependent variable. One is the number of social organizations per 10,000 people (SE), which is used in the baseline regression; another is the number of private non-enterprise organizations per 10,000 people (SEP), which is used in robust analysis.

3.2.2. Independent variable
The independent variable is digital inclusive finance, which is measured by the Peking University Digital Financial Inclusive Index of China divided by 100 (DIF).

3.2.3. Mediating variable
There are two mediating variables. One is financing constraints (fin), measured by the loan balance of financial institutions divided by GDP. The other is the common prosperity index (CP), in line with existing literature [4], which is calculated with data from the China Statistical Yearbook Database using 33 specific indicators.

3.2.4. Control variables
Referring to relevant research [3,18], control variables are the degree of openness (Open), represented by the ratio of the import and export trade volume to GDP; Per capita GDP(Pgdp), represented by the natural logarithms of per capita GDP in units of yuan; the expenditure on education, measured by the ratio of education input to GDP; the industry structure (Ind), measured by the total value in tertiary industry to the total value in secondary industry; and the internet penetration rate (IPR), measured by the ratio of internet broadband subscriber access to the year-end urban population. Urbanization (Urban) is represented by the proportion of the urban population to the total population at the end of the year to measure it. Human capita (Hc) is represented by the proportion of college students in the city to the total population at the end of the year.

The descriptive statistics of each variable are shown in Table 1. It's important to note that all the data comes from the city level. For the missing data in the statistical sources, interpolation was used to fill in the data.

Table 1
Descriptive statistics of the main variables.

Variable	OBS.	Mean	Std. Dev	Min	Max
SE	2783	0.190	0.390	0.181	0.491
SEP	2783	0.121	0.273	0.071	0.235
DIF	2783	1.789	0.902	0.195	3.345
Fin	2783	1.042	0.663	0.132	9.622
CP	2783	0.429	0.051	0.284	0.721
Open	2783	0.192	0.338	0.005	1.892
Pgdp	2783	5.306	3.159	0.461	21.495
Edu	2783	0.035	0.018	0.007	0.243
Ind	2783	1.032	0.569	0.175	5.349
IPR	2783	0.222	0.132	0.006	1.1083
Urban	2783	0.588	0.147	0.065	1.000
HC	2783	0.018	0.024	0.000	0.131

3.3. Model specification

To estimate the relationship between digital inclusive finance and SE, the following model is constructed:

$$SE_{it} = \alpha_0 + \alpha_1 DIF_{it} + \alpha_2 ControlX_{it} + \mu_i + \delta_t + \varepsilon_{it} \qquad \text{(Model 1)}$$

To verify whether digital inclusive finance can affect SE by alleviating financing constraints and promoting CP, the models are constructed as follows:

$$M_{it} = \beta_0 + \beta_1 DIF_{it} + \beta ControlX_{it} + \mu_i + \delta_t + \varepsilon_{it} \qquad \text{(Model 2)}$$

$$SE_{it} = \gamma_0 + \gamma_1 DIF_{it} + \gamma_2 M_{it} + \gamma ControlX_{it} + \mu_i + \delta_t + \varepsilon_{it} \qquad \text{(Model 3)}$$

where M_{it} is the financing constraints variable or CP, Model 2 estimates the impact of digital inclusive finance on SE, and Model 3 estimates the impact of financing constraints or CP on SE and examines whether digital inclusive finance can affect SE by alleviating the financing constraints or CP.

4. Empirical research

4.1. Baseline regression

The results of the baseline regression are shown in Table 2, with column 1 suggesting the results without control variables and column 2 suggesting the results with control variables. It can be seen that the impact of digital inclusive finance on SE passes the 1 % significant test at the confidential level of 1 %, which contains year and city fixed effects, regardless of whether control variables are added or not.

Table 2
Results of baseline regression.

Variable	(1) SE	(2) SE
DIF	0.193*** (0.012)	0.124*** (0.013)
Pgdp		0.013*** (0.001)
Open		0.031 (0.029)
Edu		0.364*** (0.088)
Ind		0.024*** (0.003)
IPR		0.004 (0.008)
Urban		−0.154*** (0.027)
HC		0.104** (0.042)
Constant	−8.079*** (1.007)	−5.045*** (0.416)
City FE	YES	YES
Year FE	YES	YES
N	2783	2783
R²	0.659	0.697

Notes: *** and ** indicate significance at the 1 % and 5 % statistical levels, respectively. Standard errors are in parentheses.

Table 3
Results of the endogeneity and robustness tests.

Variable	(1)		(2)		(3)		(4)		(5)	
	Instrumental variable		Winsorize		Excluding municipalities		Replacing dependent		Lag	
	SE		SE		SE		SEP		SE	
DIF			0.119*** (0.010)		0.130*** (0.014)		0.089*** (0.004)		0.202* (0.109)	
DIF-dis	0.203*** (0.052)									
L.SE									1.327*** (0.339)	
Constant	2.160** (0.632)		1.086** (0.519)		7.074*** (1.231)		3.086*** (0.732)		4.395** (1.195)	
Control	YES		YES		YES		YES		YES	
City FE	YES		YES		YES		YES		YES	
Year FE	YES		YES		YES		YES		YES	
N	2783		2783		2742		2783		2783	
R^2	0.339		0.295		0.565		0.419		0.438	

Notes: ***, **, and * indicate significance at the 1 %, 5 %, and 10 % statistical levels, respectively. Standard errors are in parentheses.

4.2. Endogeneity analysis

Although this study uses a two-way fixed-effects model and controls for a range of variables, the impact of digital inclusive finance on SE may still be disturbed by the presence of omitted variables, reverse causation, and so on. To mitigate the endogeneity issue, drawing on existing studies [50,51], regression analyses were conducted using the spherical distance (in kilometers) from each prefecture-level city to Hangzhou multiplied by the average value of the national digital inclusive finance index for that year as an instrumental variable (DIF-dis). The distance from each city to Hangzhou is related to the digital inclusive finance index of that city but is not related to whether the locality is socially entrepreneurial or not, and thus meets the selection criteria for the instrumental variable. The results, as shown in column 1 of Table 3, reveal that the second-stage regression results are significant at 1 %, suggesting that the impact of digital inclusive finance on SE still holds after considering endogeneity issues. The results based on the Cragg–Donald Wald F statistic and the Kleibergen–Papp rk LM statistic indicate that the instrumental variable is valid.

4.3. Robustness test

4.3.1. Winsorize
To prevent the effect of extreme values, continuous variables are winsorized at 1 % and 99 %. The results are shown in column 2 of Table 3 and are consistent with the results of the baseline regression.

4.3.2. Changing the sample
Since municipalities are stronger than other cities in terms of digital inclusive finance development and access to resources, data from municipalities are excluded. The regression results are shown in column 3 of Table 3 and are consistent with the baseline regression results.

4.3.3. Replacing the measurement of the dependent variable
Replacing the number of social organizations with the number of private non-enterprises in the regression, the results are shown in column 4 of Table 3, consistent with the baseline regression results.

4.3.4. Add the lag term of the dependent variable
Considering that the SE of the previous period may have an impact on the SE of the current period, the SE data of the previous period is added to the benchmark regression model. The results are shown in column 5 of Table 3, and the regression results are

Table 4
Result of the mechanism test.

Variable	Alleviating finance constraint		Promoting common prosperity	
	Fin (1)	SE (2)	CP (3)	SE (4)
DIF	0.008** (0.003)	0.011*** (0.012)	0.023*** (0.008)	0.015*** (0.002)
Fin		0.006*** (0.002)		
CP				0.193*** (0.032)
Constant	1.289** (0.282)	−2.059** (0.239)	2.689*** (0.372)	−3.026*** (0.044)
Control	YES	YES	YES	YES
City FE	YES	YES	YES	YES
Year FE	YES	YES	YES	YES
N	2783	2783	2783	2783
R^2	0.396	0.428	0.416	0.477

Notes: *** and ** indicate significance at the 1 % and 5 % statistical levels, respectively. Standard errors are in parentheses.

significantly positive.

The reliability of the baseline regression is further validated when combined with the robustness test results. The positive impact of digital inclusive finance on SE is further verified.

4.4. Mechanism analysis

The mechanism was further tested in the baseline regression. The results are shown in Table 4. Column 1 shows that the coefficient of the role of digital inclusive finance on financing constraints is 0.008, which passes the 5 % significance test. In addition, the results of column 2 indicate that the effects of financing constraints and digital inclusive finance on SE are all significantly positive, the mechanism of digital inclusive finance to SE by alleviating financing constraints is verified, and hypothesis 2 is supported. Similarly, Column 1 shows that the coefficient of the role of digital inclusive finance on CP is 0.023, which passes the 1 % significance test. In addition, the results of column 2 indicate that the effects of CP and digital inclusive finance on SE are all significantly positive, the mechanism of digital inclusive finance to SE by promoting CP is verified, and hypothesis H3 is also supported.

5. Heterogeneity analysis

5.1. Heterogeneity of buddhist culture

Religion can have an impact on individual behavior, especially Buddhist culture, which is extremely common in China, and Buddhist culture has a significant impact on SE [12]. Therefore, this study examines the heterogeneous characteristics of Buddhist culture in digital inclusive finance affecting SE. Comparing the number of temples in each province with the mean at the national level, cities in provinces whose number is higher than the mean are categorized into the high Buddhist culture group, and vice versa, they are included in the low Buddhist culture group. The results are shown in columns 1 and 2 of Table 5. While the impact of digital inclusive finance on SE is significant in both regions, it is more significant in the high Buddhist culture region.

5.2. Heterogeneity of judicial civilization

The Rule of Law has a significant impact on entrepreneurship, based on the aggregate score of the justice index across the country in the China Justice Index Report 2019. Provinces, autonomous regions, and municipalities are directly divided into regions with a high justice index and a low justice index according to whether their scores are above or below the average and are tested separately. The estimation results are shown in columns 3 and 4 of Table 5. Overall, digital inclusive finance promotes SE in both high-justice-level regions and low-justice-level regions, but the promotion effect is more apparent in high-justice-level regions. The reason is that the levels of justice, fairness, and enforcement in high-judicial civilization-level areas are better than those in low-judicial civilization-level areas. This difference creates a positive social environment and a higher sense of social justice, thereby making the impact of digital inclusive finance on SE more significant.

6. Conclusion and policy recommendations

This study empirically examines the impact of digital inclusive finance on SE and its mechanisms using a sample of 2783 data points from 282 prefecture-level cities in China from 2011 to 2021. The results reveal that digital inclusive finance has a positive impact on SE by alleviating financing constraints and promoting CP. Based on the research findings, the following policy recommendations are proposed:

First, accelerate the development of digital inclusive finance. This study shows that digital inclusive finance has a positive effect on promoting SE, therefore, the development of digital inclusive finance should be accelerated. On the one hand, local governments should strengthen digital infrastructure and continuously broaden the scope and depth of digital inclusive financial coverage. On the other hand, local governments should actively use financial subsidies and policy guidance to encourage and guide financial institutions to accelerate their digital transformation and develop more digital inclusive financial products utilizing digital technology, thereby promoting the development of digital inclusive finance.

Second, financing constraints should be alleviated and promoting CP is necessary. The research results show that SE is slowed down by financing constraints, hence local governments should guide financial institutions to lower the credit threshold and provide financial support for SE through government guarantees and financial support. In additional, local governments should then actively promote the process of CP, accelerate the realization of urban–rural integration and development, leverage the role of the "third distribution" system to raise residents' income level, especially the income of low-income groups, and stimulate the moral force to promote SE.

Third, the influence of heterogeneous factors should be emphasized. The role of digital inclusive finance in SE is affected by the regional Buddhist culture and the Rule of Law. Local governments should actively leverage the excellent cultural aspects of Buddhism, such as accumulating virtues, performing charitable deeds, and aiding the world to help others. For cities with lower justice levels, it is necessary to enhance judicial civilization and promote SE by intensifying judicial reform, strengthening judicial supervision, vigorously promoting public trials, and improving local justice capacity.

Table 5
Heterogeneity analysis.

Variable	Buddhist culture		Judicial civilization	
	(1)	(2)	(3)	(4)
	High	Low	High	Low
DIF	0.039** (0.001)	0.009* (0.047)	0.053*** (0.003)	0.010* (0.005)
Constant	−2.358** (0.182)	1.027** (0.113)	1.359*** (0.377)	5.135*** (0.424)
Control	YES	YES	YES	YES
City FE	YES	YES	YES	YES
Year FE	YES	YES	YES	YES
N	1588	1195	1479	1304
R^2	0.269	0.203	0.307	0.287

Notes: ***, **, and * indicate significance at the 1 %, 5 %, and 10 % statistical levels, respectively. Standard errors are in parentheses.

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All authors have approved the manuscript for submission. The paper is not submitted to any other journals, and that, if accepted, it will not be published elsewhere in the same form, in English or in any other language, including electronically without the written consent of the copyright-holder.

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Data availability

The authors declare that data is transparent.

CRediT authorship contribution statement

Qi Yang: Writing – original draft, Supervision, Methodology, Conceptualization. **Yuqi Bai:** Data curation. **Xi Yang:** Writing – review & editing. **Hua Wei:** Writing – review & editing, Supervision.

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