

Digital Finance Primer to Ease Finance Constraints for SMEs in Dongguan, China

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Abstract: This study first analyzes the general situation of SMEs in Dongguan City. Secondly, it evaluates the current situation and finance constraints of digital finance in the operation of SMEs from three aspects: breadth of digital finance coverage, depth of use of digital finance and degree of digitalization. Through multiple linear regression analysis, it is found that there is a significant relationship between digital finance variables and finance constraint variables. Based on the above analysis, this study wants to help SMEs in Dongguan alleviate finance constraints.

Keywords: Business profile, Digital finance, Finance constraint, Degree of digitalization, SMEs.

1. Introduction

1.1. Background of the Study

In the informatization and digitization era, digital finance, by leveraging its typical advantages, is reshaping the traditional models of financial services all over the world. Many scholars have pointed out that the integration of cloud computing, big data, and related technologies has endowed digital finance with the characteristics of high intelligence and inclusiveness, thus greatly improving the efficiency and coverage of the financial system.

In essence, digital finance is actually developed alongside the financing difficulties of SMEs in Guangdong Province. Our research is going to discuss and analyze the development process of digital finance in Guangdong, as well as the effect that digital finance has on the easing of financial problems faced by SMEs, in order to provide some enlightenment for both policy formulation and practical implementation. Based on the previous research, this effort will sharpen the conceptual framework and empirical methodologies related to digital finance and SME financing to contribute constructively to the sound development of SMEs in Guangdong and across the country.

1.2. Related Literature

The core emphasis of this research lies in evaluating the consequences of digital finance on the financial constraints. It examines various aspects, including the breadth of digital finance coverage, depth of use of digital finance, degree of digitalization and other pertinent dimensions, thereby providing a comprehensive analytical framework for this study.

These relevant literatures show a wealth of research content, discussing the development of digital finance, finance constraints, digital finance coverage breadth, digital finance use depth, digital finance coverage, digital finance degree and other dimensions. Within these fields, several common themes emerge, as well as different perspectives and approaches applied by different researchers.

Digital finance, a fusion of finance and technology, has garnered significant attention lately. Chen Xiuying (2021) emphasized its role as a sophisticated stage of integrating financial offerings, services, and technology, transforming

traditional financial service formats through digital methodologies. Zou Zongsen (2023) observed that in China, advancements in technologies like mobile payment and big data have fueled rapid digital finance growth, invigorating economic and social progress. Furthermore, Wang Zhihao Huang, Gao Wei, and Wang Jing (2023) noted its positive influence on the real economy through optimized resource allocation and innovation promotion.

The evolution of digital finance exhibits trends of diversification, inclusivity, and intelligence. Hong Yitian (2022), noted that the proliferation of mobile internet and big data technology is continually broadening the scope and expanding the accessibility and scope of digital financial offerings, enhancing user convenience and efficiency. This development also catalyzes the operations of conventional financial entities. Meanwhile, the combined influence of policy support and market demand in accelerating digital finance's growth in China. Zhang Qian (2023) further observed that digital finance's advancement has fostered improvements in financial innovation and risk prevention capabilities.

The rise of digital finance provides a new way to ease finance constraints. On the one hand, Nie Xiuhua (2020); Qi Xiuhui believed that digital finance enables more enterprises and individuals to enjoy financial services by lowering the threshold and expanding the coverage of financial. On a different note, digital finance leverages big data, cloud computing, and other technological tools to enhance service efficiency and transparency. This, in turn, mitigates information asymmetry and moral hazard, ultimately lowering finance costs. In addition, digital finance provides more personalized finance solutions for different groups with different needs through innovative financial products and services.

2. Methods

This chapter explains the overall methodology used in collecting data and addressing the research issues. It starts with selecting and justifying the research design used in the study, followed by information about the data management, the sampling design, and statistical treatment.

2.1. Research Design

The current situation information and digital financial

situation of SMEs in Dongguan City were collected by means of online questionnaire, and the results of the questionnaire were processed into quantitative data. This study mainly uses the methods of expert interviews and literature reading to draw relevant conclusions and define relevant concepts and variables.

The data in this study were obtained through questionnaire survey. Before the formal release of the questionnaire, conduct a preliminary investigation in a small area to check whether there are unclear, unclear, and not easy to understand items, and make further adjustments and modifications. In the process of analysis, quantitative analysis method is adopted. Aiming at the finance constraints of SMEs in Dongguan City, this paper will propose a digital finance primer to ease finance constraints for SMEs in Dongguan, China.

2.2. Data Management

The data will be collected through 400 questionnaires sent to SMEs in Dongguan, China. Due to data privacy laws, the real names and personal information of these

individuals will not be mentioned in this article. Quantitative data will be analysed. Descriptive and inferential statistical analysis of quantitative data; It should be concise in nature.

The value generated by the questionnaire will be supported by personnel interviews. By inviting different people to the meeting, the relative importance of each indicator could be assessed. The questionnaire used a 1-4 Likert scale. The expected output of this paper is to propose a digital finance primer to ease finance constraints for SMEs in Dongguan, China.

The collected data will be anonymized to ensure the security of any sensitive information. In any case, researchers should abide by rules that protect the privacy of both the company and the person under investigation. In general, all data will be backed up regularly in case other researchers verify and provide additional input for discoveries.

In the data sorting stage, the principle of eliminating invalid samples was adopted according to the principle of regularity or abnormality of questionnaire filling or the principle of short-term questionnaire filling. The descriptive statistical analysis of the basic information involved in SPSS software is carried out, and the classification, reliability and validity of the obtained data are analyzed, which provides data support for this paper.

2.3. Sampling Design

2.3.1. Sample Population

Using Raosoft software, because the number of SMEs using digital finance is uncertain, the sample size is calculated to be 397, each company will be given two questionnaires. For easier statistics, because there may be a small number of invalid questionnaires, the survey will issue 400 questionnaires, a total of 200 SMEs that have applied digital finance, the survey object of each company is two people, the survey object is mainly the target small and medium-sized enterprise owners and managers.

Questionnaire format and content will be designed using Questionnaire Star software. Research questionnaires are only one form of online questionnaire distribution. Distribution over the network enables fast distribution and recovery as well as data collection. This questionnaire survey is based on the principle of excluding invalid questionnaires

proposed by relevant scholars in the data sorting stage, that is, excluding invalid samples according to the principle of regularity or anomaly of filling questionnaires or the principle of filling questionnaires within a short time.

SPSS software is used for descriptive statistical analysis of basic information, and the obtained data is sorted out and analyzed for reliability and validity, which provides data support for this paper. Lastly, the pertinent components and impacting variables are examined using principal component analysis and exploratory factor analysis.

2.3.2. Respondents

The study will cover those directly involved in digital finance for SMEs in Dongguan. To guarantee the completeness of the survey questionnaire, we collected a list of owners and managers of SMEs that have applied digital finance in Dongguan by using a regional random sampling method.

Dongguan SMEs personnel will be the target group of the survey. The researchers will randomly select an appropriate number of respondents from each category of subject according to expert recommendations to obtain valid data.

2.3.3. Survey Instrument

In this study, we initially crafted a survey instrument comprising two primary sections: the initial section focuses on foundational details.

This information mainly includes the respondent's job title, founding time, company size, industry type, digital finance service life, company nature, and company location. The questionnaire's core section comprises three primary aspects of digital finance coverage.

The coverage of digital finance, the depth of use of digital finance, the degree of digitalization of digital finance and other measurement items refer to the maturity scale of relevant research. By reviewing pertinent scholarly materials from both domestic and international sources, this study identifies pertinent measurement items from established scales that are currently under investigation, conducts pre-questionnaire tests, discusses the scientificity and revises unreasonable items.

The rating reflects the level of alignment between the indicator and the current situation's description, with a higher rating signifying a greater degree of consistency. Choose 1 indicates strong disagreement, choose 2 indicates disagreement, choose 3 indicates agreement, and choose 4 indicates strong agreement.

2.4. Control Procedure

In investigating the digital finance applications of SMEs located in Dongguan, China, a stringent oversight mechanism has been implemented to guarantee the precision, trustworthiness, and appropriateness of the study's conclusions. This oversight mechanism spans multiple facets of the research endeavor, encompassing the stages from participant selection to data acquisition and interpretation.

Sample Selection Control. To ensure the comprehensiveness of the questionnaire, stratified random sampling was employed to select the target group. This process involved identifying three main categories of personnel involved in digital finance in

Dongguan: digital financial practitioners, digital financial experts, and SME personnel. By dividing the population into these strata, we were able to ensure that the sample represents a wide range of perspectives and experiences.

Questionnaire Design Control. The questionnaire was

designed to capture both numerical and descriptive information. To ensure the validity of the measurement instruments, the questionnaire underwent several rounds of revisions based on feedback from experts in the field. The questions were designed to be clear, concise, and relevant to the research objectives.

Data Collection Control. Data collection was conducted through both online and offline surveys. To minimize bias and ensure the reliability of the data, strict instructions were provided to the respondents regarding the administration of the questionnaire. The respondents were trained to ensure they followed the protocol consistently and accurately recorded the responses.

Data Analysis Control. The gathered information underwent both descriptive and predictive statistical analyses. The data were cleaned and checked for any errors or inconsistencies. The analysis was conducted using appropriate statistical software, and the results were cross-checked by multiple researchers to minimize the chances of errors.

Ethical Considerations. During the entire research endeavor, ethical factors were meticulously addressed. The individuals involved were briefed on the aims and characteristics of the study, and their permission was secured prior to distributing the survey instrument. Confidentiality of the data was maintained at all times, and only authorized researchers had access to the raw data.

By adhering to these control procedures, we aim to ensure that the findings of this study provide a reliable and valid assessment of the digital finance practices of SMEs in Dongguan, China.

2.5. Descriptive Statistical Analysis of the Questionnaire

Data obtained through the questionnaire were subjected to

a descriptive statistical analysis using the SPSS software. Descriptive statistics are usually used to reflect the characteristics of the data. According to the distribution structure and attributes of the respondents, summarize the characteristics of the sample on this basis, and analyze whether the survey group is representative and credible enough. The distribution of specific data such as option mean and standard deviation is analyzed to observe whether it conforms to the normal distribution. In the previous normal tests of sample data, relevant scholars mostly use kurtosis and skewness tests. Typically, the skewness absolute value falls within the range of 1, while the kurtosis absolute value remains between 3, the assumption of normal distribution can be satisfied. The study's sample comprises 400 participants, deemed adequate for the analysis.

On the basis of the data passing the normal distribution test, the non-response bias test was carried out on the questionnaire. This paper adopts the method of Armstrong & Overton and SPSS 25 software to conduct non-response bias test on the data, that is, to conduct T test and assess whether notable disparities exist in the key variables across the two datasets.

3. Results

This section outlines the procedures employed by the researcher for gathering and processing data, following the acquisition of the initial authorization certificate. Statistics of the interviewed companies and multiple linear regression analysis are included.

Multiple linear regression analysis between three aspects of digital finance and three dimensions of finance constraints.

Table 1. Multiple linear regression analysis between digital finance and finance channels

Model Summary					
R	R ²	Adj. R ²	Std. Error of the Estimate		
0.704	0.496	0.492	0.56		
ANOVA					
	Sum of Squares	df	Mean Square	F	sig.
Regression	123.243	3	41.081	129.698	0.000
Residual	125.431	396	0.317		
Total	248.674	399			
a. Dependent Variable: Finance Channels Weighted Mean					
Parameter Estimates (n=400)					
	Unstandardized Coefficients		Standardized Coefficients	t	sig.
	B	Std. Error	Beta		
Constant	0.588	0.121	-	4.846	0.000
Breadth of Digital Finance Coverage Weighted Mean	0.124	0.040	0.136	3.083	0.002
Depth of Use of Digital Finance Weighted Mean	0.272	0.046	0.288	5.945	0.000
Degree of Digitalization Weighted Mean	0.399	0.044	0.407	9.133	0.000
a. Dependent Variable: Finance Channels Weighted Mean					

Multiple linear regression analysis was performed on Finance Channels Weighted Mean (Mean) and Degree of Digitalization Weighted Mean (MEAN), three key factors. The obtained results show that there is a statistically significant regression equation ($F(3,396) = 129.698, p < 0.001$), the correlation R^2 is 0.496, and the adjusted R^2 is 0.492. This indicates that the model shows considerable adequacy in explaining the weighted mean variance of

finance channels, accounting for about 49.6% of the observed variability.

It is worth noting that all three predictors - the weighted mean of digital finance coverage breadth, the weighted mean of digital finance use depth, and the weighted mean of digital finance development degree - became significant predictors.

The weighted mean of digital financial coverage breadth is positively correlated with the weighted mean of finance

channels (standardized coefficient Beta=0.136, t=3.083, p=0.002), which means that as the extent of digital financial inclusion grows, the financial access, will also escalate.

The weighted mean of the depth of use of digital finance is also positively correlated with the weighted mean of finance channels (standardized coefficient Beta=0.288, t=5.945, p<0.001), indicating that deeper use of digital finance will promote the evolution of finance channels.

The positive correlation between the weighted mean of the development degree of digital finance and the weighted mean of finance channels is the most significant (standardized coefficient Beta=0.407, t=9.133, p<0.001), indicating that the enhancement of digital finance has an important impact on finance channels.

These results highlight the complex role of different dimensions of digital finance in influencing finance channels and provide meaningful implications for a deeper understanding of this relationship. Significant predictors not only enhance our understanding of the formation factors of finance channels, but also provide a strong basis for promoting the research of finance channels and formulating relevant strategies in the context of digital finance.

Overall, the breadth, depth of use and digitalization of digital finance may have a significant impact on the choice and use of financial channels. The increase in these factors may have facilitated the selection of more efficient and flexible financial channels, thereby reduced finance costs and improved the efficiency of business operations.

Table 2. Multiple linear regression analysis between digital finance and finance cost

Model Summary						
R	R ²	Adj. R ²	Std. Error of the Estimate			
0.549	0.302	0.296	0.768			
ANOVA						
		Sum of Squares	df	Mean Square	F	sig.
Regression		102.007	3	34.002	57.004	0.000
Residual		236.209	396	0.596		
Total		338.215	399			
a. Dependent Variable: Finance Cost Weighted Mean						
Parameter Estimates (n=400)						
	Unstandardized Coefficients		Standardized Coefficients		t	sig.
	B	Std. Error	Beta			
Constant	4.212	0.167	-		25.291	0.000
Breadth of Digital Finance Coverage Weighted Mean	-0.229	0.055	-0.214		-4.131	0.000
Depth of Use of Digital Finance Weighted Mean	-0.153	0.063	-0.139		-2.446	0.015
Degree of Digitalization Weighted Mean	-0.351	0.06	-0.307		-5.865	0.000
a. Dependent Variable: Finance Cost Weighted Mean						
* p<0.05, ** p<0.01						

Taking Finance Cost Weighted Mean as the dependent variable, based on the Breadth of Digital Finance Coverage Weighted Mean, Depth of Use of Digital Finance Weighted Mean and Degree of digitalization Weighted Mean were used for multiple linear regression analysis. The obtained results show that there is a statistically significant regression equation (F (3,396) = 57.004, p<.001) with a correlation R² of 0.302 and an adjusted R² of 0.296. This indicates that the model has some adequacy in explaining the variance of the weighted mean of financial costs, and can explain about 30.2% of the observed variability.

It is worth noting that all three independent variables - the weighted mean of digital finance coverage breadth, the weighted mean of digital finance use depth, and the weighted mean of digital finance development degree - become significant predictors (p values are all less than 0.01). The weighted mean of digital financial coverage breadth is negatively correlated with the weighted mean of finance cost (Beta coefficient is -0.214), which means that with the increase of digital financial coverage breadth, the weighted mean of finance cost tends to decrease.

The weighted mean of the depth of use of digital finance is also negatively correlated with the weighted mean of the cost of finance (Beta coefficient is -0.139), although the

correlation is slightly weaker than the coverage breadth, it still indicates that the increase of the depth of use helps to reduce the cost.

The negative correlation between the weighted mean of the development degree of digital finance and the weighted mean of finance cost is the most significant (Beta coefficient is -0.307), indicating that with the improvement of digital finance, the weighted mean of finance cost significantly decreases.

These results reveal the complex mechanism of the impact of different dimensions of digital finance on finance costs and highlight the important role of digital finance in reducing finance costs. At the same time, significant predictors provide valuable insights for understanding and optimizing finance costs, and provide meaningful implications for advancing relevant research and practical strategies.

In conclusion, the increase in the coverage breadth and depth of use of digital finance and the improvement of the level of digital development are negatively correlated with the weighted average of finance costs, indicating that digital finance is crucial for reducing finance costs. The negative correlation between the level of digital development is the most significant.

Table 3. Multiple linear regression analysis between digital finance and finance structure

Model Summary					
R	R ²	Adj. R ²	Std. Error of the Estimate		
0.545	0.297	0.292	0.825		
ANOVA					
	Sum of Squares	df	Mean Square	F	Sig.
Regression	115.087	3	38.362	55.751	0.000
Residual	272.49	396	0.688		
Total	387.578	399			
a. Dependent Variable: Finance Structure Weighted Mean					
Parameter Estimates (n=400)					
	Unstandardized Coefficients		Standardized Coefficients	t	sig.
	B	Std. Error	Beta		
Constant	0.540	0.179	-	3.020	0.003
Breadth of Digital Finance Coverage Weighted Mean	0.212	0.059	0.185	3.562	0.000
Depth of Use of Digital Finance Weighted Mean	0.307	0.067	0.260	4.553	0.000
Degree of digitalization Weighted Mean	0.255	0.064	0.208	3.961	0.000
a. Dependent Variable: Finance Structure Weighted Mean					
* p<0.05, ** p<0.01					

Based on three key factors, the weighted mean of digital financial coverage breadth, the weighted mean of digital financial use depth and the weighted mean of digital degree, the weighted mean of Finance Structure is analyzed by multiple linear regression. The obtained results showed that there was a statistically significant regression equation ($F(3,396)=55.751, p<0.001$) with a correlation R^2 of 0.297 and an adjusted R^2 of 0.292. It is worth noting that the weighted mean of digital financial coverage breadth, the weighted mean of digital financial use depth and the weighted mean of digital degree all became significant predictors, and all reached statistical significance ($p<0.001$). The model shows moderate adequacy in explaining the weighted mean variance of the Finance Structure, accounting for about 29.7% (or 29.2% after adjustment) of the observed variability.

Specifically, the weighted mean of digital finance coverage breadth ($Beta=0.185, t=3.562, p<0.001$), the weighted mean of digital finance use depth ($Beta=0.260, t=4.553, p<0.001$) and the weighted mean of digital degree ($Beta=0.208, t=3.961, p<0.001$) are positively correlated with the weighted mean of Finance Structure, which means that the increase in the value of these predictors corresponds to the increase in the weighted mean of Finance Structure. These results reveal the complex factors that influence the weighted mean of the Finance Structure and highlight the important role.

The identification of these significant predictors has enhanced the understanding of the formative elements of Finance Structure, provided meaningful implications for advancing relevant research in the financial field, and may provide important references for formulating relevant policies or strategies in the future.

In summary, these three independent variables are positively correlated with the weighted average of financial structure, indicating that the increase of their values corresponds to the increase of the weighted average of financial structure. These findings reveal the complex factors that affect the weighted average value of financial structure. The identification of these significant predictors deepens our understanding of the formation factors of financial structure and provides meaningful implications for promoting related research in the financial field.

4. Conclusions

In conclusion, the results of this study reveal the relationship between digital finance and finance constraints of SMEs. A series of conclusions are obtained by analyzing the statistics of enterprises, the results of and multiple regression analysis.

Multiple linear regression analysis enhances our comprehension of the interconnections between the three facets of digital finance and the corresponding dimensions of finance constraints.

Broad coverage of digital finance, extensive utilization of digital financial tools, and a high level of digitalization generally contribute positively to finance channels, a significant negative impact on finance costs, and a significant positive impact on finance structure.

There is no significant difference in years established, company size and industry type regarding digital finance and its finance constraints, but there are significant differences in years of digital finance usage, nature of the firm and location of the firm. Enterprises that have used digital finance for a long time have established a more perfect digital transformation system, which can make better use of digital financial tools and reduce finance constraints. State-owned enterprises or enterprises with state-owned background are more successful in advancing and implementing digital financial solutions. Multiple linear regression analysis shows that the coverage, depth of use and digitalization of digital finance have a positive impact on finance channels, a negative impact on finance costs, and a positive impact on finance structure. These findings suggest that policy makers and enterprise managers should formulate targeted digital finance promotion and finance support policies according to the situation of enterprises and regional characteristics.

5. Recommendations

It is recommended to focus on tailored strategies for promoting digital finance and addressing finance constraints among SMEs, taking into account the significant impact of years of digital finance usage, the nature of the firm, and its location. Policies and initiatives should be designed to cater to the varying needs and experiences of SMEs in these

dimensions. For instance, providing targeted training and support for SMEs with limited experience in digital finance, offering specialized solutions for non-state-owned enterprises or those located in less developed areas, and fostering a collaborative environment where firms can share best practices based on their years of digital finance usage. By doing so, SMEs can more effectively leverage digital finance to overcome finance constraints and enhance their overall competitiveness.

Based on the findings from the multiple linear regression analysis, it is recommended that policymakers and enterprise managers take a targeted approach in formulating digital finance promotion and financial support policies. For enterprises with longer experience in digital finance, further enhancing their digital transformation capabilities and leveraging advanced digital financial tools can further reduce financial constraints. For state-owned enterprises or those with state-owned backgrounds, policies should focus on sustaining their success in digital finance adoption. Additionally, regional characteristics, including the economic development level and digitalization degree, should be factored into policy decisions to ensure that they support the digital finance needs of enterprises in different areas. By adopting a tailored and comprehensive approach, policymakers and managers can foster the digital transformation and sustainable development of enterprises, ultimately contributing to overall economic growth and innovation.

For future research, researchers need to further explore the root causes of SMEs finance difficulties and explore how to use blockchain, large-scale data analytics alongside emerging technological advancements to reduce information asymmetry and improve finance efficiency. At the same time, conduct fine-grained evaluation of policy effects and analyze the actual effects of different policy tools on SME finance to provide scientific basis for policy optimization. Researchers should continue to pay attention to changes in the domestic and international financial environment and predict future trends to provide forward-looking guidance for SMEs.

Encourage researchers to explore diverse finance channels other than traditional bankloans, such as equity finance, bond finance, crowdfunding, etc., and analyze the advantages, disadvantages, and applicable conditions of each channel to provide diversified finance options for SMEs. At the same time, study supply chain finance and green finance, etc., and explore their potential application in SME finance.

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