

Digital Finance Contributes to Promotion of Financial Sustainability

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Contributor: Dan Luo, Man Luo, Jiamin Lv

Digital finance, which is defined as the digitalization of the financial industry, has shown growing importance in recent years. It has helped promote financial inclusion, providing means to address the problem of financial depressions in developing and emerging economies. Digital finance possesses three key features including a high capacity for acquiring and processing information, instant cross-spatial information dissemination, and a low marginal cost effect.

Keywords: digital finance ; financial inclusion ; financial efficiency ; sustainability

1. Introduction

Historically, financial depressions have been common among emerging and developing economies, especially among those in low income and remote regions and micro, small, and medium-sized enterprises (MSMEs) who are underserved within the traditional financial system. According to the report released by World Bank ^[1], about one-third of the world's adults still lack access to a basic transaction account, and the unmet need for financial credit by millions of both formal and informal MSMEs in developing economies amounts to almost USD \$8.1 trillion or about 40% of GDP. This explains the global interest in "financial inclusion" since it was coined by the United Nations (UN) in 2015 ^[2]. By promoting access to financial services, financial inclusion is aimed at facilitating the development of disadvantaged communities, MSMEs, and the real economy at large, and it is positioned prominently as an enabler of other developmental goals in the 2030 Sustainable Development Goals (SDGs) of the United Nations. However, in practice, the customers of inclusive financial services are often the so-called long-tail users. It was generally cost-ineffective for traditional financial institutions to serve these customers so that they might only resort to government subsidies or favorable policies to sustain the service, that is, lack of sustainability. An increasing number of researchers have observed over the years that to ensure the sustainability of financial services, a cost-benefit balance has to be achieved on both the supply and demand ends. Otherwise, inclusive financial service cannot endure ^{[3][4][5][6]}. Promoting the financial sustainability is crucial for the long-term development of financial service, especially that of inclusive financial service, and it plays an essential role in expanding the coverage of financial customers and enhancing the quality of financial service. Therefore, it has become a great concern for scholars and policymakers to improve the financial sustainability.

Digital finance, which is defined as the digitalization of the financial industry ^[7], has shown growing importance in recent years. It has helped promote financial inclusion, providing means to address the problem of financial depressions in developing and emerging economies. More generally, digital finance has acted as a catalyst for financial inclusion, and it has been widely regarded as the strategy for developing financial inclusion in the future ^{[8][9][10]}. According to the Global Association for Mobile Communications Systems (GSMA), mobile payment technology has allowed 1 billion people around the world to access convenient financial services as of 2019. The International Monetary Fund also reports that inclusive digital finance in the mobile payment segment alone contributes more than 2% to annual global GDP growth. It is noteworthy that China's digital financial applications and practices are at the world's forefront. For example, the Chinese digital financial giant Ant Group created the so-called "310" loans, meaning it requires only three minutes to apply, one second to approve, and demands zero human interaction to use their loan products. Reportedly, as of 30 June 2020, the Ant Group had served more than 20 million Chinese MSMEs, of which nearly 80% had obtained operating loans for the first time. Clearly, digital finance has improved financial efficiency and mitigated the mismatch between supply and demand for financial services ^{[11][12][13]}, thus contributing to financial sustainability, and achieving the mission of sustainable financial inclusion.

2. Contributes of Digital Finance

2.1. Conceptualization

To begin with, the concept of digital finance emerged along with the development and widening application of technologies such as big data, cloud computing, and blockchain. However, there is no consensus with its definition, and it was often mixed up or used interchangeably (often imprecisely) with similar concepts such as electronic finance, internet finance, FinTech, and intelligent finance. FinTech as a concept was initially coined by Bettinger ^[14] at a time when its development was dominated by the traditional financial sector and featured by the electronic processing of financial services driven by information technology ^[15]. This is exactly the reason why it was also known as “electronic finance”. In addition, the Financial Stability Board (FSB) defines FinTech as “technology-enabled innovation in financial services that could result in new business models, applications, processes or products with an associated material effect on the provision of financial services”. When it comes to digital finance, it usually describes the digitalization of the financial industry ^[17], and it is defined as the adoption of digital technology by financial institutions and internet companies in order to provide financing, payment, investment, and other new forms of financial services ^[16]. Another core feature of digital finance is that the adoption of digital technology can provide a set of formal financial services to those who have limited access to financial services, and more importantly, does so in a sustainable manner for the service provider ^[18].

Second, the concept of financial efficiency has evolved over a long period of time with many iterations to its definition. From a regional perspective, scholars to date generally agree that financial efficiency indicates the degree of financial development of a region or a financial system, as well as its status of financial resource allocation ^{[17][18]}.

Third, the concept of financial sustainability is most commonly defined as “development that meets the needs of the present without compromising the ability of future generations to meet their own needs” ^[19]. Sustainability is also defined by a blended-value mission entailing the coexistence of impact objectives and business objectives, which includes safeguarding a financial return to be able to continue creating a long-term impact ^[6]; this is particularly true for financial institutions in order to sustain the provision of financial services, especially to the aforementioned long-tail users. Hence, financial sustainability describes a status when not only the customers but also the suppliers, i.e., the financial service providers, can at least break even over a business transaction. Therefore, it should be emphasized that financial sustainability hereafter refers to the sustainability of financial service provision.

2.2. The Impacts and Effects of Digital Finance

Financial sustainability is said to be achieved when the participants receive benefits from financial services that outweigh the costs borne ^[20], and the enhancement of financial efficiency has a large impact on the reduction in costs as well as the improvement of benefits. Therefore, improving financial efficiency is vital to achieving financial sustainability.

Different methodologies, such as Dagum and StoNED, have been employed to measure regional financial efficiency in order to compare regional differences. Most of these studies argue that regional financial efficiency is closely related to local economic development, transportation convenience, and the scale of financial industry. The greater the level of economic development, the more convenient transportation, and the larger the scale of the financial sector, the higher the regional financial efficiency ^{[21][22][23]}. The causes of regional differences in financial efficiency have primarily been analyzed from the standpoints of information asymmetry and economies of scale ^[24]. Much research has demonstrated that the deterioration of information asymmetry will result in a decline in financial efficiency, while a lack of scale effects for long-tail users will also contribute to the delay of financial efficiency improvement. With regard to China's financial development, typically, researchers have suggested that the misallocation of financial resources within China's financial system is severe, and financial depression is widespread, which might even impede China's economic growth ^[25].

With the continuous evolution of digital technology, financial services have long ceased to be limited to traditional financial services such as banking, savings, and stock trading. The development of digital finance has become an irreversible trend and a key focus of research in global academia. Although the development of digital finance is still in its infancy, scholars have been attempting to conduct research on its connotations, extensions, enablers, impacts, and effects.

Among these studies, those that evaluate digital financial development and explore the impact and effects of digital finance can be considered the most extensive and comprehensive. Specifically, the univariate estimation of digital financial development could be biased. Hence, quantifiable financial development indices computed from multivariate estimations are advocated by scholars and international organizations. To name a few, the Global FinTech Hub Index by Deloitte ^[26], the FinTech Development Index (FDI) by Academy of Internet Finance of Zhejiang University, and the Peking University Digital Financial Inclusion Index of China (PKU-DFIIC) by Institute of Digital Finance Peking University ^[27]. Most

of these indices evaluate the regional development of digital finance from perspectives such as its industrial development, size of consumers, digital infrastructure, etc. Moreover, the People's Bank of China (PBOC) has also issued national financial industry standards, namely the FinTech Development Indicators. It has constructed three sets of standards to evaluate the digital financial development of financial institutions, financial industry, and regions.

When it comes to the impacts and effects of digital finance, they can be classified into two categories: macro and micro. From the macro perspective, studies to date have generally agreed that digital finance has a positive impact on the development of traditional finance, economic growth, and equality of income distribution in both urban and rural areas ^[11] ^[28]. However, some scholars suggest that the development of digital finance may negatively impact on local income distribution based on their heterogeneity analysis ^[29]. From the micro perspective, most existing studies have focused on the effects of digital finance on MSMEs, resident entrepreneurship, household financial demand, and household consumption ^[12]^[30], which usually indicates that digital finance could enhance utility for these long-tail users. In addition, a small number of researchers have used the qualitative approach to study the relationship between digital finance and financial efficiency. Most of them propose that digital finance can overcome geographical boundaries so as to improve financial efficiency by fundamentally changing how users access and pay for financial services, and widening access to a broader range of financing channels for MSMEs ^[12]. Moreover, it is noteworthy that financial efficiency is closely related to the cost of financial services, and quite often, the reductions in the cost of financial services can be attributed to elevation in financial efficiency ^[31].

2.3. Digital Finance Contributes to Promotion of Financial Sustainability

2.3.1. Three Features of Digital Finance to Resolve the Three Pain Points of Traditional Finance

Traditional financial institutions have been reluctant to offer financial services to low-income and remote populations as well as MSMEs ^[32], because quite often, there are only a limited number of branches in the areas where these customers reside. Hence, they cannot access cash, loans, or other financial services conveniently ^[33]. Specifically, this is caused by three major pain points in the financial market: firstly, there is information asymmetry. MSMEs and users in low-income and remote areas have difficulties with providing standardized information required for financial risk analysis, such as credit history. Some even do not own bank accounts. This makes it difficult for financial institutions to collect accurate information from them and identify customers who are in need of such services. As a result, they discontinue providing services to these customers to avoid adverse selection and moral hazard problems. Secondly, there are geographical constraints. Traditional financial services are primarily provided by branches of financial institutions, and users need to travel to them on site, which limits the availability of financial services due to information transmission difficulties, transportation costs, and time costs, leaving financial institutions unwilling or unable to provide financial services to remote users. Finally, there are diseconomies of scale. Although demand for financial service remains high, financial institutions cannot achieve economies of scale if the cost of service is too high. With these three pain points, it is challenging for financial institutions to profit from providing financial services to long-tail users; instead, they might have to rely on government policies and targeted subsidies to sustain the service. Under this circumstance, financial efficiency cannot be improved, and the sustainability of financial services are highly likely to be jeopardized.

Nevertheless, digital finance possesses three key features: high capacity for acquiring and processing information, instant cross-spatial information dissemination, and a low marginal cost effect, which can be leveraged to tackle with the three pain points faced by traditional financial institutions in serving long-tail consumers. In particular, as for reducing information asymmetry, digital financial technologies, such as big data, cloud computing, artificial intelligence, and distributed technology, can process massive quantities of data at low cost and low risk ^[34]. This enables financial institutions to acquire and process information efficiently, and it allows them to build and optimize algorithms and construct big data warehouses ^[35]. In so doing, financial institutions are capable of systematically embedding massive information into financial services so as to reduce information asymmetry, increase the ability to identify potential financial service users, and pick out qualified users. In this way, financial institutions can improve the efficiency of providing financial services ^[36]. As for reducing geographical constraints, digital finance has the potential to instantly disseminate information across space ^[31], thus diminishing the importance of geographical distance, and gradually reducing the geographical boundaries between regions as well as between financial institutions and users ^[37]. When it comes to limiting diseconomies of scale, the ubiquitous nature of the Internet dictates digital finance a low marginal cost effect, that is, the marginal cost of providing financial services to long-tail users can be significantly reduced with digital technologies ^[38]. In this case, economies of scale will be as well formed for this group of users.

2.3.2. Two Driving Forces Enabling Digital Finance to Improve Financial Efficiency and Sustainability: The Breadth of Coverage and Depth of Adoption of Digital Finance

In addition, digital finance has contributed to improving financial efficiency by enhancing the breadth of coverage and depth of adoption of digital finance.

With respect to the breadth of digital financial coverage, the number of users covered by financial services determines the size of the demand for financial services. The need for a financial account is a prerequisite for accessing traditional formal financial services, and those without a financial account must physically visit a branch of a financial institution in order to open an account for the first time. As a result, traditional financial institutions will need to increase user coverage by continuously opening new physical branches. Despite the fact that traditional financial institutions can generate income inflow when they reach long-tail customers, the high cost of running branches might lead to economic loss [39]. Consequently, traditional financial systems are more likely to overlook long-tail users. In contrast, by virtue of its ability to immediately disseminate information across space, digital finance can make a significant contribution to reducing geographic barriers of accessing financial services and providing financial services at a lower marginal cost. Therefore, it will facilitate the improvement of financial efficiency and make it possible for financial institutions to provide financial services to long-tail users with benefits outweighing costs and regaining financial sustainability.

When it comes to the depth of digital financial adoption, traditional financial institutions are often the centralized location for almost all financial activities, and most users are required to perform financial activities with physical presence. This is when digital finance could come into use to overcome the geographical constraints of financial services with its capability of instant cross-space dissemination of information, allowing users to access multiple financial services online without visiting a branch. Digital finance can also be leveraged by financial institutions to embed financial services into various daily life scenarios, thanks to its powerful capabilities of information acquisition and processing, as well as low marginal costs borne. It can even facilitate the provision of customized financial services to specific needs. All of these have substantially enhanced the frequency (depth) and efficiency with which consumers utilize various financial services. As an additional benefit, digital finance can also be used to improve the internal business processes of financial institutions, thus improving the overall efficiency of financial services [40].

Thus, overall, the specific mechanisms behind which digital finance improves financial efficiency and sustainability can be summarized as follows: digital finance possesses three key features including a high capacity for acquiring and processing information, instant cross-spatial information dissemination, and a low marginal cost effect → it can be leveraged to resolve the three major pain points that traditional finance encounters when serving long-tail users, i.e., information asymmetry, geographical constraints, and diseconomies of scale → it increases the breadth of coverage and depth of adoption of financial services → this results in improved financial efficiency and financial sustainability. Of course, improvements in the financial efficiency and sustainability of financial institutions at micro level will, in turn, lead to improvements in the financial efficiency and sustainability of the region as a whole.

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