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A LITERATURE REVIEW ON DIGITAL DIVIDE – AN IMPEDIMENT ON A PATHWAY TO SUSTAINABLE DEVELOPMENT

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Abstract: Financial inclusion is very essential to ensure for effective economic development. Various organisations and authorities at national and international level are taking efforts to achieve sustainable development goals. Few of them can be attained with the help of financial inclusion like reduced inequalities, no poverty, zero hunger, gender equality, etc. In today's digital era, technology is playing very influential role where financial sector is also reaping benefit out of it. But still, it is facing difficulties due to differences in technology adoption across socio-economic sectors of the society. This has gained attention of various scholars to understand the issue and find out the best solution. This paper attempts to study various articles, reports discussing this issue. The study is based on the secondary data. There are various factors causing digital divide but among them inadequate infrastructure, poor or no digital skills, lack of financial literacy, cybercrimes, rural urban divide are strongly affecting digitalization. The Government of India has implemented various schemes to achieve financial inclusion and reduce digital divide. Financial institutions and regulatory authorities are also putting its efforts to achieve SDGs.

Keywords: Digital Divide, Sustainable Development, Digital Financial Inclusion, Digital Financial Literacy, Digital Literacy, Digital Financial Service, Financial Inclusion

I. INTRODUCTION:

Climate change has become an indispensable issue for the world. This has caught a serious attention of all stakeholders viz. policymakers, business organisations, international entities, governments, and world citizens since the 2000s. Regulatory authorities have framed various policies and regulations at national as well as global level. Every nation showed its willingness to work on it. The business enterprises also showed their voluntary contribution towards environmental sustainability. UN mentioned about ESG in the year 2004 through its report titled 'Who Cares Wins' report. (Krantz, 2024). UN along with its 193 member countries have adopted 17 Sustainable Development Goals in 2015 which covered the issues like poverty, climate change, inequality, poverty, etc. at global level. Environmental, Social and Corporate Governance (ESG) is a set of principles adopted by organizations to promote a long-term sustainable approach to conducting business. (esgthereport, 2024). Various governments have updated their regulations to stress ESG in their practices (Krantz, 2024). It provides a systematic structure on how business enterprises can be assessed for their contribution towards sustainable development. It even offers an array of business and investment opportunities and also beneficial for society and environment (Redondo Alamillos & De Mariz, 2022) (esgthereport, 2024).

Digitalization refers to digital transformation of business operations in every aspect of its environment. IoT can provide exceptional prospects enabling the corporates to resolve the challenges related to UNs Sustainable Development Goals (SDGs) and thereby confirming an equitable, environmentally sustainable, and strong society (Mondejar et al., 2021). The advancement in information and communication technologies has accelerated and ensured the availability and usability of technology. (Aydin, 2021)

Digital finance is a form of digitalisation of the economy. It is an alternative to the traditional financial system which has its own shortcomings related to cost, physical constraints, distribution, etc. It comprises of wide range of services, platforms like online lending, payment system and crowdfunding. The new innovation in the field of Artificial Intelligence, cloud computing, big data has enriched the application of digital technology in transaction, payment, risk control, customer service and other financial service thereby greatly transforming the traditional banking and financing system (Liu et al., 2022). The financial development has rapidly promoted by digital diffusion through easy access to financial services. It minimizes the information asymmetries, inspires competitions between formal and informal finance. (Mignamissi & Djijo T., 2021a) Although more people are becoming a part of the era of digital financial innovation, its benefits have not been allocated to everyone equally. This disparity in access and use of information and communication technology (ICT), is mentioned as the "digital divide" (Nam & Lee, 2023)

Individuals across different socio-demographics have found with existence of digital divide. They are not availed with equal access to digital technologies which can be considered as one of the determining factors for digital competencies (Aydin, 2021). It is also acting as hindrance towards achievement of Sustainable Development

Goals like no poverty, gender equality, reduced inequalities, climate action, etc. This paper attempts to study the factors, challenges, initiatives to tackle digital divide.

II. LITERATURE REVIEW:

Digital finance: Digital Finance refers to a part of FinTech which encompasses mobile money, digital payments, peer-to-peer lending, Insurtech, crowdfunding (Afjal, 2023). It requires digital platforms like computers, mobile phones and other internet enabled devices for service access. Traditional financial services face obstacle for financial inclusion due to its innate hurdles which can be tackled by fintech (Bhattacharya et al., 2020). With the help of digital technologies, FinTech firms are able to provide cost-effective, convenient and customized financial products to can deliver more inexpensive, accessible, and customized financial products and services to deprived section of society which includes women, rural people, low-income groups. (Afjal, 2023).

Digital Literacy: Though fintech services are useful, people must have digital literacy to gain the benefit. Digital literacy is considered as an essential skill in the digital era of 21st century. (Aydin, 2021). It equips the people to work with the electronic infrastructures and tools (Gautam et al., 2022). (Golden & Cordie, 2022) explains digital literacy as application of technologies for the purpose of finding, creating, evaluating as well as communicating the information for which both cognitive (knowledge) and technical skills for using the technology are required.

Digital Financial Literacy: (Loke et al., 2025) discussed that financial literacy alone is not sufficient for adoption of Digital Financial Services, but people will also require digital skills and knowledge of digital risks involved in it. Digital Financial Services (DFS) offers various types of products and services. People need to know about the features and fees of those products. They need to understand how to adopt cybersecurity practices to protect themselves from online frauds. By this means, they can utilise DFS in effective and efficient manner. (Loke et al., 2025)

The diffusion effect in fintech can be helpful for decrease in information asymmetry. Today, the social media is playing an important role of screening or selection in financial transactions in either cases of real or financial domain. Development pace of mobile banking application, geographic position and social influence, human capital and economic freedom can be mentioned as effective transmission channels for shift from ICT to financial development (Mignamissi & Djijo T., 2021a).

Digital Divide: Heeks explained the digital divide in terms of a 'haves' vs. 'have nots' related to technology access. In other words, it can be referred as 'digital inequality'. He elaborated view on digital divide: Divides in accessibility of technology, Divides in adoption of technology and Divides in use of technology (Heeks, 2022). Various studies have highlighted on the determinants of digital divide as – uneven development of ICT infrastructure, insufficient digital skills, geographical location of digital technology suppliers and consumers. Some recognized age, occupation, gender, cultural values, language, content, and attitude to ICT as less critical in case of digital divide (Deineko et al., 2022). In terms of digital skills, individuals differ in both technology access and their competency in technology use to gain benefits (Aydin, 2021).

Digital Finance and Sustainable Development: The FinTech Innovations with its transformational capabilities have started disrupting the existing business structure. It has changed the way how individuals and organizations acquire products and services.(Nam & Lee, 2023) Thus, FinTech is identified as an emerging partaking in the agenda of financial inclusion (Demir et al., 2022; Nam & Lee, 2023). Fintech also had its direct and indirect contribution in fulfilment of Sustainable Development Goals. There are lots of factors hindering FinTech's contribution to financial inclusion and one of them is digital divide as the significant one (Nam & Lee, 2023)

In developing countries, majority of people own mobile phones. The study has proved the strong association between penetration of mobile phones and financial inclusion across the nation. Mobile technologies show potencies to overcome the hurdles of traditional system and reach to unbanked population who owns a mobile phone. Reduction in inequalities as one of SDGs can be achieved effectively through FinTech-driven financial inclusion policy (Demir et al., 2022; Kara et al., 2021). Easy credit access will be instrumental in achievement of United Nations (UN) Sustainable Development Goals (SDGs) in ending poverty, improving health and education, and reducing inequality (Kara et al., 2021). The digitalisation of financial services can provide effective tools to empower women, particularly in the developing world. (OECD, 2018)

With technological development, financial development supports environment friendly production by way of reduction of carbon dioxide emissions (Kara et al., 2021; Khan et al., 2023). As financial development happens, households will be fulfilled with wide availability of finance which may lead to their investment in green energy. But there is also different view mentions that Digital Financial Inclusion (DFI) can have dual effect (positive and negative) on carbon emissions (Kara et al., 2021). Though DFI can improve production and industrial operations, it may also in higher carbon emissions. There is a rising demand for energy with expansion of DFI which may come from polluting sources and will lead to additional carbon emissions. (Khan et al., 2023)

Digital divide and Digital Finance:

Though financial information is available at one's fingertips through online, adults are lacking with either digital or financial literacy skills on effective use of applications (Panos & Wilson, 2020). World Bank further highlights on the concern related to knowledge and understanding of financial principles which is critical for gaining from financial information access (World Bank, 2018). OECD report highlights on some issues like privacy, security, unfamiliarity with products and service providers, lack of trust are refraining individuals from using digital

financial services (OECD, 2018). These issues are highlighting on financial literacy which required to enhance by encouraging and facilitating digital financial education and practice (Golden & Cordie, 2022).

Nexus between Digital finance, digital divide and sustainable development: In recent years, digital technologies are rapidly consolidating in the economy. By offering new products, services and providers, it is exhibiting substantial impact in the financial industry. The availability of Mobile money services in developing countries have influenced individuals and businesses at global level. Application of digital technologies in personal financial management is helpful for consumers and entrepreneurs for improvement of their financial lives and wellbeing (OECD, 2018).

III. RESEARCH METHODOLOGY

Research design: The study has adopted Literature Review method to summarize on digital adoption, sustainable development and digital divide hindering digital adoption. The researchers' discussions on above concepts and various reports on digital adoption and digital divide are valuable to develop insight on digital divide as impediment for sustainable development.

Objectives:

1) To discuss the causes and challenges of digital divide regarding accessibility of digital technology
2) To discuss the causes and challenges of digital divide regarding adoption of digital technology
3) To discuss the causes and challenges of digital divide regarding usage of digital technology

Source of data: The study is based on the information collected from secondary sources namely research papers, reports, blogs, newspaper articles, webpages, book sections, etc.

Data analysis: Literature review analysis method is applied for understandings on digital divide. This paper is descriptive
in nature.

Scope: The study covers the various digital financial tools and applications to be used for investment purposes, digital infrastructure of India, India's digital customer base, barriers and challenges towards digital tools usage.

Limitations: As the study is based on secondary data, it may affect the reliability of data.

IV. DISCUSSION AND INTERPRETATION:

The digital technology is rapidly rising but along with it a gap between society has widened with respect to access, usage and share in benefits. Cultural and social system has become one of the determinants for acceptance of technology all countries. Comparatively Asian countries are far behind to non-Asian countries (Nipo et al., 2025). Various studies have been conducted to understand state and causes of digital divide. The digital divide can be seen in three aspects – access, adoption and usage.

Digital Infrastructure: Digital infrastructure ensures the access towards the technology. If it is implemented properly, it will be more instrumental to reach to remote areas. (Hadda & Mukherjee, 2024).

Digital infrastructure	**size**	**Percentage**	**Remark**	**Source**
Active mobile connections	1.12 billion	76.6% of total population	• (-0.1%) decreased by 1.3 million • May not be including internet access	Data Reportal 2025
Internet users	806 million users	55.3% of total population	• Growth - (+6.5%) • Increased by 49 million	Data Reportal 2025
Mobile phone usage - Rural - Urban		(age group 15-29 years) 96.8% 97.6%	• At least once in last three months (phone calls or internet)	Comprehensive Modular survey, PIB Delhi
Smart phone ownership - Rural - Urban		(age group 15-29 years) 95.5% 97.6%	• Percentage of mobile owners	Comprehensive Modular survey, PIB Delhi
Internet connections	30 million wired connections added		• The rise is between 2014 and 2024.	Data For India
Mobile broadband connections	900 million added		• The rise is between 2014 and 2024.	Data For India

BharatNet • Gram Panchayats • Optical Fibre Cable Length • Wifi hotspots	2,18,347 increased to 42.13 lakh route km 1,04,574 installed.			Extending Internet Access, Expanding Rural Progress, PIB Delhi
Possession of Digital id - Aadhar	over 1.3 billion Indians	96.8% of Indians		Institut Montaigne, 2024
Data Centres			Substantial growth in data centres National Data Centre – Delhi, Pune, Bhuvneshwar and Hyderabad	India's Digital Revolution: Transforming Infrastructure, Governance, and Public Services, PIB Delhi

The mobile connections is not directly related to population size as it may include those who may be using more than one mobile connections (Kemp, 2025). India stands 160th out of 208 countries with 81% population with mobile connection. It shows high penetration in India. The growth is also accelerated due to widespread of internet availability in India. Internet access in household counts around 86.3 percent. (PIB Delhi, 2025). BharatNet has completed its phase 1 and its 2nd and 3rd phase is ongoing. (PIB, GoI, 2025). India has exhibited its remarkable achievement of becoming first country to advance in all three aspects of Digital Public Infrastructure - digital identity, real-time fast payment and a platform for data sharing (Cacicedo, 2024). As of 2024, 138.34 crores Aadhar cards have been generated which is considered as strong digital identity helpful for digital transactions. UPI has proven as fast, secure payment system contributing to India's cashless economy. (PIB Delhi, 2024)
Still, there are some barriers in this growth such as slow broadband speed, uneven 5G launch and insufficient fibre optic networks. India's telecom towers connection with fibre is inadequate for 5G services.(IPCIDE, 2023). Indian rural areas have insufficient digital infrastructure, limited access to the digital world (Laskar, 2023). India ranks 105th in the world in average internet speed. (Dwivedi, 2024). States of India are also showing disparities in digital infrastructure. The rural–urban divide in DSI is highest in Assam, Madhya Pradesh, and Jharkhand and lowest in Kerala, Himachal Pradesh, and Punjab. (Arora & Sapre, 2025). Digital divide is also visible in case of women having smartphones who are still lacking internet access. The accessibility of online resources among wealthy and educated people is higher (Sahu et al., 2023).

Digital adoption: Digital adoption ensures the transformation of society into digital society. It confirms the people have started approving usage of digital tools and applying it very effectively.

Digital Adoption	**Details**
Internet users	806 million individuals; 55.3 percent
social media user identities	33.7 percent of the total population
Internet adoption rate	increased by a relative 5.5 percent
Aadhaar Enabled Payment System	77.5% of population

The above figures also show that there is still around 652 million Indians are non-users of internet. It means around 44.7 percent people are still on "offline" mode (Kemp, 2025). The disparities in phone usage are found across gender, education and age. Majority of women, illiterate and elderly people do not use phones (Waghmare, 2025). Digital literacy being important determinant for digital adoption putting challenges due to its deficiency (Dwivedi, 2024). Small and Medium Enterprises are experiencing problems in digital adoption due to limited resources, limited technical expertise (Akal Admin, 2024). There is variation in internet usage in India. Younger, more urban, better educated and richer Indians comparatively show higher usage (Waghmare, 2025). There is gap between male and female regarding internet usage where men (58%) show higher usage compared to women (42%). The urban men is at the highest level of internet usage whereas rural women remain at lowest level of internet usage (Sahu et al., 2023).
Digital usage: Digital usage comes after adoption of digitalisation. It proves how successfully the society has transformed into digital society. This stage comes when the people find digital services useful to achieve their goals. They found it friendly, cost effective and easy to operate.
Studies show that the most intensive mobile data users in the world are Indians. The household expenses have risen on mobile phone charges. Over 300 million people are using UPI as payment system. Though it shows sharp increase in users of UPI, the NEFT and RTGS are still preferred for high value transactions. (IPCIDE, 2023). The young generation from 18-35 years age group show their preferences towards UPI. Though banking sector is providing digital services, the rural and semi urban accountholders prefer visiting bank branches (EY - India, 2024). It is found that urban youth's (15-29 years) internet usage is more compared to rural youth for not less than

once in every three months. In urban areas, 95.7 percent from same age group use the internet. (PIB Delhi, 2025). Youth act as early adopters of FinTech as they are tech-savvy, higher income earner and especially from urban area. Major use of Fintech services are done by younger and wealthier people. (Odei-Appiah et al., 2022).
For digital usages, digital literacy is very crucial factor. Digital awareness and knowledge are part of digital literacy. High level of digital financial literacy is found among males from higher socio-economic status. Even self-employed people exhibit higher level of digital financial literacy. (Loke et al., 2025). Under resourced people lack access to digitalized education. Though it shows high internet accessibility, it is more used for the purpose phone calls and entertainment. (Laskar, 2023)

Challenges in Bridging the Digital Divide: Many studies have done on identifying factors leading to digital divide across the globe. These issues are proving as influencers for digital divide.

General factors responsible for digital divide	**Highlighted by**
Inadequate digital infrastructure	(Dwivedi, 2024), (Liu et al., 2022), (Raihan et al., 2025), (Vasile et al., 2021)
Lack of user education/digital literacy/digital skills	(Akal Admin, 2024), (Amnas et al., 2024), (Arora & Sapre, 2025), (Dwivedi, 2024), (Laskar, 2023), (Raihan et al., 2025)
Perceived security risk	(Mignamissi & Djijo T., 2021), (Akal Admin, 2024), (Amnas et al., 2024), (Deineko et al., 2022), (Liu et al., 2022)
Disparities in digital access in rural urban area	(Arora & Sapre, 2025), (De Clercq et al., 2023), (Dwivedi, 2024), (Laskar, 2023), (Nipo et al., 2025)
Policy and regulatory hurdles	(Amnas et al., 2024), (Dwivedi, 2024), (Yue et al., 2022)
Lack of financial literacy	(Gallego-Losada et al., 2024), (Vasile et al., 2021), (Yue et al., 2022)
High costs of digital infrastructure	(Amnas et al., 2024), (Deineko et al., 2022)
Operational risk	(Mignamissi & Djijo T., 2021b), (Liu et al., 2022)
Slow Internet speed	(Akal Admin, 2024), (Dwivedi, 2024)
Inappropriate products and services	(Gallego-Losada et al., 2024), (Liu et al., 2022)
Lack of affordability in services	(Gallego-Losada et al., 2024), (Raihan et al., 2025)
Difficulties in adoption for SMEs	(Akal Admin, 2024)
Resistance to change in traditional communities	(Amnas et al., 2024)
Entry level smart phones	(Akal Admin, 2024)
Shortage of skilled manpower for digital infrastructure	(Akal Admin, 2024)
Lack of trust	(Amnas et al., 2024)
Poor service quality	(Amnas et al., 2024)
Digital services not available in local language	(Dwivedi, 2024)

Facilitating conditions considerably affect the behavioural intension as well as use behaviour of FinTech. Mobile money, UPI, AEPS are a part of facilitating conditions but owning mobile is main among them. Some FinTech services are easier to operate but some demand specialised skills to use it for example, cryptocurrency, crowd funding, wealth management (Odei-Appiah et al., 2022). The regulatory environment helps consumers to perceive the financial system as a stable and safe system which gradually transform into strong trust on it (Afjal, 2023).

V. CONCLUSION:

Digitalization is considered essential to provide service quality with low cost, convenience and pace. With rapid progress and diffusion of digital technology, inclusiveness of people in the economy specifically socially and economical deprived people will be achieved. However, to access the financial services successfully, individuals need to have digital literacy as well as digital financial literacy. Also, customers require assurance on the safety of this digital system. Regulatory authorities can provide it with enforcement and implementation of rules, protecting consumers' interests, ensuring ethical practices adopted by players in this sector. Thus, it will boost confidence among consumers and build trust on the system.
Digital divide can be reduced through deliberate action taken by the government, regulatory authorities, financial institutions, corporates, etc. As it is already discussed, digital divide can be seen through three aspects i.e. access, adoption and usage. The government must be proactive towards development of Digital Public Infrastructure. In India, the GoI has taken initiative through launch of various programs like Digital India, e-Aadhar, National Broadband Mission, etc. Though it shows remarkable success, it is not enough. There are disparities across states,

age, gender, socio-economic status. Even rural area is lacking the robust digital infrastructure compared to urban areas. So, expansion of digitalization is alone not enough but it has to achieve with equitable distribution across areas, gender, income, age.

The another area of digital divide is lack of digital skills. There is also disparity in digital literacy in various strata of the population. The GoI has launched various drive, programmes to improve the digital skill level among people. Pradhan Mantri Gramin Digital Saksharta Abhiyaan (PMGDISHA), Digital Infrastructure for Knowledge Sharing (DIKSHA), PM eVidya, SWAYAM. Digital skill is essential but to reap the benefits of fintech services, individuals should have digital financial literacy. Cost effectiveness will also induce people to go for digitalisation in finance sector. Security is the main concern which makes people to be away from digital financial services. The serious attention is needed to protect people from any cyber attack as well as confirming data privacy.

With removal of digital divide, the developing country like India can achieve financial inclusion smoothly. It will surely take the nation towards sustainable development. We are on the way towards sustainable development, but its pace needs to be accelerated while ensuring equal opportunities to grow for every sections of the society.

VI. Suggestions for reducing the digital divide:

The government should focus more on rural and semi urban areas for building effective digital public infrastructure so that digital services can be availed with minimum cost. Financial institutions should take more lead in imparting knowledge about digital apps and financial services. Educational institutions can play a major role in spreading awareness about financial knowledge. In future, block chain technology can avoid human intervention and provide more assurance towards safety of data and money.

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