Digital Finance and its Effects on Businesses, Governments and Society

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This research paper focuses on the impact of digital finance, which is further split into three subsections to be analysed, namely: the effect of digital finance on the efficacy of businesses, how governments can accommodate digital finance, and lastly how does digital finance affect the autonomy of individuals. This is explored through a systematic literature review considering recent research done on the effects of digital finance and current laws. Overall most research seems to indicate that digital finance has a positive effect on governments, businesses and society. However, the risks that come with widespread adoption of digital finance as well as the challenge of regulating digital finance are also considerable. This research paper contributes to the digital finance literature assessing the wider impact of digital finance, to give an overview of the current situation.

Additional Key Words and Phrases: digital finance, finance, digital transformation, systematic literature review

1 INTRODUCTION

With modern life becoming intimately interwoven with technological appliances such as smartphones, personal computers and even workplaces becoming digital, it is only a matter of course that the financial sector trends towards becoming digital. Digital finance refers to the use of digital technology in the provision and management of financial services, such as banking, insurance, and investment. Digital finance is a broad term, under which fall many different fields and sectors, it can be further divided into four main areas, which are regarded as the ABCD[1] – artificial intelligence, blockchain, cloud computing, and big data. These areas have been growing rapidly in recent years, as an industry fintech had its revenue had increase by 97% in the 2017-2020 period and global fintech revenues were expected to reach more than €188 billion in 2024, before the predictions were stalled by the coronavirus crisis[2]. Digital finance has already become a common occurrence, as many users and clients have enjoyed the benefits it brings, mostly in terms of convenience, efficiency, and inclusivity. As technology continues to advance, digital finance becomes increasingly prevalent, and as such, it has influenced governments, businesses, and individuals alike. However, this change is still largely an unknown, so whether it is beneficial or detrimental, is still a question that is not fully answered. Which is why, this research paper explores the current state of the changes brought by the digital finance transformation.

Since the overall impact of digital finance is unknown and due to the widespread nature of digital finance, hard to quantify. The main research question is as follows, what impact has digital finance have on businesses, governments, and society? Yet this is an extremely broad question that goes beyond the scope of a single paper and as such it is topically divided into three smaller sub-research questions:

- How does the integration of digital finance affect business efficacy?
- What changes do governments have to make to accommodate digital finance?
- How does digital finance affect individuals' financial autonomy?

To assess the impact, multiple sources of information are considered. The main source being other research papers done investigating the change digital finance has brought. While the paper is a systematic literature review, also considered are laws concerning digital finance.

2 RELATED WORK

Research considered in the findings section is all listed in Table 1, together with their focus and the main goal of the research, while there was some overlap, most of the papers were used to answer the research question relating to their type. A pie chart illustrating the ratio of the types is also included in figure 2. Most of the research that has been done on the impacts of digital science focus on specific sections and limited impact. Such as the impact of digital finance on carbon emissions by H. Zhao[3] or the changes adopting digital finance has on household consumption by J. Li[4]. However, there has been research of similar scope done before. The paper by I. Anagnostopoulos[5] explores the disruptive effect digital finance has on the wider financial ecosystem as well as regulators. While a paper by Z. Wysokińska[6] looks at how the digital finance transformation affects the global and European economy. There has also been research done to investigate potential issues with digital finance as well as ways to circumvent them by O. Peterson in his paper on the impact digital finance has on financial inclusion and stability[7].

There has been research done on how digital finance relates to the adoption and implementation of green solutions. While it is not directly related to the three focus groups of this paper, it is still relevant in exploring the wider impacts that the digital finance transformation can bring. C. Shaopeng[22], found that digital finance in contrast to conventional finance, has much greater impact in promoting green technology innovation. Similarly, F. Suling[23], found that this effect is greatest in medium to small enterprises and manifests by reducing the constraints of corporate financing and industrial structure upgrading. Furthermore, an analysis of 441 family farms in China, done by Y. Lili[24] on adoption of green techniques found that digital finance increases the likelihood these techniques are adopted and as such helps achieve sustainable agricultural development.

Research that focuses on the direct impact and effects of digital finance is not the only type, that is related to the proposed paper. For papers on regulating fintech by W.Magnuson[8] and J.Jagtiani[9]are relevant even if they do not study the direct impacts of digital finance, they still consider the changes in legislation that have to be made to accommodate the digital finance transformation. There are

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Table 1. All analysed research

Authors	Type	Research goal
Hui Zhao, Yaru Yang, Ning Li, Desheng Liu, and Hui Li[3]	Government	Provide an empirical basis for policy-makers to promote the development of digital finance to reduce carbon emissions.
Jie Li, Yu Wu, and Jing Jian Xiao[4]	Society	Show the relation between introducing digital finance and an increase in household consumption, as well as the mechanisms through which consumption was increased.
Ioannis Anagnostopoulos[5]	Government	Examine the implications of fintech for financial institutions, and regulation, especially when the technology poses a challenge to the global banking and regulatory system.
Zofia Wysokińska[6]	Government	Consider the implications of the digital transformation on the global and European economy. Notably how advanced technologies can help achieve sustainable development goals.
Peterson K Ozili[7]	Society	Show the impact of digital finance on financial inclusion. With the largest positive effect on financial inclusion being in emerging and developing economies.
William Magnuson[8]	Government	Argue that regulators' focus on preventing the risks associated with large institutions overlooks the conceptually distinct risks associated with small, decentralized financial markets.
Julapa Jagtiani and Kose John[9]	Government	Argue that fintech will be able to help billions of underserved users and as such must be carefully regulated to protect them from new forms of risk.
Jiajia Liu, Xuerong Li, and Shouyang Wang[10]	Business	Analyse the state of fintech research through a scientometric analysis. Helping find new research directions and create a base of knowledge for research on fintech related topics
Karl SR Warner and Maximilian Wäger[11]	Business	Explore how incumbent firms in traditional industries build the capabilities for digital transformation. Namely, how agility is the core mechanism used to digitize a corporations business model, collaborative approach and culture.
Mingtao Yu and Aiguo Yan[12]	Business	Show that digital merger and acquisition can be the main tool in allowing companies to achieve digital transformation and sustainable development, without much risk
Shengqi Chen and Hong Zhang[13]	Business	Investigate how digital finance can be used to create new business models in the manufacturing industry. Digital finance increased the servitization of enterprises, making up for the shortcomings of traditional finance, while increasing efficiency.
Xiuxiu Jiang, Xia Wang, Jia Ren, and Zhimin Xie[14]	Government	Explore the impact of digital finance on economic growth and the mechanisms through which they interact. Findings show that digital finance helped economic growth through financial inclusion and helping regional entrepreneurship.
Qian Wang, Jinbao Yang, Yung-ho Chiu, and Tai-Yu Lin[15]	Government	Show that digital finance correlates with increased financial efficiency, especially in developed regions.
Peterson K Ozili[16]	Society	Argue that digital finance is not an ideal solution, especially when it comes to the poor, as it might expose them to risks and exploitation they otherwise would avoid.
Yu Ji, Lina Shi, and Shunming Zhang[17]	Business	Find the link between digital finance and corporate bankruptcy risk. The research finds that digital finance helps reduce bankruptcy risk by providing investors with more accurate financial information, allowing for more adequate decisions.
Boou Chen and Chunkai Zhao[18]	Society	Explore if and through what mechanisms digital finance reduces poverty. The research explains that digital finance reduces poverty through, better access to financial information, removing credit constraints, and promoting entrepreneurship.
Lianying Yao and Xiaoxiao Ma[19]	Society	Explore how income inequality changes with the introduction of digital finance. Namely that as digital finance is further developed it also reduces the income inequality in a region.
Aamir Aijaz Syed, Farhan Ahmed, Muhammad Abdul Kamal, and Juan E Trinidad Segovia[20]	Government	[2] Show that digital finance development reduces the prominence of the shadow economy, while also increasing financial inclusion and instability.
Yun Ye, Yongjian Pu and Ailun Xiong[21]	Society	Explore the impact digital finance has on household participation in risky financial markets. The research finds that through digital finance households are more likely to invest in risky financial assets, which helps in building wealth.

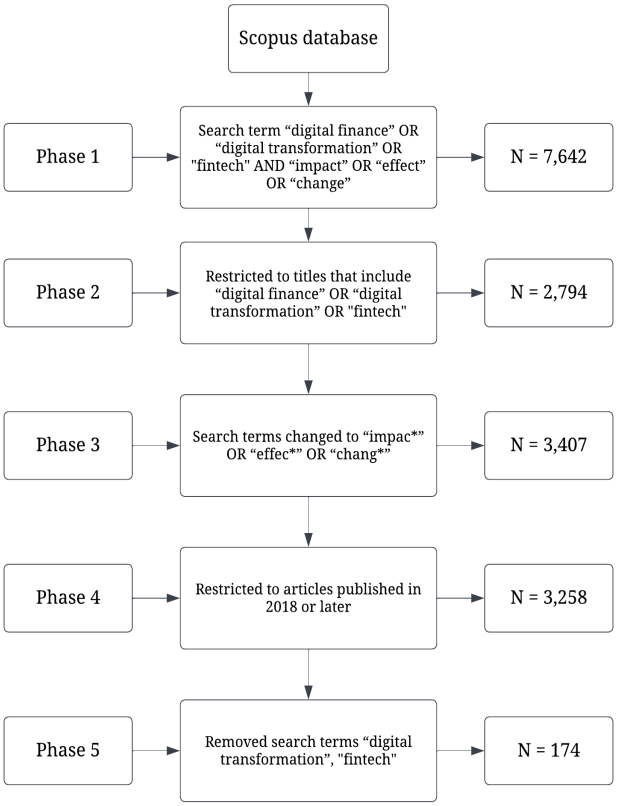

Fig. 1. Phases of literature review

also literature reviews done in the field as well, like the scientometric analysis on fintech research by J. Liu[10], which analyses over 600 fintech related research papers.

While evidently there are papers and research done on multiple facets of digital finance, especially on the impact the digital transformation has had, there seems to be a lack of comprehensive overviews that take a broader look at the state of digital finance and the changes it has caused and may cause in the future.

3 METHODOLOGY

The process of the systematic literature review is illustrated in figure 1. Scopus was chosen as it is a very complete database of scientific journals and articles, which had all the information necessary for this research. In each phase articles were sorted by number of citations, from highest to lowest, then if the research was about the impact of digital finance on governments, businesses or society, it was added to table 1 and included in this research. The systematic literature review happened in five phases, each phase iterated on the previous in providing more relevant results. In phase 3 truncated phrases were used, with the symbol *, this allows, for example, all forms of the word "change", such as "changed" or "changes", to be included in the search. Similarly in phase 4, only articles written in

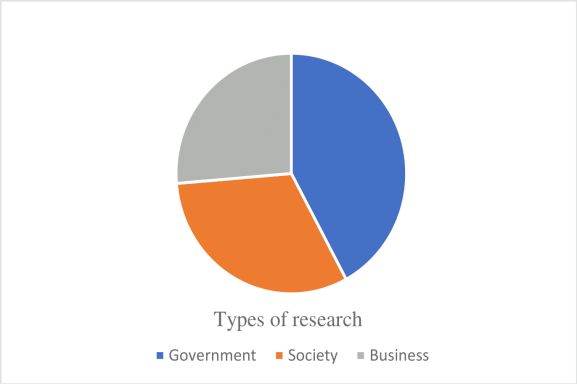

Fig. 2. Illustration of the ratio of the types of research

the last 5 years were considered, as digital finance is a new subject. However, this did not exclude many papers, but it was useful in ensuring that the information collected is relevant. A full breakdown of the publication dates of all the research in table 1 is also displayed in figure 3. The other phases were used to get results that are relevant to the impact of digital finance. However, not all articles found in this search were fit for the final research. Since a lot of results pointed towards how digital finance can be used to reduce emissions and make finance “greener”, this is only slightly relevant in relation to SDGs (sustainable development goals) for the government side of the research, which is why many of these papers were not included. Lastly, some research was added from the citations of the papers found in the systematic literature review as they were relevant to the topic at hand.

4 FINDINGS

4.1 How does the integration of digital finance affect business efficacy?

The integration of digital finance has great influence on a business. Mainly through the increased efficiency and automation of financial transactions. Digital finance tools such as online payments, digital wallets, and mobile banking apps allow for faster and more convenient financial transactions for both businesses and customers. Which leads to increased sales and customer satisfaction. This is further reflected in a study by the International Data Corporation (IDC) it predicts that by 2024, about 50% of the global economy will be digitized or close to digitized, while 90% of businesses and organizations will pursue digital transformation as their main growth strategy. Digital finance can also provide businesses with access to a wider range of financial services and products, such as loans and investments. This can help businesses grow and expand, increasing their overall efficacy. Additionally, digital finance can also provide businesses with access to a larger customer base, as more people are able to access and use financial services through digital channels.

Another way in which digital finance can help business efficacy is using data and analytics. Digital finance systems can collect and analyse a large amount of data on financial transactions and customer behaviour. This can help businesses make more informed

decisions, such as identifying new opportunities for growth or detecting fraud.

However, the integration of digital finance can also have negative effects on business efficacy. One potential issue is the increased competition from digital businesses that can take advantage of the benefits of digital finance more effectively than traditional businesses. Additionally, the use of digital finance can also increase the risk of cyber-attacks and data breaches, which can lead to financial losses and damage to a company's reputation. Not to mention the short-term growing pains that a business must go through, when embracing digital transformation, as outlined by K. Warner and M. Wäger, in their paper on how to build capabilities for digital transformation[11]. An organization must have the financial resources, culture, and correct attitudes by leadership towards a digital transformation to produce favourable results, making it a risky endeavour overall.

Research by M. Yu[12] into how digital finance interacts with digital transformation, from the perspective of M&A (mergers and acquisitions), found that utilizing M&A even larger traditional companies can reap the benefits of digital finance. Which is why often M&A are employed by companies to build the digital capabilities they might not have at hand, without compromising their own operations by undergoing a complete digital transformation, which allows them to gain access digital technologies and services or to capture digital markets, increasing efficacy while minimizing risk.

Overall, the integration of digital finance can have both positive and negative effects on business efficacy. While it can increase efficiency and provide access to new opportunities, businesses must also be aware of the potential risks and challenges associated with digital finance to fully harness its benefits.

As found in a research paper focusing on the Chinese manufacturing sector by Chen[13] digital finance solves two large issues for the manufacturing sector, firstly it allows for the manufacturing companies to receive better allocation of finances, by giving the wider market access to their information and creating opportunities for investors. Secondly, digital finance also allows for manufacturing firms to easily employ servitization providing a more customer-centric business model and the ability to generate new revenue streams through the provision of services.

Another study done in China by Y. Ji[17] found that in areas where digital finance is more developed, the rate at which companies' default is diminished. The main reasoning behind this being increased transparency. By reducing the informational asymmetry between firms and investors it is less likely for a company to receive risky investments upon which they would likely default. This principle can also be applied more generally, where digital finance provides investors with the necessary information and makes companies more transparent to support better investment strategy and in turn increase business efficacy.

4.2 What changes do governments have to make to accommodate digital finance?

Governments have many vested interests regarding digital finance, as it comes with many benefits and challenges. The largest and most prominent being the benefit to the economy and growth, as

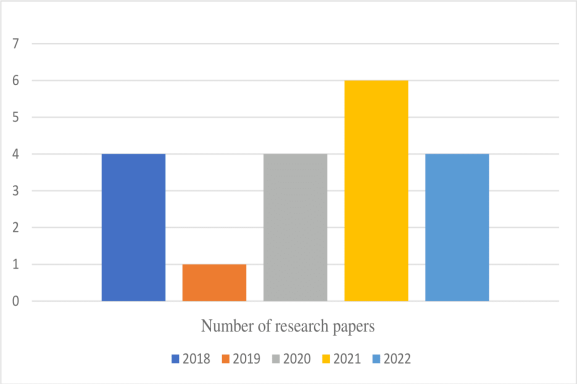

Fig. 3. Quantity of considered research by year of publishing

pointed out in the most recent EU digital finance package[25]. This has also been the recent trend with high tech industries booming in international trade [6] and fintech being one of the fastest growing European industries [2]. Not all benefits are financial however, since digital finance can be used to achieve SDGs, namely digital finance has shown to have an effect reducing carbon emissions, when studied in China[3]. Yet it also is not without obstacles, one recent and clear example of this is the cryptocurrency space, which has been used as a platform for scams and other illegal activities as outlined in a paper by M. Bartoletti[26].

These factors have forced governments to respond and adapt. One of the main changes has been the creation of regulatory frameworks to ensure the safety and security of digital financial transactions. For instance, the European Union has released the aforementioned digital finance package that outlines how the union will proceed in supporting the digital finance transformation, this package includes legislative proposals for taxing and managing crypto assets, mitigating cyber threats, and supporting business innovation. Additionally, governments have had to adapt to the new business models created by digital finance and fintech, such as peer-to-peer lending, and create regulations for them. Similarly, the U.S. Securities and Exchange Commission has issued guidance on the application of federal securities laws to online marketplaces that offer and sell securities, this is to ensure that they are transparent and fair to investors.

Since digital finance encroaches on banking it leads to a complicated situation for regulators. While banking, out of all the financial sectors, is historically one of the most resistant to change and innovation. Due to the disruptive nature of digital finance, they are bound to receive newfound competition, challenging the status quo. This is pointed out by I. Anagnostopoulos "The imperfection of the banking system to respond quickly has inevitably drawn the attention of the Silicon Valley community to it. In terms of profits and market share under threat for example, loan marketing, which has largely become the hub of challenger banks also, comprise nearly 60% of total banking profits globally. As a further testament of data-driven credit, relationship lending through chasing big markets is gradually ceasing to be a banker's unique terrain." [5]. Banking being one of the most strictly regulated economic sectors[27], will

likely lead to a need for digital finance and more specifically fintech dealing with banking to be strictly regulated as well.

There are quite a few laws that have been passed in relation to digital finance and banking already. Here are two examples from the largest economies:

- In the United States, the Office of the Comptroller of the Currency (OCC) has issued a fintech charter for non-depository financial technology companies, allowing them to operate as special purpose national banks, subject to federal banking laws and regulations.[28]
- In the European Union, the Payment Services Directive 2 (PSD2) requires banks to share customer data with authorized third parties through open APIs, in order to increase competition and innovation in digital payments.[29]

In a research paper done by X. Jiang[14] Digital finance shows to have a correlation with innovation and economic development. This is especially prominent in underserved and underdeveloped regions, by providing access to financial services, it allows for entrepreneurship, as a mechanism of digital finance, to provide economic growth, the paper also goes as far as to recommend "Specifically, the government should take steps to expand the coverage breadth and usage depth and to tap the functions of digital finance". While the paper is focused on China, this same attitude can also be found in existing already passed laws in the west:

- The EU's revised Payment Services Directive (PSD2): This regulation, aims to increase security in the digital payment industry. It requires customer authentication for digital payment transactions, as well as enabling third-party providers to access bank account information with the customer's consent.[29]
- The U.S. Securities and Exchange Commission's Regulation Crowdfunding: This regulation, allows small businesses to raise money from a large number of investors using online platforms. It also has protections for investors, namely limits on how much investors can invest, which is derived from their income and net worth.[30]
- The U.K.'s Financial Conduct Authority's Sandbox: This is an initiative that allows fintech companies to experiment with new products and services in a controlled environment before they are released to the general public. The Sandbox allows firms to test their innovations with real users, in a real-world environment, while also ensuring the safety of the users.[31]

Overall, the laws and research already done, seem to indicate that a nurturing and supportive attitude towards digital finance is the most beneficial, while also ensuring the safety of the users. This seems to mostly be due to the benefits digital finance provides to economic growth and innovation. Therefore, governments should adopt policies that allow for digital finance to develop in a safe and stable manner, without being so harsh as to stifle any new innovation. Such regulation would likely lead to economic growth, while keeping digital finance users safe.

4.3 How does digital finance affect individuals financial autonomy?

Digital finance has increased individuals' financial autonomy by making it easier for them to access financial services, than under conventional financial institutions. To give some examples, online banking and online lending platforms have made it easier for individuals to access credit, invest in financial products, and manage their savings. For instance, apps such as Acorns[32], Stash[33] and Robinhood[34], have made it simple and accessible for individuals to start investing even with minimal starting funds. Such apps also provide them with educational resources to help with financial literacy, which also works to increase individual autonomy. Additionally, Websites like Bankrate[35] and NerdWallet[36], allow individuals to compare financial products, such as credit cards and mortgages, and make decisions based on their specific needs and financial situation. However, with the increased adoption of digital finance, also comes the risk of fraud and cybercrime, which can affect individuals' autonomy and security in a negative manner.

Digital finance affects household participation through increasing the amount of investment channels, while also promoting households' access to financial information. Both of which are made difficult by conventional finance and alleviated through digital finance tools. Research on Chinese households and their participation in risky financial markets by Y. Ye [21], found that while Chinese investors have been very averse to any financial assets that are not risk-free, this has been changing in correlation with the adoption of digital finance "The Chinese Household Finance Survey (CHFS) show that the participation rate of Chinese households in risky financial markets rose from 2% in 2013 to 26% in 2017, which is basically in line with the development trend of digital finance." [21] The study also states that by participating in risky financial markets, households can better achieve their wealth goals and reduce income inequality, which in turn also increases their autonomy, by providing more options and possibilities.

Another way in which digital finance increases the autonomy of individuals, is through reduction of poverty. The research done by B. Chen[18], found that through the introduction of digital finance that "the probability of absolute and relative poverty in rural households decreases by 10.27% and 18.31%" [18] respectively. This is of course a very significant reduction and might also be the reason why digital finance has found to have greatest effect on economic development in underdeveloped and underserved areas as found by X. Jiang in their paper[14]

However, there is also research directly contesting this notion, namely the research paper "Contesting digital finance for the poor" by P. Ozili[16]. In the paper P. Ozili argues that evidence for favorable outcomes in development with the introduction of digital finance is weak and that technology is not equal to everyone, especially the poorest. This is due to multiple factors such as the digital divide, access to internet and ICT devices needed to fully utilize digital finance. More arguments are made for stronger regulation of the financial sector before widespread adoption, essentially to de-risk the endeavour, as according to P. Ozili the risk outweighs the benefits. This is further reinforced by a paper done on the effect of digital finance on the income gap in China, by L. Yao[19]. The study found that digital finance has a strong positive correlation with increasing income inequality, this sentiment is also echoed by the research paper done by P. Ozili. Both increased financial risks and increased income inequality can serve to decrease the autonomy of

individuals utilizing digital finance, which is something that must be addressed when considering increasing the rate of adoption.

4.4 Impact of digital finance

Having analyzed the impact of digital finance through the three focus points, it is also possible to summarize the total impact of digital finance. Overall digital finance can be seen to have great impact upon all three points of focus outlined in the previous subsections. Taking them as a whole it can be seen that digital finance provides many opportunities to businesses and by extension - their clients. This is especially applicable to financial firms, indicative by the recent growth of the fintech sector. However, while there are many benefits to be gained through widespread adoption of digital finance, it does not come without risks. These risks ultimately become a responsibility of the governments to reduce. Yet it is also important that this risk reduction does not also reduce the growth and innovation that is found in digital finance, balancing these factors is essential in deciding on the magnitude and benefit of the impact the digital finance transformation will have.

5 CONCLUSION

In conclusion, digital finance has had a significant impact on governments, businesses, and individuals, which for the most part has been positive. The integration of digital finance has increased efficiency and competition, which lead to lower costs for businesses and consumers, while also opening new business opportunities in new, uncharted markets. An increase in the availability of funding as well as more information has also led to greater development opportunities for businesses. On the other hand, adopting digital finance for conventional businesses can be a risky endeavour that requires a lot of planning to execute correctly. Digital finance also comes with some inherent risks such as cyber-attacks and data breaches. Overall, digital finance has had a positive impact on business efficacy, even when considering the added risk.

Governments have had to adapt to the new business models and create regulatory frameworks to ensure the safety and security of digital financial transactions and new business models appearing with the digital finance transformation. A benefit for governments has been the increased economic growth through the adoption of digital finance, which has been extremely prominent in the fintech sector. Governments also have a vested interest in digital finance as it has shown to reduce the shadow economy as shown in the study done by A. Syed [20], so a well-regulated and widespread digital finance ecosystem could also prove to help government regulation.

Digital finance and fintech have increased individuals' financial autonomy by making it easier for them to access financial services and manage their finances, but it also comes with the risk of financial fraud and cybercrime. The risk of finance in general must also be considered as pointed out by P. Ozili[16] digital finance also tends to expose individuals to risks that would otherwise be out of reach. So, it is hard to say whether the impact of digital finance on the individual level has been wholly positive. As technology continues to evolve and digital finance becomes more widespread, so will grow the magnitude of these effects.

This systematic literature review had multiple limitations. The main limitation was the lack of time, since the research was limited to an eight-week window it had to be small in scope. Furthermore, since this is a systematic literature review, no new data concerning the impact of digital finance was collected, which limited the insight that could be gained. These limitations could be amended with future research since there are still many unexplored avenues for digital finance research. Continuing the research of this paper, just in larger scope by considering the impact of digital finance as a whole, rather than only certain types of impact would prove to give a better comprehensive view. This research could also be expanded upon by collecting new data points, as digital finance is very new, collecting current data could also lead to better insight on its true impact. There are also many similar research venues that could be interesting to explore, since most research collected in this paper was of Chinese origin, it might also have a bias towards how digital finance has been working in China, rather than globally. So, to amend this, doing more research on the impact of digital finance in other geographical locations is necessary. Going in another direction, since digital finance is such a broad topic, exploring the impact of digital finance technologies, like mobile banking or blockchain, might give results that are clearer and more specific. Finally, the impact of digital finance is a very new and ever-evolving topic that requires constant research, and the research avenues listed here are just a few of the possibilities that could be considered.

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