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Does A Link Exist Between Digital Finance, Green Finance, And Social Finance?

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ABSTRACT

Social finance is an emerging concept that seeks to increase financial flows to activities and projects that improve society and the world while generating financial returns. This chapter examines the link between digital finance, green finance, and social finance. It also explores the empirical link between people's interest in information about these three types of finance. The empirical analyses show a strong positive correlation between people's interest in digital, green, and social finance information. A unidirectional causality exists between interest in social and green finance information. People's interest in social finance information significantly negatively impacts their interest in digital finance information.

In contrast, interest in social finance information significantly positively affects green finance information. The findings imply that social finance is linked to digital and green finance. Thus, policymakers should not explore social finance opportunities in isolation. Instead, they should investigate the intersection between digital, green, and social finance.

KEYWORDS: Digital finance, green finance, social finance, information, investment, society, environment.

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1. INTRODUCTION

This chapter explores the potential link between digital finance, green finance, and social finance. Several innovative finance sources have emerged since the financial crisis of 2007–2008, also called the global financial crisis (GFC). These innovative finance sources aim to raise additional funds to meet pressing development needs and to fund projects and activities that traditional financial institutions are unwilling to finance. Such innovative finance sources include digital, green, and social finance.

The need to increase financial flows to activities and projects that improve society and the world led to digital, green, and social finance development. Digital finance uses digital technology to mobilize, allocate, and utilize financial services (Burlacu et al., 2021; Ozili, 2023). Green finance refers to financial flows to activities and projects that preserve the environment (Berrou et al., 2019; Taghizadeh-Hesary and Yoshino, 2019). Social finance refers to financial flows to activities and projects that address a social need, which may be a societal or environmental problem (Kuchler and Stroebel, 2021; Nicholls et al., 2015).

Digital and green finance investments have increased exponentially during the previous two decades. Still, investment in social finance has been disproportionately lower because social finance is a relatively new development in international finance (Joy et al., 2011). Greater attention has been paid to digital and green finance than social finance. As a new concept, no universally accepted definition of social finance exists. However, some experts suggest that social finance leverages private capital to address a known social or environmental problem while generating a financial return. Likewise, digital and green finance can also be directed to investments that address a known environmental problem. Despite the potential for digital, green, and social finance to direct financial flows to similar projects and activities, there is little knowledge of the possible link between these three types of finance. Establishing a link between them presents an opportunity to utilize these financing sources to improve society's and the environment's well-being. Fully harnessing their benefits involves exploring the convergence or the meeting point of social finance with digital and green finance.

This chapter contributes to the emerging social finance literature by exploring the relationship between social finance and other financial services categories, such as digital and green finance. It also contributes to the financial innovation literature that examines the available innovative financing sources that can be used to improve the environment and societal well-being. The chapter further contributes to the sustainable finance literature by investigating the different categories of financial services available for sustainable development. It adds to the sustainable finance literature by showing that digital, green, and social finance are innovative financial services that can accelerate investment into projects and activities promoting sustainable development.

The remainder of the chapter is organized as follows. The next section presents the conceptual framework and discusses the concepts of digital, green, and social finance, suggesting a conceptual link between the three finance types. The remaining three sections present a literature review, empirical analysis, and conclusions.

2. A CONCEPTUAL FRAMEWORK

This section describes digital finance, green finance, and social finance concepts and discusses various links between the three types of finance. Of particular note is that the causation may not necessarily flow from a digital to green to social finance causation channel.

2.1. Digital Finance

Digital finance is the use of digital innovations to deliver financial services. It uses digital technologies to mobilize, allocate, and utilize financial services (Pazarbasioglu et al., 2020). The need for digital finance arose from the need to increase access to financial services, improve the efficiency of financial service delivery, reduce transaction costs, improve security, serve customers and clients better, and increase choice for customers (Ozili, 2018; Thomas and Hedrick-Wong, 2019). Currently, several innovations are used to enable digital finance, such as open banking frameworks, open application programming interfaces (APIs), artificial intelligence (AI) systems, financial technology (fintech) products, mobile phone applications,

online banking apps, online payment services, peer-to-peer (P2P) digital lending, cryptocurrencies, and central bank digital currencies (Arslanian and Fischer, 2019; Karlan et al., 2016; Ozili, 2023). These digital innovations have accelerated using digital financial services. The popular agents used to provide digital financial services are mobile network operators, payment service providers, merchant aggregators, retailers, fintech companies, neo-banks, digital banks, and super platforms (Bachas et al., 2018; Owens, 2013; Scardovi, 2017). Digital finance also poses some risks. The most notable risks are cybersecurity risks, online fraud, unauthorized loss of funds, over-indebtedness, privacy risks, algorithmic bias, money laundering risks, identity theft, and abusive digital loan recovery practices.

2.2. Green Finance

The advocacy for green finance arose from the need to mitigate the adverse effects of climate change on the environment and reduce harm to the environment caused by human activities (Berrou et al., 2019; Su et al., 2022). Green finance involves mobilizing public and private investments in environmental goods and services (Berrou et al., 2019). It can also be viewed as financing public policies that encourage implementing environmental protection, mitigation, and adaptation projects and initiatives (Lindenberg, 2014). Green finance encompasses all funds raised and allocated to green projects and activities that preserve the environment. Green financing aims to increase financial flows from banking and non-bank sources from the public, private, and not-for-profit sectors to green and sustainable development priorities. On an impact level, green finance supports green projects and investments that deliver a safe and sustainable environment for sustainable development (Adams, 2008). It is often mobilized using public and private financing mechanisms and financial market instruments such as green climate funds, green bonds, structured green funds, green credit cards, green banks, green venture capital, public energy banks, and green stock indices (Bhutta et al., 2022; Lindenberg, 2014; Randjelovic et al., 2003). Typical beneficiaries or targets of green financing and green investments are non-governmental organizations (NGOs), private and public firms involved in water processing and recycling, biodiversity protection, industrial pollution control,

energy efficiency, water sanitation, climate change adaptation, renewable energy, dam management, reforestation, pollution prevention, circular economy initiatives, sustainable use of natural resources and land, green transition, voluntary de-carbonization initiatives, green buildings, and climate-smart agriculture (Kenis and Lievens, 2016; Kohler, 2018; Li et al., 2022; Lindenberg, 2014).

2.3. Social Finance

Social finance arose from the need to focus on a financial investment's return and social impact (Weber, 2012). Social finance involves mobilizing private capital to projects and activities that deliver a social dividend and an economic return to achieve social and environmental goals (Dadush, 2015; Weber, 2012). Social finance also involves acquiring private or market funds to meet the world's most pressing social challenges while offering minimal financial returns (Dadush, 2015).

Social finance is often raised using private financing mechanisms, financial market instruments, and commercial-style investment tools. The mobilized social finance funds are directed to investments yielding blended returns, i.e., social, financial, and environmental (Hangl, 2014; Harji and Hebb, 2009; Moore et al., 2012). Many social finance instruments exist to drive social change in communities globally. They include:

- *Social impact bonds (SIBs)*. *Social impact bonds* are outcomes-based contracts between investors, outcomes payers, and service providers. The outcomes payer identifies desired social outcomes, commits to paying the investor an agreed return on investment (ROI), and commits to paying the service provider an agreed-upon amount if the outcomes are achieved. The ROI to the investor depends on whether the social outcomes improve. If the outcomes improve, the outcome payer repays the investors for their initial investment plus a return on the financial risks taken. UK-based Social Finance Ltd. launched the first SIB in September 2010.
- *Development impact bonds (DIBs)*. *Development impact bonds* are a social outcomes contract in which investors fund development programs with returns linked to achieving

specific development goals. DIBs are common in low-income and middle-income countries such as Palestine, India, Cameroun, Sierra Leone, and Kyrgyzstan.

- *Social finance investment funds (SFIFs)*. *Social finance investment funds* allow investors to direct their private capital toward social public good initiatives such as affordable housing projects, community development projects, social enterprises, or not-for-profit projects.
- *Social enterprises or social purpose organizations (SPOs)*. These corporations use a market-based approach to meet specific social objectives, such as a restaurant that employs vulnerable youths, a food bank that provides food to poor people, or a care home that cares for disabled people.
- *Social innovation funds (SIFs)*. These funds invest in intermediaries who can find a country's most innovative social service programs and scale those already working programs. The Corporation for National and Community Service (CNCS) created the first SIFs in 2009 in the United States.

On an impact level, social finance supports social projects and social works that deliver lasting and widespread social change to improve the lives of people and communities globally. Social finance creates opportunities for investors, associations, cooperatives, real estate trusts, banks, insurance companies, and asset managers to finance projects that benefit society, enabling organizations to access new sources of funds. Social finance funds' major beneficiaries or targets include the social care industry, education, health, employment, children's, food banks, public works, and social enterprises.

2.4. Links Between the Three Finance Types

This section discusses how the three types of finance can affect each other, but the causation may not necessarily flow from digital to green to social finance.

Linking Digital Finance to Social and Green Finance

Conceptually, digital finance is linked to social and green finance in three ways. First, existing digital finance tools, such as fintech applications, can be used to accelerate investment in social bonds, green bonds, private social equity funds, and private green index funds, as shown in Figure 22.1, so that these funds can be used to invest in green-oriented projects and activities and in social projects and activities that meet some pressing social needs in society (Nassiry, 2018; Ozili, 2021; Puschmann et al., 2020).

Second, authorities can use digital finance payment applications, such as debit cards and point-of-sale (POS) terminals, to collect fines and penalties from citizens who commit petty crimes (Vincent and Evans, 2024). They can use these collections as green equity and social capital to invest in public climate mitigation and adaptation projects that improve social well-being.

Third, digital finance applications can be embedded into private green crowdfunding platforms and private social crowdfunding platforms. The embedded digital finance tools can mobilize funds from private individuals, philanthropists, investors, corporations, and non-governmental organizations (Halden and Cali, 2024). After these funds have been mobilized, digital finance applications can be used to allocate these funds to projects and activities that protect the environment and to projects that meet some pressing social need in society, as shown in Figure 22.1.

(Insert Figure 22.1 here)

Linking Green Finance to Social and Digital Finance

After green bonds and private green index funds have been raised, existing digital finance applications can also be allocated to organizations and entities undertaking green projects and activities to protect the environment, as shown in Figure 22.1. A private, hybrid green-social fund can also be raised, and digital finance applications can be used to allocate the hybrid green-social fund to green-oriented and social-oriented projects and activities that protect the environment and improve the well-being of members of society.

Linking Social Finance to Digital Finance and Green Finance

After social bonds and social index funds have been raised, existing digital finance applications can be used to allocate these funds to organizations and entities that undertake social projects and activities to improve the well-being of members of society, as shown in Figure 22.1. A private, hybrid green-social fund can also be raised, and digital finance applications can be used to allocate the hybrid green-social fund to green- and social-oriented projects and activities that improve the well-being of members of society and protect the environment.

3. LITERATURE REVIEW

The social finance literature is a relatively new area of finance. Among earlier studies, Rizzi et al. (2018) conceptualize social finance as a new innovative financing source that enables financial flows to activities or ventures that achieve positive social and environmental impact alongside financial returns. Marks and Spinelli (2019) identify some existing social finance innovations that tackle critical social problems, such as social impact bonds in Europe, pay-for-success bonds in the United States, social benefit bonds in Australia, and development impact bonds in poorer communities. The authors contend that these financial instruments collectively aim to bring private sector actors and service providers into a contractual agreement to finance some agreed outcomes or initiatives by which investors provide up-front funding and receive a return if the outcomes are achieved. Rexhepi (2016) shows that social finance presents a better way to deal with the poverty problem because a social financing approach would motivate capitalists to lower their profit maximization expectations and instead pursue profits that will be used to meet pressing social and environmental needs.

Mitić and Rakić (2017) demonstrate that social finance can be delivered to poor and developing countries through social microfinance. It can also be introduced in developed countries by compelling companies to incorporate social responsibility into their investment and financing models. They suggest some characteristics of a social financing model, which include providing a transparent cost structure that is devoid of predatory and high default

interest rates, issuing loans to socially responsible projects and organizations, blocking loans that are considered to be bad for the social environment, and respecting ethical and moral codes. Andrikopoulos (2020) maintains that social finance, such as social impact bonds, venture philanthropy, and crowdfunding, can lead to a social economy and entrepreneurship that can solve social and environmental problems. Hilbrich (2021) shows that the social finance market is growing. It seeks to close the funding gaps that impede the socialization of the social goals in the 2030 sustainable development agenda. The author also contends that social finance may give rise to low-cost sustainable business models. Moore et al. (2012) assert that social finance can stimulate social innovation, but it may carry higher risks relative to their expected returns. Strandberg (2013) also argues that risk assessment for social finance is challenging due to inadequate returns, constraints in finding capital to match specific social investments, and a lack of access to tailored social capital.

Ozili (2021) considers the intersection between digital, green, and social finance for promoting sustainable development. The author maintains that digital finance offers an efficient channel for individuals and corporations to fund social projects that deliver a social dividend. He also contends that digital finance provides an efficient channel for individuals and corporations to fund green projects that lead to a sustainable environment. Ozili concludes that digital finance is an efficient enabler of green and social finance.

Tang (2021) examines the impact of the COVID-19 pandemic on green and social finance using data collected from 60 countries. The author finds that firms with better access to green and social finance could withstand the COVID-19 pandemic compared to firms without such access. Tang also observes that green firms issued new bonds to support corporate activities during the pandemic, which improved economic growth by smoothening economic growth and leading to lower growth volatility.

Kuchler and Stroebe (2021) review the contributions to the field of social finance while attempting to show the intersection of social and household finance. They analyze how social interactions influence people's financial decisions through several channels. The study

indicates that peer effects in household financial decisions are pervasive and occur through several channels, such as "social information" and "social utility."

4. EMPIRICAL ANALYSIS

Assessing the empirical link between digital, green, and social finance is difficult due to limited data on these three types of finance. However, some insights can be gained by examining the empirical relationship between people's interest in digital, green, and social finance information. This section presents an empirical analysis of the link between people's interest in such information. This analysis is important because people need to learn about these three finance types to use these finance sources efficiently. Their curiosity would lead them to seek more information about these finance types through a web search.

4.1. Methodology

Google Trends database provides data on the number of times people searched the internet for certain keywords across cities and countries over a specific period. This database provides data on their interests over time using specific keywords on the internet through website searches. This study uses monthly global data from the Google Trends database between 2004 and 2023 in 240 countries using the keyword "social finance."

After querying the database with the "social finance" keyword, the resulting data are termed the "interest in social finance information" or the social finance (SF) variable. This procedure is repeated for the keywords "digital finance" and "green finance," and the resulting data are termed "interest in digital finance (DF) information" data and "interest in green finance (GF) information," respectively. The popularity scores of the three output data reports range between 0 and 100. A score of 0 means that there is insufficient data for the keyword. A score of less than 50 indicates that web searches for the keyword are less popular. A count of 50 means that web searches for the keyword are half as popular as the peak terms. A count of 100 means that a term was very popular and reached its peak popularity.

4.2. Trend, Descriptive Statistics, and Correlation Analysis

Figures 22.2, 22.3, and 22.4 report the countries with the top 20 interests in digital, green, and social finance information. Figure 22.2 shows that countries like Singapore, Zimbabwe, and Uganda are most interested in digital finance information. In contrast, countries like the United Arab Emirates, Pakistan, and Nepal are less interested in social finance information.

(Insert Figure 22.2 here)

Figure 22.3 shows that countries like Hong Kong, St. Helena, Singapore, India, and Luxembourg are most interested in green finance information. In contrast, countries like Nigeria, South Africa, and Canada reveal lower interest in green finance information. In the case of Nigeria, people are less interested in green finance information because of the need to survive and cope with the frequent economic instability citizens face, making it difficult for them to prioritize or give significant attention to green finance information. For countries like Canada and South Africa, the government leads the effort in promoting green finance initiatives. At the same time, citizens are more interested in searching the internet for other information that meets their needs, such as cheap loans, credit cards, and shopping deals. They are not actively searching the internet for green finance products.

(Insert Figure 22.3 here)

Figure 22.4 shows that countries like Namibia and Zimbabwe are most interested in social finance information. In contrast, countries like the United States and Hong Kong are less interested in social finance information. Just as in the case of Canada, the United States and Hong Kong are likely to experience less interest in social finance information because their citizens are more interested in searching the internet for other types of information that meet their needs, such as cheap loans, cheap credit cards, and cheaper shopping deals. They are not actively searching the internet for information about social finance products. Meanwhile, the growing interest in social finance information in Namibia and Zimbabwe is due to the massive government social programs introduced in the two countries over the years. People were interested in these programs and searched the internet to learn about them.

(Insert Figure 22.4 here)

Table 22.1 reports the descriptive statistics of the data on people's interest in digital, green, and social finance information. It shows that the mean and median values are higher for the "interest in social finance information" variable (SF), followed by the "interest in green finance information" variable (GF), "interest in digital finance information" (DF) has the lowest mean and median values during the period. On average, interest in digital, green, and social finance information in 2021, 2022, and 2023 increased compared to the early 2000s.

(Insert Table 22.1 here)

The correlation results reported in Table 22.2 show a statistically significant positive correlation between DF, GF, and SF. Interestingly, people's interest in digital and green finance information is more strongly correlated than their interest in green and social finance information. This finding might be due to the popularity of green finance information relative to social finance information. Since green finance information is more popular than social finance information, people knowledgeable about digital finance are likelier to use digital apps to make financial flows for green purposes than for social purposes.

(Insert Table 22.2 here)

4.3. Granger Causality

The first requirement to conduct the Granger causality test is checking the stationarity of the time series data of the three variables using the augmented Dickey-Fuller (ADF) unit root test. The test results reported in Table 22.3 show that the "interest in digital finance information" variable has a p-value of 0.99 and a t-value of 0.77, both greater than the 0.05 level. The evidence indicates that the "interest in digital finance information" variable has a non-stationary unit root. Therefore, the first difference in the "interest in digital finance information" variable will be considered before conducting the Granger causality test.

(Insert Table 23.3 here)

The ADF unit root test result also shows that the "interest in social finance information" variable has a p-value of 0.86, greater than the 0.05 level, and a t-value of -0.629 . This evidence indicates that the "interest in social finance information" variable has a non-stationary

unit root. Therefore, the first difference in the "interest in social finance information" variable will be considered before the Granger causality test is conducted.

The ADF unit root test result also shows that the "interest in green finance information" variable has a p-value of 0.995, greater than the 0.05 level, and a t-value of 0.841. This evidence indicates that the "interest in green finance information" variable has a non-stationary unit root. Therefore, the first difference of the "interest in green finance information" variable will be considered before conducting the Granger causality test.

The Granger causality test in Table 22.4 shows bidirectional causality between "interest in digital finance information" and "interest in green finance information" because their p-values (0.017, 0.018) are less than the 0.05 level. This finding indicates that people's search for digital finance information led them to become interested in green finance information. Furthermore, their search for green finance information also led them to become interested in digital finance information. There is also a unidirectional Granger causality between "interest in social finance information" and "interest in green finance information" because the p-value (0.0002) is less than the 0.05 level. This result indicates that people's search for social finance information interested them in green finance information. Meanwhile, no Granger causality exists between "interest in green finance information" and "interest in social finance information" because the p-value (0.09) is greater than the 0.05 level. There is also no Granger causality between "interest in digital finance information" and "interest in social finance information" because the p-values (0.305 and 0.328) exceed the 0.05 level.

(Insert Table 22.4 here)

Regression Analysis Linking Digital, Green, and Social Finance

This section uses regression analysis to analyze the link between interest in digital, green, and social finance formation. It examines the effect of DF, GF, and SF on each other using the two-stage least squares regression estimation method, which addresses potential endogeneity in the data. Table 22.5 reports the two-stage least squares regression estimation results.

(Insert Table 22.5 here)

Column 1 of Table 22.5 reports the effect of the DF and GF variables on the SF variable. The DF coefficient is negative and economically significant at the 0.01 level. This finding indicates that a 1% increase in interest in digital finance information leads to a -2.78% decrease in interest in social finance information. This result may happen when people who are knowledgeable about digital finance prefer to use their mobile phones and digital apps to make financial flows to non-social activities or to activities that do not have a social benefit to society but are legal, such as engaging in an alcohol business, gambling, hunting, and drugs. This evidence implies that interest in digital finance information can lead to less interest in social finance information. Meanwhile, the GF coefficient is positive and economically significant at the 0.01 level, indicating that a 1% increase in interest in green finance information will lead to a 2.87% increase in interest in social finance information. This finding suggests that as green finance information becomes widespread, it leads to greater interest in social finance information among the population.

Column 2 of Table 22.5 reports the effect of the SF and GF variables on the DF variable. The SF coefficient is negative and statistically significant at the 0.01 level. This finding indicates that an increase in interest in social finance information leads to a significant decrease in interest in digital finance information. This evidence suggests that as more people become interested in information about social finance, they are less likely to become interested in information about digital finance. Meanwhile, the GF coefficient is positive and statistically significant at the 0.01 level, indicating that an increase in interest in green finance information leads to a significant increase in interest in digital finance information. This result implies that interest in green finance information stimulates people's interest in digital finance information.

Column 3 of Table 22.5 reports the effect of the SF and DF variables on the GF variable. The SF coefficient is positive and statistically significant at the 0.01 level. This finding indicates that an increase in interest in social finance information leads to a significant increase

in interest in green finance information. Thus, as more people become interested in information about social finance, they are more likely to become interested in information about green finance. Meanwhile, the DF coefficient is positive and economically significant at the 0.01 level, indicating that a 1% increase in interest in digital finance information will lead to a 1.429% increase in interest in green finance information. This evidence suggests that people will become interested in green finance information after gaining an interest in digital finance information.

5. SUMMARY AND CONCLUSIONS

The chapter examines the link between digital, green, and social finance. The need for the study arose from the understanding that social finance and green finance cannot exist in isolation and that social finance should exist as part of an ecosystem of innovative financial services. Therefore, establishing a relationship between digital, green, and social finance is necessary. The study links digital finance to green and social finance by showing that existing digital finance tools can accelerate investment into green bonds, social bonds, private social equity funds, and private green index funds. These funds can be used to invest in green-oriented and social-oriented projects and activities that meet pressing environmental and social needs. The study also connects green finance and social finance to digital finance by showing that after green bonds, social bonds, green equity funds, private green index funds, and private social index funds have been raised, existing digital finance applications can be used to allocate green and social funds to organizations and entities that undertake green and social projects and activities that protect the environment and improve social well-being.

The study also analyzed information to determine the empirical link between people's interest in digital, green, and social finance information. Its findings show that digital finance information was higher in countries like Nigeria, South Africa, and Canada. Interest in green finance information was higher in Hong Kong, St. Helena, Singapore, India, and Luxembourg. Interest in social finance information was higher in Namibia and Zimbabwe. Interest in digital, green, and social finance information was higher in 2021, 2022, and 2023 compared to the

early 2000s. A strong positive correlation exists between people's interest in digital, green, and social finance information.

Interestingly, people's interest in digital and green finance information was more strongly correlated with those in social finance and green finance information. There is a unidirectional causality between interest in social finance information and green finance information, but a bidirectional causality between interest in digital finance information and green finance information. The regression analysis reveals that people's interest in social finance information negatively affects their interest in digital finance information. People's interest in social finance information positively affects their interest in green finance information.

The study's findings imply that social finance is conceptually linked to digital and green finance. In contrast, a link exists between interest in social finance information and interest in digital and green finance information. Based on these findings, policymakers should not explore social finance opportunities in isolation. Instead, they should investigate the intersection between digital, green, and social finance. Information about these three finance sources should be available to the public to facilitate investment in digital, green, and social finance instruments.

Researchers can extend this study by using stock market and other financial data to establish a link between digital, green, and social finance when such data becomes available. They can also examine the relationship between these three finance types in emerging, developing, and developed countries.

DISCUSSION QUESTIONS

1. Identify three sectors that would benefit from social finance instruments.
2. Describe how digital finance can enable social finance.
3. Identify two publicly available social finance initiatives in the world.
4. Explain how a social impact bond works.
5. Describe the link between social finance and the environment.

REFERENCES

- Adams, W. M. 2008. *Green Development: Environment and Sustainability in a Developing World*, Fourth Edition. Milton Park, Abingdon, Oxfordshire: Routledge.
- Andrikopoulos, Andreas. 2020. "Delineating Social Finance." *International Review of Financial Analysis* 70(July), 101519.
- Arslanian, Henri, and Fabrice Fischer. 2019. *The Future of Finance: The Impact of FinTech, AI, and Crypto on Financial Services*. Dordrecht, The Netherlands: Springer.
- Bachas, Pierre, Paul Gertler, Sean Higgins, and Enrique Seira. 2018. "Digital Financial Services Go a Long Way: Transaction Costs and Financial Inclusion." *AEA Papers and Proceedings*, 108, 444–448.
- Berrou, Romain, Philippe Dessertine, and Marco Migliorelli. 2019. "An Overview of Green Finance." In Marco Migliorelli and Philoe Dessertine (eds.), *The Rise of Green Finance in Europe. Palgrave Studies in Impact Finance*. Cham, Switzerland, Palgrave Macmillan.
- Bhutta, Umair S., Adeel Tariq, Muhammad Farrukh, Ali Raza, and Muhammad Khalid Iqbal. 2022. "Green Bonds for Sustainable Development: Review of Literature on Development and Impact of Green Bonds." *Technological Forecasting and Social Change* 175(C), 121378.
- Burlacu, Sorin, Ghenadie Ciobanu, Victor Adrian Troaca, and Carol Cristina Gombos. 2021. "The Digital Finance – Opportunity of Development in the New Economy." *Proceedings of the International Conference on Business Excellence* 15(1) 392–405.
- Dadush, Sarah. 2015. "Regulating Social Finance: Can Social Stock Exchanges Meet the Challenge?" *University of Pennsylvania Journal of International Law* 37(1), 139–228.
- Halden, Ugur, and Umit Cali. 2024. "Exploiting Green Energy Potential Via FinTech: The Role of DLT-based Crowdfunding in PV and ESS Investments." *Renewable Energy* 120528.
- Hangl, Christa. 2014. "A Literature Review about the Landscape of Social Finance." *ACRN Journal of Finance and Risk Perspectives* 3(4), 64–69.

- Harji, Karim, and Tessa Heeb. 2009. *"The Quest for Blended Value Returns: Investor Perspectives on Social Finance in Canada."* Ottawa: Carleton Centre for Community Innovation.
- Hilbrich, Sören. 2021. "What Is Social Finance? Definitions by Market Participants, the EU Taxonomy for Sustainable Activities, and Implications for Development Policy" (No. 29). Discussion Paper. German Institute of Development and Sustainability (IDOS), Bonn.
- Joy, Iona, Lucy de Las Casas, and Benedict Rickey. 2011. "Understanding the Demands for and Supply of Social Finance: The Big Society Finance Fund." *New Philanthropy Capital*, 1–52.
- Karlan, Dean, Jake Kendall, Rebecca Mann, Rohini Pande, Tavneet Suri, and Jonathan Zinman. 2016. "Research and Impacts of Digital Financial Services." Working Paper No. 22633. National Bureau of Economic Research.
- Kenis, Anneleen, and Matthias Lievens. 2016. "Greening the Economy or Economizing the Green Project? When Environmental Concerns Are Turned into a Means to Save the Market." *Review of Radical Political Economics* 48(2), 217–234.
- Kohler, Niklaus. 2018. "From the Design of Green Buildings to Resilience Management of Building Stocks." *Building Research & Information* 46(5), 578–593.
- Kuchler, Theresa, and Johannes Stroebel. 2021. "Social Finance." *Annual Review of Financial Economics* 13(1), 37–55.
- Li, Jing, Guangxin Song, Mengshan Cai, Jiao Bian, and Badamasi Sani Mohammed. 2022. "Green Environment and Circular Economy: A State-of-the-art Analysis." *Sustainable Energy Technologies and Assessments* 52(Part B), 102106.
- Lindenberg, Nannette. 2014. "Definition of Green Finance." DIE mimeo, April 15. Available at <https://ssrn.com/abstract=2446496>.
- Marks, Michael B., and Gabriella Spinelli, 2019. "Opportunities and Challenges in Utilizing Social Finance Impact Investments to Support Social Innovations." *Brunel University Working Paper*. Available at <https://bura.brunel.ac.uk/bitstream/2438/18955/2/FullText.pdf>.

- Mitić, Petar, and Slobodan Rakić. 2017. "Social Finance and Social Banking: A Path Towards a More Sustainable Future." *Review of Applied Socio-economic Research* 9, 108–119.
- Moore, Michele-Lee, Frances R. Westley, and Alex Nicholls. 2012. "The Social Finance and Social Innovation Nexus." *Journal of Social Entrepreneurship* 3(2), 115–132.
- Nassiry, Darius. 2018. "The Role of Fintech in Unlocking Green Finance: Policy Insights for Developing Countries." Working Paper No. 883. Asian Development Bank Institute, Tokyo.
- Nicholls, Alex, Jeremy Nicholls, and Rob Paton (eds.). 2015. "*Social Finance*." Oxford, UK: Oxford University Press.
- Owens, John. 2013. "Offering Digital Financial Services to Promote Financial Inclusion: Lessons We've Learned." *Innovations: Technology, Governance, Globalization* 8(1–2), 271–282.
- Ozili, Peterson K. 2018. "Impact of Digital Finance on Financial Inclusion and Stability." *Borsa Istanbul Review* 18(4), 329–340.
- Ozili, Peterson K. 2021. "Digital Finance, Green Finance and Social Finance: Is There a Link?" *Financial Internet Quarterly* 17(1), 1–7.
- Ozili, Peterson K. 2023. "Digital Finance Research and Developments around the World: A Literature Review." *International Journal of Business Forecasting and Marketing Intelligence* 8(1), 35–51.
- Pazarbasioglu, Ceyla, Alfonso Garcia Mora, Mahesh Uttamchandani, Harish Natarajan, Erik Feyen, and Mathew Saal. 2020. "Digital Financial Services." *World Bank* 54, 1–42.
- Puschmann, Thomas, Christian Hugo Hoffmann, and Valentyn Khmarskyi. 2020. "How Green FinTech Can Alleviate the Impact of Climate Change — The Case of Switzerland." *Sustainability* 12(24), 10691.
- Randjelovic, Jelena, Anastasia R. O'Rourke, and Renato J. Orsato. 2003. "The Emergence of Green Venture Capital." *Business Strategy and the Environment* 12(4), 240–253.
- Rexhepi, Gadaf. 2016. "The Architecture of Social Finance." In M. Lehner Othman (ed.), *Routledge Handbook of Social and Sustainable Finance*, 35–49. Oxfordshire, UK: Routledge.

- Rizzi, Francesco, Chiara Pellegrini, and Massimo Battaglia. 2018. "The Structuring of Social Finance: Emerging Approaches for Supporting Environmentally and Socially Impactful Projects." *Journal of Cleaner Production* 170(January 1), 805–817.
- Scardovi, Claudio. 2017. *Digital Transformation in Financial Services* (Vol. 236). Cham, Switzerland: Springer International Publishing.
- Strandberg, Coro. 2013. "Scaling the Social Finance Pipeline: Challenges and Opportunities." *A Strandberg Consulting, White Paper*.
- Su, Chi-Wei, Muhammad Umar, and Ruosu Gao. 2022. "Save the Environment, Get Financing! How China Is Protecting the Environment with Green Credit Policies?" *Journal of Environmental Management* 323(December 1), 116178.
- Taghizadeh-Hesary, Farhad, and Naoyuki Yoshino. 2019. "The Way to Induce Private Participation in Green Finance and Investment." *Finance Research Letters* 31(Special Issue), 98–103.
- Tang, Yongjun. 2021. "The Effects of Green and Social Finance on Firms, Markets and the Economy." *Asian Development Outlook*, 1-42
- Thomas, Howard, and Yuwa Hedrick-Wong. 2019. "How Digital Finance and Fintech Can Improve Financial Inclusion." In Howard Thomas and Yuwa Hedrick-Wong (ed.), *Inclusive Growth: The Global Challenges of Social Inequality and Financial Inclusion*, 27–41. Leeds, UK: Emerald Publishing Limited.
- Vincent, Olusegun, and Olaniyi Evans. 2024. "Fintech and Tax Revenues: Does Political Institution Matter?" *Asia-Pacific Journal of Accounting & Economics*, 1–19.
- Weber, Olaf. 2012. "Social Finance and Impact Investing." Available at https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2160403.

Table 22.1 Descriptive Statistics of the Variables

This table summarizes the mean of the data for the interest in digital, green, and social finance information.

Year	Interest in Digital Finance Information (DF)	Interest in Green Finance Information (GF)	Interest in Social Finance Information (SF)
2004	4.3	6.2	33.7
2005	4.5	15.2	45.6
2006	8.0	17.8	33.5
2007	10.2	23.1	40.7
2008	10.3	25.7	47.3
2009	11.5	25.7	48.2
2010	10.8	26.4	53.9
2011	9.7	26.1	60.3
2012	8.8	26.7	59.2
2013	8.6	26.2	55.9
2014	9.8	25.0	55.7
2015	10.9	25.1	57.9
2016	13.0	26.2	56.6
2017	15.9	28.3	57.0
2018	18.0	28.4	55.4
2019	20.1	34.8	53.2
2020	24.1	52.8	56.4
2021	27.2	53.4	60.0
2022	36.5	63.7	81.8
2023	40.1	74.7	75.2
Mean	15.1	31.5	54.3
Median	12.0	27.0	55.0
Maximum	100.0	95.0	100.0
Minimum	0.0	0.0	0.0
Std. Dev.	10.7	17.1	14.2
Observations	240	240	240

Table 22.2 The Pearson Correlation Coefficients of the Variables

This table reports the Pearson correlation for the interest in the social finance information variable (SF), interest in the green finance information variable (GF), and interest in the digital finance information variable (DF).

Variables	SF	GF	DF
SF	1.000 -----		
GF	0.641*** (0.00)	1.000 -----	
DF	0.565*** (0.00)	0.873*** (0.00)	1.000 -----

*** indicates statistical significance at the 0.01 level. The p-values appear in parentheses. SF = interest in social finance information. GF = interest in green finance information. DF = interest in digital finance.

Table 22.3 Augmented Dickey-Fuller (ADF) Unit Root Test

This table shows the stationarity or non-stationarity of the digital, green, and social finance data.

Variables	t-statistic	p-value	Decision	Remark
Interest in the digital finance information variable (DF)	0.777	0.994	p-value > 0.05	Has a unit root and is non-stationary
Interest in the green finance information variable (GF)	0.841	0.995	p-value > 0.05	Has a unit root and is non-stationary
Interest in the social finance information variable (SF)	-0.629	0.860	p-value > 0.05	Has a unit root and is non-stationary

Table 22.4 Pairwise Granger Causality Tests

This table shows the Granger causality between digital, green, and social finance.
Sample: 2004M01 2023M12

Lags: 2

Null Hypothesis	Observations	F-statistic	Probability
D(GF) does not Granger cause D(DF)	237	4.09418	0.0179
D(DF) does not Granger cause D(GF)		4.06542	0.0184
D(SF) does not Granger cause D(DF)	237	1.19360	0.3050
D(DF) does not Granger cause D(SF)		1.11894	0.3284
D(SF) does not Granger cause D(GF)	237	9.02431	0.0002
D(GF) does not Granger cause D(SF)		2.40217	0.0928

D() denotes the first difference of the time series data of the variable. DF = interest in digital finance information. GF = interest in green finance information. SF = interest in social finance information.

Table 22.5 Two-stage Least Squares Regression Estimation with Instrumental Variables

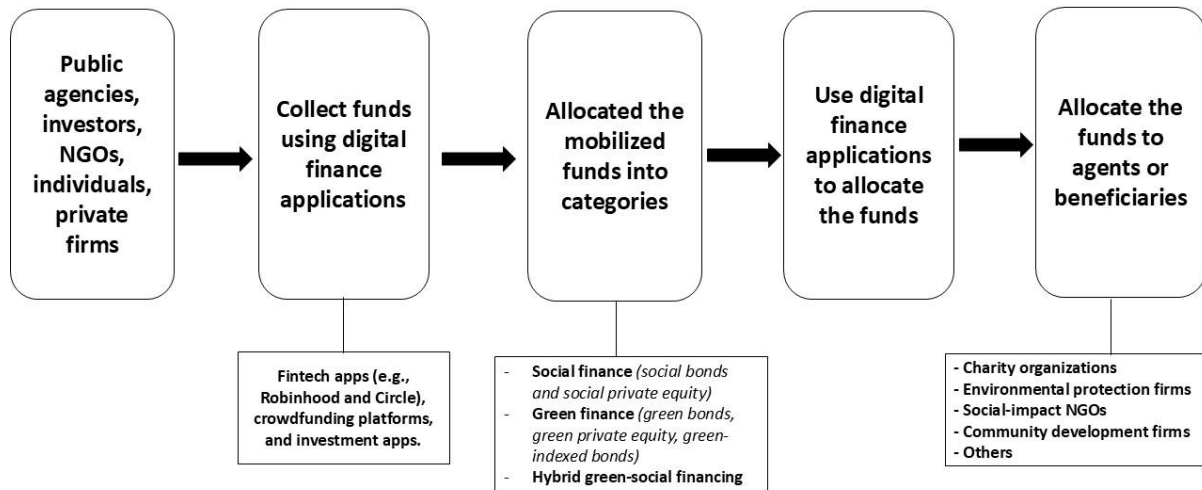
This table estimates the effect of digital and green finance on social finance in the first column, social and green finance on digital finance in column 2, and social and digital finance on green finance in column 3.

Independent Variables	Dependent Variable: SF	Dependent Variable: DF	Dependent Variable: GF
SF		-0.087*** (-3.89) ((0.00))	0.186*** (7.66) ((0.00))
DF	-2.785 (-3.19) ((0.00))		1.429*** (19.05) ((0.00))
GF	2.870 (6.51) ((0.00))	0.628*** (17.96) ((0.00))	
Adjusted R ²	65.88	75.15	77.91
J-statistic	0.363	0.0001	0.002

*** indicates statistical significance at the 0.01 level. The t-statistic appears in a single parenthesis, and the p-value appears in double parentheses. The instrumental variables are the one-year lag of the explanatory variables in each model. SF = interest in social finance information. DF = interest in digital finance information. GF = interest in green finance information.

Figure 22.1 Conceptual Link Between Digital, Green, and Social Finance

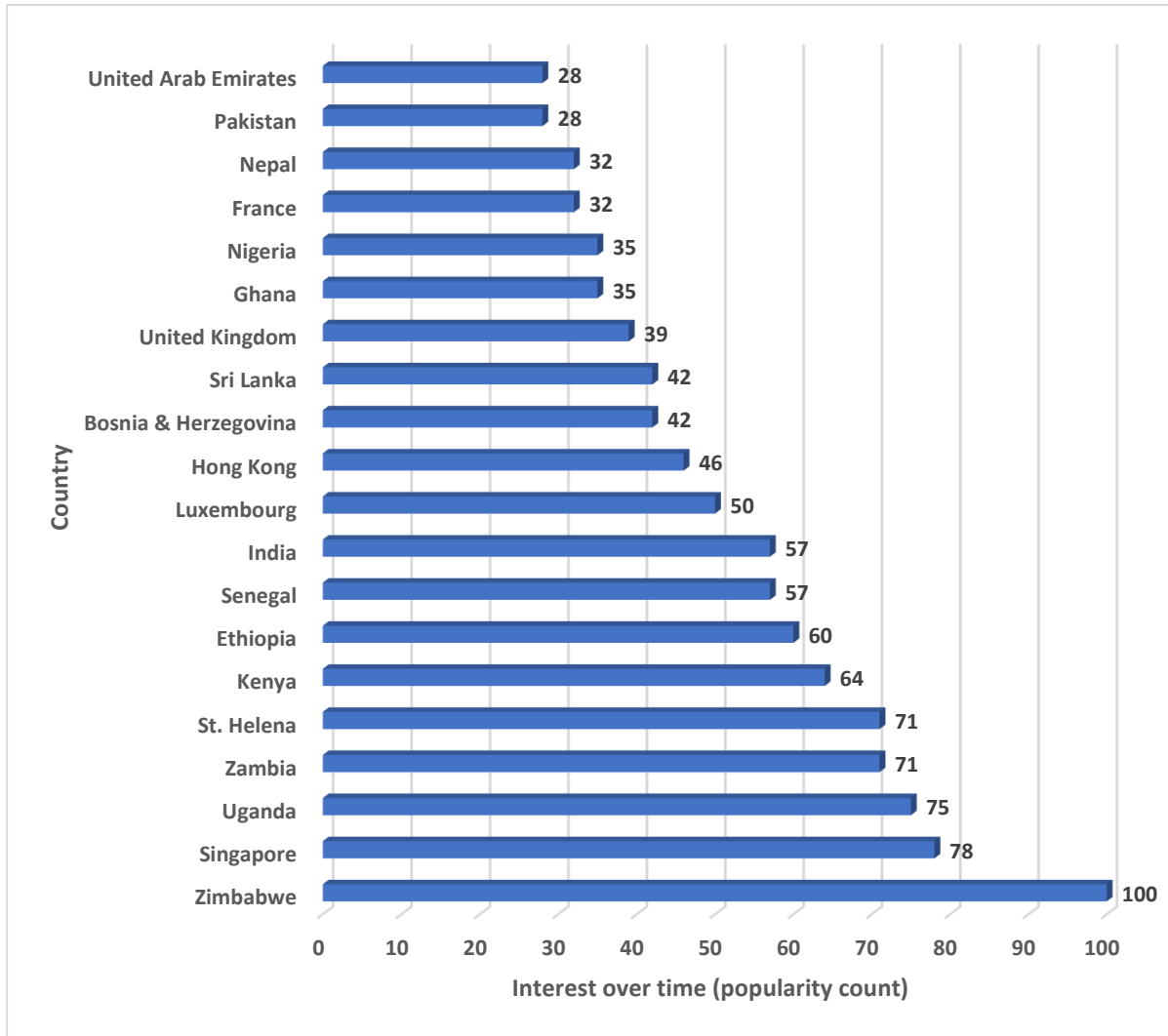
This figure shows a link between digital, green, and social finance. It reveals that digital finance tools can mobilize green and social funds for a green and social purpose. It identifies digital finance technology as the appropriate mechanism for allocating green and social funds to activities and projects that deliver positive social impact.



Source: The author.

Figure 22.2 Interest in Digital Finance Information between 2005 and 2023

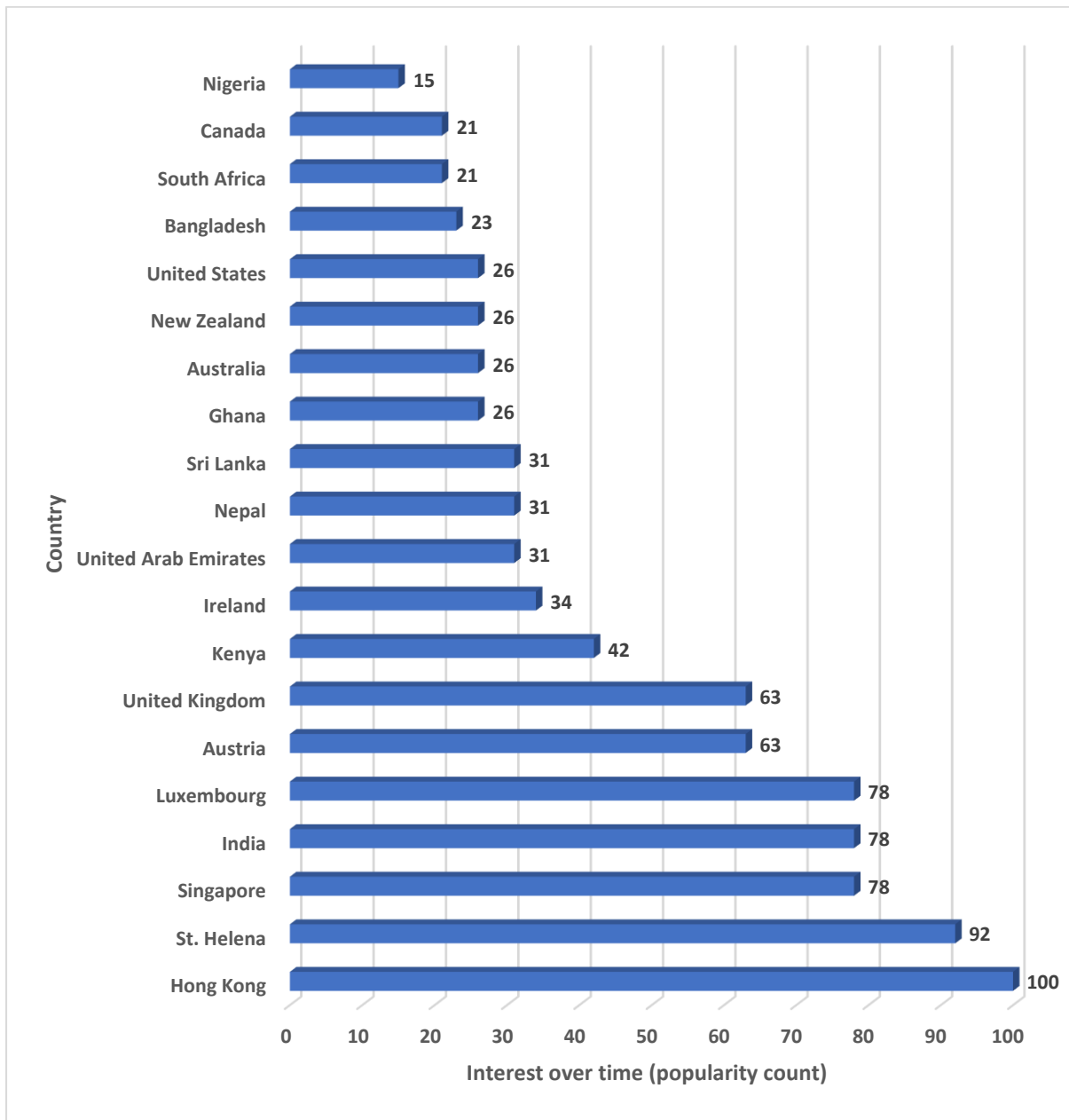
This figure shows the popularity or interest in digital finance information across countries. It reports on the top 20 countries with the highest interest in digital finance information.



Source: The Google Trends Database.

Figure 22.3 Interest in Green Finance Information between 2004 and 2023

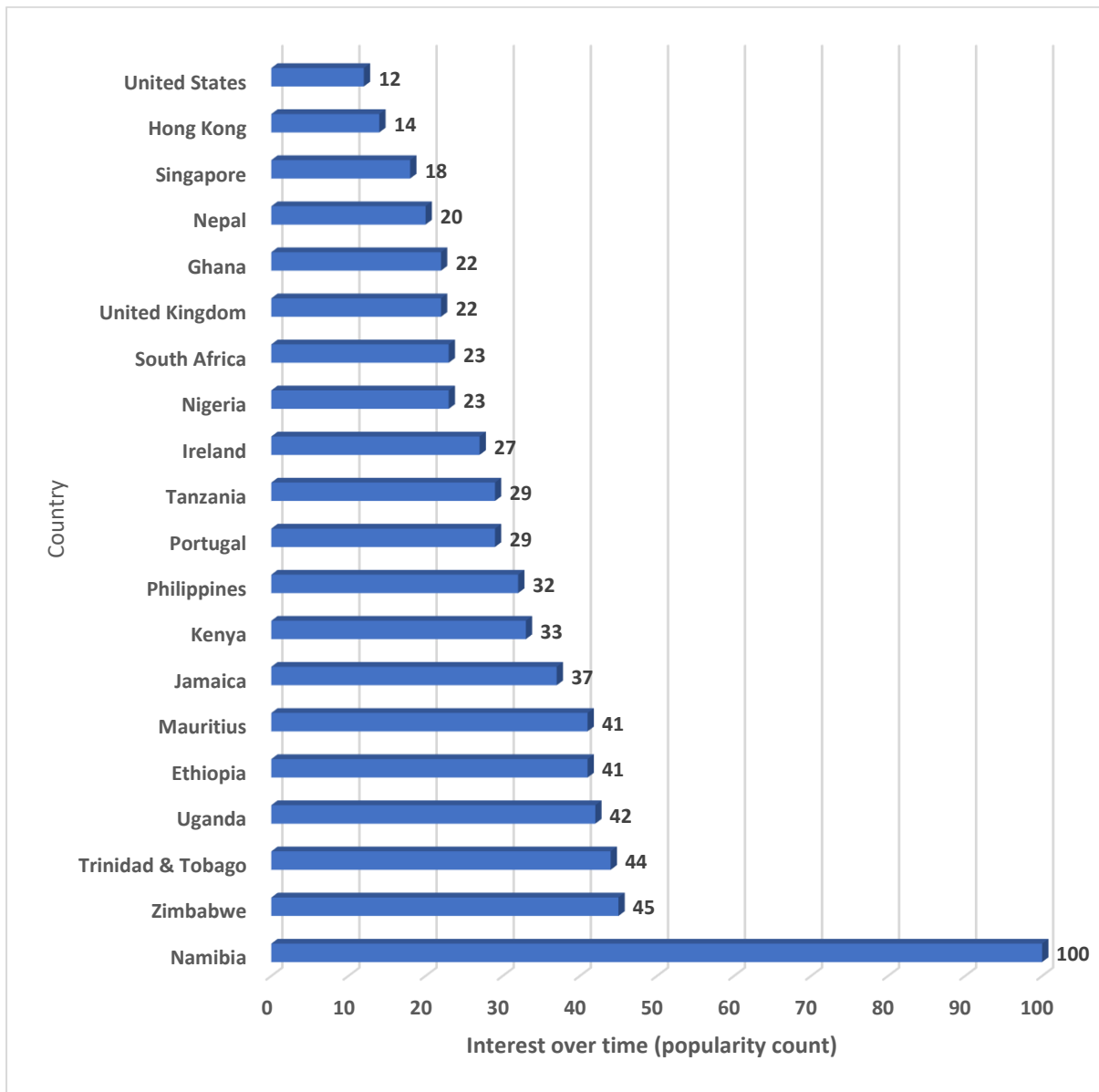
This figure shows the popularity or the interest in green finance information across countries. It reports on the top 20 countries with the highest interest in green finance information.



Source: The Google Trends Database,

Figure 22.4 Interest in Social Finance Information between 2004 and 2023

This figure shows the popularity or the interest in social finance information across countries. It reports on the top 20 countries with the highest interest in social finance information.



Source: The Google Trends Database.