

The Rise of Digital FDI: Implications for Traditional Investment Models

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Abstract. This paper explores the transformative impact of investments in Information and Communication Technology (ICT) on institutionalized democracy and foreign direct investment (FDI) in developing countries. Using content analysis of secondary data from academic and electronic sources, the research reveals that digital technologies have significantly changed the global business landscape. The rapid growth of digital technologies has changed the business landscape, and foreign direct investment (FDI) is no exception. The traditional model of FDI is evolving into digital foreign direct investment (DFDI), which focuses on intangible assets such as data, software and intellectual property. This shift has significant implications for host countries, investors and policymakers. This study explores the concept of DFDI, its benefits and challenges, and its potential to boost economic growth and competitiveness. The findings show that DFDI can improve efficiency and productivity, boost economic growth, and enhance a country's ability to respond to global challenges. However, DFDI also raises new policy challenges, such as data protection and national security concerns. This research highlights the need for policymakers to adapt to the changing FDI landscape and develop strategies to attract and regulate FDI. This research contributes to the understanding of FDI and its implications, providing insights into the future of FDI.

1 Introduction

Experts in technology economics and management guide the international service industry to adapt to digital technologies, so that international direct investment in appropriate physical infrastructure can succeed (Fitzgerald et al., 2014; Parviainen et al., 2017). Given digitalization's ability to accelerate speed, reduce costs, and dissolve borders, these experts guide the international services industry to adjust to digital technologies. However, although research on digital technologies to guide foreign investment - digital FDI - and research on factors influencing digital service provider infrastructure investment are of great interest to academics in the fields of service management and regional and urban economics, digital FDI is still underdeveloped in international direct investment research (Chowdhury & Mavrotas, 2006). Therefore, this paper explores the mode of digital service provision and examines adaptation to digital technology as one of the key factors of spatial agglomeration of international direct investment, focusing on the case of gaming sector data centers. As such, this paper offers practical contributions and implications as well as opportunities for future expansion of digital FDI studies.

The impact of digital transformation on international business growth is significant, as it has resulted in a seismic upheaval in the dynamic field of international business, changing established paradigms. Digital technology has allowed organizations to increase their product and service reach internationally, enabling businesses to seize opportunities to enhance operational efficiency and acquire a competitive edge on a global scale (Al Sayed & Sayed, 2023). Digital technologies have dramatically impacted the success of businesses, particularly in terms of managing productivity, inventory, financial accounting, and customer relationship management (CRM). These technologies contribute to optimizing business operations and have been crucial in the pandemic era, where businesses had to adapt quickly to safety restrictions and remodel processes and supply chains.

The service industry has also been transformed significantly, with companies like ING Bank and Marriott International leveraging technology to enhance customer experience, streamline operations, and create competitive advantage. Agile working methods and highly-rated mobile banking apps have been key strategies in this transformation, allowing companies to adapt quickly to changing customer demands and market trends. In the context of international direct investment, digital technologies play a crucial role in facilitating foreign investment and influencing digital service provider infrastructure investment. The mode of digital service provision and adaptation to digital technology are key factors in the spatial agglomeration of international direct investment, particularly in sectors like gaming data centers. This paper aims to contribute to the development of digital FDI research and provide practical insights for future studies (Taufikurahman & Firdaus, 2020). Overall, the integration of digital technologies into international business practices is essential for businesses to remain competitive and adapt to the rapidly changing global landscape.

2 Literature Review

Zekos (2005) analyzed the role of foreign direct investment (FDI) in the emergence and development of the digital economy. It highlighted the importance of FDI in fostering economic growth and development in the digital age (Zekos, 2005a). The need for more data to quantify the new impetus given to globalization by the rise of digital FDI, as well as for the conceptualization of this new, more capital-intensive phase in the world economy, is the main argument of this paper. These investments can be in the form of usage rights of digital infrastructure functionalities running over private or public cloud networks. With the help of examples and eventually statistical information, short macroeconomic time series on relevant capital stocks, this paper finally examines whether the special features implied in the definition of digital FDI are indeed specific to firms belonging to the digital domain or are economic consequences of some other dimension already recognized for physical FDI (Staff et al., 2001). Whereas, a research examined the impact of digitalization and FDI on economic growth in developed countries was reported by Kusairi et al. (2023). The findings showed that both digitalization and FDI positively impacted economic growth, emphasizing their crucial roles in the economic growth of developed countries (Kusairi et al., 2023).

Another study explored the impact of digitalization on FDI inflows in 270 Chinese cities from 2012 to 2019 in which its results indicated that digitalization had a positive impact on FDI inflows, but this effect was more limited in high-middle income cities compared to lower-income cities. The study also highlighted the importance of government spending on science and technology in attracting FDI (Dansha Zhang, 2024). Besides, there is a study which examined the role of FDI, particularly in the field of information technology (IT), in spurring innovation and progress in the Indian IT sector. The study found that FDI inflows had significant effects on industry growth, including job creation, skill improvement, and technological advancements (Kumawat & Singh, 2023). A book edited by Maček (2021) examined various aspects of FDI, including its growth, determinants, and implications. The

book discussed how countries have placed limitations on foreign investors and how FDI can be influenced by institutional forces such as government regulations and policies (“Foreign Direct Invest. Perspect. through Foreign Direct Divest.,” 2020).

Those studies demonstrate the significant impact of digitalization on FDI and highlight the need for governments to develop comprehensive policies to attract and utilize FDI effectively in the digital economy. They also emphasize the importance of maintaining good ICT infrastructure and supporting digital industries to drive economic growth and sustainable development.

3 METHODS

Qualitative descriptive methodologies were used in this investigation. This method examines how traditional investment models are affected by digital foreign direct investment. This approach is appropriate for investigating the traits and trends of digital foreign direct investment and how they affect conventional investment models. The information was gathered from a variety of secondary sources, including academic journals, industry reports, government legislation, and web articles, as well as current research on digital foreign direct investment. In order to identify important themes and patterns regarding digital foreign direct investment (FDI) and its effects on conventional investment models, the gathered data was then condensed and cleaned up. The resulting information was then presented in an understandable and succinct way, utilizing narrative prose to outline the features of digital FDI and its effects on conventional investment models.

In order to determine the effects of digital foreign direct investment (FDI) on conventional investment models, the data is analyzed using the theoretical framework. This includes determining the advantages and disadvantages of digital FDI as well as how it is altering the investment landscape. The analysis highlights the key factors influencing the shift towards digital FDI, such as the increased efficiency and cost-effectiveness it offers, the enhanced transparency and accountability it provides, and the new opportunities it creates for businesses to expand globally. The qualitative descriptive approach used in this study provides a detailed and nuanced understanding of the effects of digital FDI on traditional investment models, highlighting both the opportunities and challenges that arise from this shift. By examining the key themes and patterns emerging from the data, the study contributes to the ongoing discussion on the future of international investment and the role of digital technologies in shaping the global economy.

4 RESULTS

Digital technologies have radically changed the rules of business in the global economy (Meyer et al., 2023). The International Digital Economy and Telecommunication Society predicts that digital technologies will comprise about 70% of the world's entire infrastructure, and that the world will witness new corporate giants practicing new forms of leadership and different ways of managing resources and people (Al Yahya, 2023). Among digital services, the provision of entertainment, as well as products and services related to gaming, communications, and travel, have accounted for the highest percentage of global investment in physical infrastructure, including semiconductor development, electronics companies, etc., by far (Ayres & Williams, 2004). The Center for Policy and Communication Studies in the United States digitized that between 1990 and 2011, global investment in these four sectors increased more than seven times compared to the previous era in history, namely the Global Era of Mobile Communications, which was considered a subset of 'traditional telecommunications' such as landlines and cellular networks in 1980-1989 (Irwin-Hunt,

2020). This significant surge in investment reflects the profound impact of digital technologies on the global economy, transforming the way businesses operate and interact with customers.

The rise of digital technologies has led to the emergence of new industries and business models, creating new opportunities for growth and innovation. For instance, the gaming sector has seen a massive increase in investment, driven by the growth of online gaming and the development of sophisticated digital platforms. Similarly, the travel industry has been transformed by digital technologies, enabling consumers to book flights, hotels, and other travel services online, and providing real-time information and updates on travel schedules and itineraries.

The increased investment in digital technologies has also led to significant advancements in areas such as artificial intelligence, blockchain, and cybersecurity. These technologies have enabled businesses to improve operational efficiency, reduce costs, and enhance customer experiences. Moreover, they have also created new opportunities for data-driven decision making, enabling businesses to better understand customer behavior and preferences.

The impact of digital technologies on the global economy is expected to continue to grow, with the International Digital Economy and Telecommunication Society predicting that digital technologies will account for 70% of the world's entire infrastructure by 2030. This shift will require businesses to adapt to new forms of leadership and management, as well as new ways of managing resources and people. As the world becomes increasingly digital, businesses must be prepared to leverage these technologies to stay competitive and drive growth in the global economy.

4.1 Historical Context of FDI

The operation of these functions creates an additional institution of capitalism: the firm. The firm is an instrument of capitalist functioning that grants certain rights to certain individuals so that they can make the rapid authoritative decisions that effective capitalism requires. These rights can only be obtained within the institution of the firm. The individual exchange model of FDI, with its implications about the production needs of factor price differentials driven by factor productivity differentials, and about the attractiveness of transaction costs and foreign investment substitutes, also requires this capitalist institution (Shrikhande, 2002).

To facilitate an understanding of the diversity of FDI and the application of digital technologies, as well as the importance of investing in physical form, a brief historical context of their institutions would be useful. Foreign direct investment implies capital accumulation in a more traditional form. PMA stands for Perseroan Terbatas Penanaman Modal Asing, which is established in Indonesia with capital ownership held by foreign investors (Demir & Lee, 2022). Foreign direct investment requires investment value and capitalization requirements set by BKPM, such as having a PT company that is owned by at least two or more shareholders, having a minimum amount of foreign investment in Indonesia of IDR 10 billion, and having a minimum capitalization of IDR 2.5 billion. The opportunity for large-scale capital injections, and the value of private ownership that exists to make such projects worthwhile, is a product of the institutional framework of free market opportunities or, more broadly, the underlying economic framework of private ownership, free exchange, and defined and enforced contracts. In the historical context, FDI has been an important part of the Indonesian government's strategy to increase foreign investment and boost economic growth. With set investment value and capitalization requirements, FDI can be an effective tool to increase foreign investment and boost economic growth.

4.2 Traditional FDI Models

Foreign direct investment, as described by Dunning, is understood in relation to a complex web of imperfections, both in the markets for capital, goods, and services, and in the roles of firms as suppliers, customers, and investors (Dunning, 1981). These imperfect situations drive firms to invest around the world through three sets of determinants. The first set of determinants looks at the relationship between a region's expanse and the investor's standards, some activities, and their efficiency. This view argues that FDI flows follow location determinants, particularly the relative efficiency of regional factors of production with respect to different activities. Based on the fact that efficiency activities are location-specific, such investments are said to be investments in intangible assets (technology and brand names). The third double-diamond set of home-based country determinants is more of a traditional presence-seeking determinant. This recognizes the fact that not all investments can be fully controlled from the country of origin by writing the political, historical, and competitive profile of the country. In this context, foreign direct investment becomes an important part of the government's strategy to boost economic growth and improve the country's ability to face global challenges.

To understand the implications of digital foreign direct investment (DFDI) for the traditional model, we need to know what is meant by the traditional model. Not all digital investment is digital foreign direct investment, but we mainly focus on the big one: digital investment that leads to foreign direct investment (Zekos, 2005b). FDI by definition binds non-resident firms to trust-based implicit multilateral agreements with the public authorities of other countries with less influential physical presence of the firm. The conventional Dunning model, for example, defines classic FDI and can be expressed as: market-seeking, resource-seeking, efficiency-seeking, and strategic asset-seeking (Dunning, 1981; Nayak & Choudhury, 2014). In this context, digital foreign direct investment (DFDI) differs from traditional investment in that it has broader and more complex implications. DFDI focuses not only on physical investments, but also on digital investments that can improve the efficiency and productivity of firms. Therefore, to understand the implications of DFDI on the traditional model, we need to understand how DFDI can improve the efficiency and productivity of firms, as well as how DFDI can help boost economic growth and improve the country's ability to face global challenges.

4.3 The Emergence of Digital FDI

A new generation of digital FDI has emerged from wider investment, particularly in the US and India, in software platforms to facilitate digital business models (Athukorala, 2009). The main route for these companies is to provide cloud-based digital tools to startups and companies in other sectors, mainly including digitizing operations, providing big data analytics and support for artificial intelligence (AI). These companies are leveraging digital technologies to improve efficiency and productivity, and expand global market reach. Platform infrastructure for digital businesses, particularly AI software, is being commercialized after pioneering internal and external use. Therefore, it seems that we are entering a new phase of cross-border digital investment between industries, which requires a large market and global economies of scale. In this context, cross-border digital investment between industries becomes strategic to boost economic growth and enhance the country's ability to face global challenges.

Digital giants were once startups. The embryonic form of their global scale was digital Foreign Direct Investment (FDI) (Soper et al., 2012). The emergence of digital FDI dates back to the mid-1990s, when the Internet opened up the prospect of a global market for digital services, with very low supply costs (Dunning, 1981). Technology companies originating

from the United States were the first movers, providing 'cloud' services - infrastructure, platforms, and especially software - over the Internet. Indian companies have staked out a strong position in providing operational software services, initially through body shopping and still primarily through labor arbitrage. After its initial surge, US-based digital FDI has continued to grow at a lower but still substantial rate. The identity of its leaders has also changed, but they remain headquartered in the United States. India-based digital FDI is on the lower track, mostly limited to operating software services outsourced by governments and companies in other countries, with a labor cost advantage complemented by Indian expertise and experience.

4.4 Key Technologies Driving Digital FDI

Regarding the digital technology maturity level of the development of key digital enablers, digitalization is the process of becoming digital rather than being digital in daily life. The Committee on Industrial Revolution 4.0 of the Department of Industry 4.0 of UNIDO proposed four levels of digitalization in the conventional industry 4.0 model (Koh, L; Guido, Orzes; Zia, 2017). The four levels of digitization are initiation, integration, deployment, and reconfiguration. Initiation involves the ability to initiate primarily on timeliness and specifically reflects timeliness through real-time predictability. Integration presents consistency and transparency through data interpretation and understanding. Deployment illustrates the interpretation and understanding of data to make decisions and actions. Reconfigurability adapts and enables flexible, dynamic and scalable activities. The DPSIR (Driving Forces, Pressures, State, Impact, Responses) indicator provides a simple way to categorize the level of digital transformation of different types of organizations (Giacobbe & Esposito, 2024).

The most important technological enablers of digital FDI are computing and storage technologies, technologies that support circular economy, advanced materials, data management technologies, industrial Internet, artificial intelligence, big data and analytics, robotics, industrial automation, and 3D printing. Blockchain, quantum computing, and graphene are future technologies that show high levels of FDI attraction. Computing and storage technologies are the foundation of digital FDI, enabling the development of more complex and efficient applications. Technologies that support the circular economy, advanced materials, and data management technologies enable companies to improve efficiency and productivity. Industrial internet, artificial intelligence, big data and analytics, robotics, industrial automation, and 3D printing are technologies that enable companies to increase capabilities and innovation. Blockchain, quantum computing and graphene are future technologies that show a high level of FDI attraction and enable companies to enhance capabilities and innovation (European quantum flag ship, 2024). The most attractive digital FDI trend is cloud technology that drives the development of agriculture 4.0 (Casella & Formenti, 2019). Nowadays, it is common to apply uniform key technologies for the development of all products. In addition, there is a tendency for commercial companies to simplify their customers' products to offer the same product with a less colorful and more economical design.

5 Analysis: Benefits and Challenges of Digital FDI

However, digital FDI also presents a series of challenges to host countries without necessarily resulting in a positive and desirable spillover of innovation and technology on their territory (Satyanand, 2021). In fact, the potential benefits of digital FDI towards technological upgrading and competitiveness are subject to a list of enabling conditions, such as an efficient innovation and intellectual property regime, high investment in human capital and

knowledge, and an efficient competition regime that ensures market openness and prevents anti-competitive behavior. Digital FDI can improve technology and competitiveness, but only if the host country has enabling conditions. If the host country does not have enabling conditions, then digital FDI can potentially present challenges to the host country. In this context, digital FDI can potentially present a significant expansion mismatch between the process and outcomes of digital FDI investment and national productivity. Therefore, host countries should ensure that they have the enabling conditions to optimize the benefits of digital FDI.

Digital FDI introduces new opportunities and challenges for the country's development and prosperity (Demir & Lee, 2022). In terms of opportunities, digital FDI creates a series of production and investment opportunities for multinational companies. As with traditional FDI, digital FDI can help host economies to upgrade their technology, build capacity or develop value chains, trade, and participate in local economic development. Digital FDI creates production and investment opportunities for multinational companies, and helps host economies to upgrade technology and build capacity. Digital FDI also provides opportunities for multinationals to access new or fragmented markets and puts pressure on the development of local digital champions. In addition, digital FDI provides opportunities for multinationals to boost job creation and workforce development, especially in the areas of innovation and technology. In this context, digital FDI introduces new challenges for the country's development and prosperity, such as improving the country's competitiveness and ability to face global challenges.

5.1 Benefits for Host Countries

The localization of digital activities helps press for social and economic goals, such as a gradual transition from lower/no value-added jobs to more intensive and specialized jobs. A common challenge in the case of most developing countries is that while they have managed to attract internationally mobile activities, they have done so mainly for traditional export production purposes (low-skilled and labour-intensive industrialization). Digital FDI can help the process of industrial restructuring and incorporate themselves into higher value-added and less labour-intensive segments of GVCs by engaging in activities that provide higher incomes from a lower labour base (Staff et al., 2001). Digitally organized industries are also more gender-inclusive. The lack of segregated working hours and the possibility to combine planning with personal commitments has led to increased female participation in some digital industries. In this context, digital FDI enables firms to increase efficiency and productivity by using digital technologies, and improve the quality of products and services offered. Therefore, digital FDI can help improve the ability of digital industries in Indonesia to improve the quality of products and services offered, and increase women's participation in digital industries.

The benefits of digital FDI for host countries can be identified through two main channels: (1) the various economic and social benefits facilitated by digital and technological capabilities, and (2) the private benefits to the companies operating in the country. Localization of digital activities helps the diffusion process of creating and sharing new global knowledge networks (the fourth phase of globalization). Digital activities are the result of innovative and research-intensive processes that help expand the knowledge society. Digital FDI can lead to the reorganization and expansion of the host country's economy, where productivity gains are realized by single firms, such as integrating artificial intelligence (AI) in industrial processes, using 3D printing instead of traditional manufacturing, and so on. By hosting such advanced technological solutions, host countries gain opportunities to face global development challenges, such as improving efficiency in environmentally stressful industries. Therefore, digital FDI can help enhance the capabilities

of digital industries in Indonesia to improve the quality of products and services offered, and increase the participation of women in digital industries.

5.2 Policy Implications and Future Directions

The rise of digital FDI has important policy implications for host countries, especially in managing and protecting data flows (Satyanand, 2021). Host countries have adopted various measures to manage and protect data flows, such as stricter data protection regulations, such as the General Data Protection Regulation (GDPR). The Court of Justice of the European Union (CJEU) decision on Schrems II invalidated the adequacy of the Privacy Shield allowing US companies certified under the Shield to self-certify the transfer of personal data from the EU (Mildebrath, 2020). Therefore, host countries must ensure that they have a legitimate legal basis for data transfers, such as Standard Contractual Clauses (SCCs), to ensure the protection of personal data.

These regulations indicate that foreign investors must comply with and respect the regulatory requirements set by the host country in order to obtain the relevant benefits. While dominance of market power is not necessarily prohibited under monopoly/market share regulations, there is an implication that market dominance through mergers and acquisitions (M&A) may be subject to strict scrutiny for adverse effects. In addition to antitrust/competition regulations, some countries are looking to use their national security protection laws to exercise increasingly stringent control over foreign M&A transactions related to companies with sensitive personal data. Therefore, foreign investors should comply with the regulations set by the host country and pay attention to the implications of market dominance through mergers and acquisitions (M&A) to ensure that the transaction does not harm the host country and its people.

6 Conclusion

The rise of digital foreign direct investment (DFDI or PMAD) has significant implications for traditional investment models. Digital FDI is reshaping global investment patterns by enabling investment in intangible assets such as data, software and intellectual property. Traditional FDI models may need to evolve to adapt to the digital economy, focusing more on intangible assets and technology-based investments. Governments and policymakers should consider updating regulations and incentives to effectively support and regulate digital FDI. The shift to digital FDI highlights the importance of understanding how technology is changing investment practices and requires a re-evaluation of existing economic frameworks and policies.

The main finding in this paper is that digital technology has radically changed the rules of business in the global economy. International direct investment (FDI) has evolved into digital direct investment (DFDI), which focuses not only on physical investments but also on digital investments that improve the efficiency and productivity of companies. DFDI has become an important part of the government's strategy to boost economic growth and improve the country's ability to face global challenges.

This paper offers practical contributions and opportunities for future expansion of digital FDI studies. By understanding how DFDI can improve the efficiency and productivity of firms, as well as how DFDI can help boost economic growth and enhance the country's ability to face global challenges, this paper provides a broader and more complex view of digital FDI. As such, this paper can assist academics and practitioners in understanding the implications of digital technologies on international direct investment and enhance the country's ability to face global challenges.

However, this paper also points out some research limitations. First, research on digital FDI is still underdeveloped in international direct investment research. Second, this paper only focuses on the case of gaming sector data centers and does not cover all economic sectors. Therefore, the recommendation for future research is to expand digital FDI research to other sectors and to further study how DFDI can improve the efficiency and productivity of firms as well as how DFDI can help boost economic growth and improve the country's ability to face global challenges. Thus, this paper can make a more significant contribution to understanding the implications of digital technology on international direct investment and improving the country's ability to face global challenges.

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