A Study on Impact of Digital Inequality on Economic Stability in India

Swati Modi[1][1], Inna Lazanyuk[2][2]
[1]*Faculty of Business Administration, GLS University, Ahmedabad, India*
[2]*Department of Economic and Mathematical Modeling, Peoples' Friendship University of Russia (RUDN University), 6 Miklukho-Maklaya Street, Moscow, 117198, Russian Federation*
lazanyuk-iv@rudn.ru

Keywords: digital inequality, India's economic stability, digital divide, India's sustainable development, information and communication technologies.

Abstract: In less than two decades, advancements in information technologies have transformed governmental, scientific, educational, and commercial infrastructures. The proliferation of powerful personal computers, high-bandwidth and wireless networking technologies, and the widespread adoption of the Internet have converted previously stand-alone systems and predominantly closed networks into a nearly seamless fabric of interconnectivity. The information technology (IT) and IT-enabled services (ITeS) sectors contribute to India's image as a youthful and resilient global knowledge powerhouse but being a highly diversified country geographically and culturally, India has digital divide and inequality. The digital divide in India refers to the disparity between individuals, communities, and regions that have access to modern information and communication technology (ICT) and those that lack such access. This study aims to identify the dimensions of digital disparity that impact the stability of the Indian economy. The findings indicate that bridging the digital divide within the Indian economy is contingent upon ensuring equitable access to ICT. The analysis concludes that addressing the digital divide by providing access to mobile communications and broadband Internet is crucial for fostering sustainable economic development. Additionally, an increase in the proportion of the population utilizing the Internet positively influences economic stability, while developing the skills necessary for creating digital economy products also contributes to stable economic growth in India. It is concluded that uniting the essential aspects underlying the current digital divide—namely, access, intensive use, and the availability of digital skills—is essential for establishing the conditions necessary for sustainable economic development. A targeted state policy aimed at addressing the causes and consequences of the digital divide will facilitate further economic development and enhance the quality of life for the country's population. In this study, the dependent variable is annual GDP per capita, while the independent variables include the number of mobile cellular subscriptions per 100 people in India, the number of fixed broadband subscribers per 100 people in India, the number of fixed telephone subscribers per 100 people in India, imports and exports of ICT goods, number of Internet Subscribers In INDIA , personal computers Per 100 populations, internet penetration rate in India and annual revenue and net income generated by meta platforms.

1 INTRODUCTION

In the context of digital transformation, the pervasive influence of technology on various facets of society has reshaped economies globally. As nations progressively integrate digital technologies into their economic frameworks, disparities in access to these resources become increasingly prominent, underscoring the concept of digital inequality. In India—a country marked by substantial diversity and socio-economic divides—the ramifications of digital inequality pose considerable challenges to economic stability and growth.

Digital inequality refers to the disparities among individuals and communities regarding access to digital technologies and the internet, as well as

[1] https://orcid.org/0009-0009-9013-2093
[2] https://orcid.org/0000-0002-1834-3154

variations in skills, usage, and the benefits derived from these resources. This phenomenon is particularly pronounced in India, where a significant segment of the population continues to lack reliable access to the internet, digital literacy, and technological infrastructure.

The implications of digital inequality in India extend beyond individual access; they permeate multiple dimensions of economic stability. For example, unequal access to information and services can exacerbate existing economic disparities, hindering opportunities for entrepreneurship, innovation, and job creation in less advantaged regions. Furthermore, the digital divide can restrict access to essential services such as education, healthcare, and government benefits, adversely affecting human capital development and economic productivity.

Understanding the impact of digital inequality on economic stability in India is critical for policymakers, businesses, and society at large. This study aims to explore various facets of digital inequality in India, investigating how it influences economic outcomes, social equity, and overall national progress. By analysing the current state of digital access and its repercussions on economic stability, this research seeks to highlight the urgent need for inclusive policies that bridge the digital divide and foster a more equitable digital ecosystem.

Through a comprehensive review of existing literature, data analysis, and case studies, the study will examine the challenges posed by digital inequality and propose potential strategies to enhance access, improve digital literacy, and ultimately achieve a more stable and inclusive economy in India. By addressing these critical issues, this research aspires to contribute to a nuanced understanding of the intersection between technology and socio-economic stability, offering insights for future initiatives aimed at achieving digital equity.

The digitalization of India's economy, which includes the development of digital public infrastructure and its widespread adoption among the populace, provides India with a distinct competitive advantage. This transformation not only reduces the cost of doing business but also contributes to the formalization of the economy, enhances financial inclusion, and fosters the creation of new business opportunities.

Digitalization has significantly impacted the Indian economy in several areas like

Digital Economy Growth which has rapidly expanded, with its share of Gross Value Added (GVA) increasing from 5.4% in 2014 to 12.5% in 2023. The digital economy is expected to continue its growth trajectory

As far as Digital Payments are concerned, The Unified Payments Interface (UPI) and Bharat Interface for Money (BHIM) apps have facilitated easier digital transactions. In 2022, UPI's total transaction value accounted for nearly 86% of India's GDP.

In case of Manufacturing sector in India, it has developed significantly due to digitalization. The government's "MAKE IN INDIA" program aims to establish India as a global manufacturing hub.

In relation to Jobs, the digital economy has created new job opportunities, with 62.4 million workers employed in digitally dependent roles in 2019. The government has implemented programs to enhance broadband and mobile connectivity, as well as to provide internet access through shared service centers. Digitalization has also led to the development of new products and services and has created opportunities for market growth.

2 LITERATURE REVIEW

Literature Review on Digital Divide and Economic Stability Introduction The digital divide refers to the gap between individuals who have access to modern information and communication technology (ICT) and those who do not. This divide can significantly impact economic stability, as access to technology is increasingly linked to economic opportunities, education, and social mobility. This literature review explores the relationship between the digital divide and economic stability, highlighting key findings from various studies. The digital divide can be categorized into several dimensions, including access, usage, and skills. According to van Dijk (2005), access refers to the physical availability of technology, while usage encompasses the ability to effectively utilize these technologies. Skills are critical for navigating the digital landscape, and disparities in these areas can lead to unequal economic outcomes.
Economic Implications of the Digital Divide has been observed from various studies 1. **Employment Opportunities**: Research by Hargittai (2002) indicates that individuals with better access to the internet are more likely to find employment and secure higher-paying jobs. The lack of digital skills can hinder job seekers from competing in a technology-driven job market.

2. **Education and Skill Development**: The digital divide also affects educational attainment.

According to Warschauer (2003), students with access to technology have better educational outcomes, which in turn influences their future economic stability. The disparity in educational resources can perpetuate cycles of poverty.

3. **Entrepreneurship and Innovation**: A study by Zook and Graham (2007) highlights that access to digital tools fosters entrepreneurship and innovation. Regions with higher internet penetration tend to experience more robust economic growth, as businesses leverage technology for efficiency and market reach.

4. **Social Capital and Community Development**: The digital divide can exacerbate social inequalities. As noted by Putnam (2000), communities with lower levels of internet access may struggle to build social capital, which is essential for economic development and stability. Policy Implications Addressing the digital divide is crucial for promoting economic stability. Policies aimed at increasing access to technology, improving digital literacy, and fostering inclusive economic growth are essential. According to the International Telecommunication Union (ITU, 2019), investments in broadband infrastructure and targeted training programs can help bridge the digital divide and enhance economic resilience.

This review underscores the importance of addressing the digital divide as a means to enhance economic stability and promote inclusive growth.

1. According to a study by (Akabirkhojaeva, 2022) Scientific supervisor, in a paper titled "Analysing the importance of digitalization of economy in developing countries" the pace of economic activity has transformed significantly due to digital technology. The role of digitalization in the economy has expanded, particularly since the onset of the Fourth Industrial Revolution. This study examines the significance of economic digitalization for developing countries by comparing various economies—developed, developing, and least developed. This project employs a comparative assessment index system based on the concepts and characteristics of the digital economy from three perspectives: digital economy infrastructure, the openness of the digital economy, and the environment for innovation and competitiveness that are essential for advancing digital technology. The findings indicate that, despite a geographical imbalance in the development of the digital economy across these nations, the digital economy positively influences their economic growth. Furthermore, the results reveal a long-term stable relationship between technological innovation and its determinants, including the digital economy, bank financing of research and development expenditures, gross domestic product, and financial risk.

2. In another article, (Popov, 2018) assert that the Internet and digital devices are significant drivers of economic growth . To illustrate their perspective, the article analyses the digital economy and society of developing countries in comparison to EU countries, drawing conclusions about future development trends. I concur that digitalization has a substantial impact on economic growth.

3. The study by (Uddin, 2024) **titled** "The role of the digital economy in Bangladesh's economic development " evaluates the current and prospective dimensions of the digital economy in Bangladesh, with the overarching aim of promoting the country's development and prosperity by the year 2041 (Al Mubarak, 2022). Simultaneously, this analysis examines various aspects of the digital economy through a framework that incorporates the principles of the Fourth Industrial Revolution and emerging technologies. The methodology section adopts a qualitative approach to achieve the research objectives, utilizing secondary data sources. The findings of the study provide a comprehensive overview of the present state of the digital economy, with particular emphasis on emerging trends that positively influence the national gross domestic product (GDP). Both companies and individuals demonstrate an understanding of the conceptual implications associated with the digital economy. This awareness has the potential to bridge the digital divide and establish a robust connection between technology and the economy. In conclusion, it is anticipated that the digital economy will expand its potential for commercial and corporate opportunities. Future research could be further enriched by employing a qualitative approach to explore the concept of a digital Bangladesh.

Digital inequality, defined as the disparity in access to and utilization of digital technologies, is increasingly acknowledged as a critical factor influencing socioeconomic disparities and sustainable development. The synthesis of the literature investigates the implications of digital inequality on societal stability.

4. One of the study by (Zarko Doric et al., 2022) revealed that Digital progress has created significant wealth but has concentrated it among a small number of individuals, companies, and countries, exacerbating existing inequalities

5. In another study, (popova p nuttunen, 2020) it was mentioned that Digital inequality worsens the socio-economic development gap between rural and

urban areas, leading to rapid deterioration of human resources and potential depletion of resources in agriculture.

6. The study titled (Sanjay Kumar Singh b, Feb 2022)“ The digital divide: A review and future research agenda” presents a systematic review of the digital divide, which pertains to disparities in access to, use of, and outcomes from Information and Communications Technology (ICT). It identifies the factors influencing the digital divide that have emerged in recent years (2017–2021) and investigates whether new forms or levels of the divide have surfaced in contemporary literature. The findings, derived from an analysis indicates that the factors influencing the digital divide can be categorized into three segments and nine primary categories: sociodemographic, socioeconomic, personal elements, social support, type of technology, digital training, rights, infrastructure, and large-scale events. Among these factors, education is most strongly linked to the digital divide. The majority of recent studies have focused on Level 2 of the divide. Furthermore, only one article within the sample has examined the digital divide at the firm level. The findings also reveal the emergence of a new dimension, termed type-of-internet access, as well as two potential new levels of the digital divide: algorithmic awareness and data inequalities, as identified in contemporary literature. These results enhance the understanding of various perspectives surrounding the concept of the digital divide. They also contribute to the literature on the determinants of the digital divide and issues of social inequality and digital inclusion. This review serves as a guide for managers to recognize and understand the forms of the digital divide and to explore their organizational capabilities in relation to digitalization, thereby evaluating where further development is needed within their organizations to help mitigate the divide.

7. Digital divide refers to the gap between people who have adequate access to information communication technology (ICT) and people who have poor or no access to ICT (Soomro et al., 2020)

8. According to the study, (Pullattu, 2024) “Digital Divide and Its Impact on Financial Inclusive in Tribal Kerala” the financial Internet is worsening the digital divide in our country, particularly in the absence of infrastructural developments. Digitalization has the potential to enable global connectivity and facilitate access to high-quality financial services. Consumers are increasingly seeking to minimize fraudulent activities to enhance the cost-effectiveness, speed, security, and overall efficiency of financial transactions. The digital divide impacts various facets of life, including literacy, health, security, and access to financial services. Consequently, a developing country like India must prioritize inclusive and equitable growth. The researcher aims to identify the areas that require emphasis, specifically regarding timely interventions in technological access and proficiency within the sample population. The study found no significant association between educational attainment and digital literacy concerning the digital divide in the country.

9. As mentioned by (Zhang, 2013) the increased usage of the Internet and information and communication technology (ICT) in contemporary times has resulted in a form of social inequality. The social inequality is arising because of the disparities between and among the individuals in terms of digital skills, use of the Internet, and access to digital devices

10. As per the studies done by (Dwivedi, 2010) and (Reede 2011), it has been observed that the extensive use of the Internet is often associated with social and economic well-being. It has also been noted that the easy availability of Internet services is related to a nation’s growth and development (Bowles and Wilson 2010)

11. A study done by Azari and Pick (2005) states that the “uneven distribution of the ICT benefits” refers to the digital divide. As the definition of the digital divide evolved with time, it came to be associated with empowerment, mobility, and differentiation as well (Newhagen and Bucy 2004). It is to be noted that since the 1970s, the usage of ICT was unevenly distributed, and most of the population still faces digital exclusion (Selwyn and Facer 2007)

12. As per the study by Banaras Hindu university,(Assessing the impact of the digital divide on indian society: A study of social exclusion, 2021) there have been several studies that have linked social inclusion with digital inclusion. Recent research has found that digital inclusion has significant social and economic benefits for individuals who have a computer at home, which results in better educational opportunities as well

The literature indicates a strong correlation between the digital divide and economic stability. Access to technology is not merely a matter of convenience; it is a critical factor influencing employment, education, entrepreneurship, and community development. As economies become increasingly digital, addressing the digital divide will be essential for ensuring equitable economic opportunities and fostering long-term stability.

3 RESEARCH METHODOLOGY

The aim of the study is to identify the primary factors contributing to digital access and divide. To assess how digital infrastructure has an influence on economic stability and it is measured on GDP. Highlight potential benefits of universal digital access, such as increased economic equality and resilience. In the present study, the Regression model and correlation matrix have been developed at various level of significance from the data from 2000 to 2022 using JAMOVI. The dependent variable is GDP per capita, PPP (current international dollar), and the various independent variables are Mobile cellular subscriptions (per 100 people), - Fixed broadband subscriptions (per 100 people), Fixed broadband subscriptions (per 100 people), - Fixed telephone subscriptions (per 100 people), - ICT goods imports (% of total goods imports), - ICT services exports (% of services exports, BoP, ICT goods exports (% of total goods exports) and - Internet users (% of population)

Details of Dependent and Independent Variables and the source from where data is obtained

Y - GDP per capita, PPP (current international dollar) Source: World Bank https://data.worldbank.org/indicator/NY.GDP.PCAP.PP.CD

X1 - Mobile cellular subscriptions (per 100 people) Source: World Bank https://data.worldbank.org/indicator/IT.CEL.SETS.P2?view=chart

X2 - Fixed broadband subscriptions (per 100 people) Source: World Bank https://data.worldbank.org/indicator/IT.NET.BBND.P2?view=chart

X3 - Fixed telephone subscriptions (per 100 people) Source: World Bank https://data.worldbank.org/indicator/IT.MLT.MAIN.P2?view=chart

X4 - ICT goods imports (% of total goods imports) https://data.worldbank.org/indicator/TM.VAL.ICTG.ZS.UN?view=chart

X5 - ICT services exports (% of services exports, BoP) Source: World Bank https://data.worldbank.org/indicator/BX.GSR.CCIS.ZS?view=chart

X6 - ICT goods exports (% of total goods exports) https://data.worldbank.org/indicator/TX.VAL.ICTG.ZS.UN?view=chart

X7 - Internet users (% of population) Source: World Bank https://data.worldbank.org/indicator/IT.NET.USER.ZS

4 FINDINGS AND DISCUSSIONS

Table 1: Correlation Matrix.

	Y	*X1*	*X2*	*X3*	*X4*	*X5*	*X6*	*X7*
Y	1							
X1	0.890254	1						
X2	0.970422	0.930761	1					
X3	-0.87772	-0.93927	-0.90977	1				
X4	0.509414	0.395345	0.351795	-0.42944	1			
X5	0.205817	0.21859	0.06743	-0.08364	0.179241	1		
X6	0.216322	0.105997	0.260158	-0.08051	-0.01525	0.259887	1	
X7	0.90619	0.792295	0.841712	-0.84672	0.625422	0.134579	0.037289	1

The correlation matrix provides insight into the relationships between GDP per capita and various ICT-related indicators. Here's a breakdown of some key findings and interpretations from the matrix:

1. GDP per capita is highly positively significantly correlated with mobile cellular subscriptions (0.89) which indicates high availability of communication services and developed communication infrastructure.

2. GDP per capita is highly positively significantly correlated with Fixed broadband subscriptions (0.97) which reflects well developed telecommunication services and availability of broadband internet

3. GDP per capita is highly positively significantly correlated with Fixed telephone subscriptions (0.878)

4. GDP per capita is positively and significantly correlated with ICT goods Imports (0.206)

5. GDP per capita is positively and significantly correlated with ICT goods exports (0.216). The positive dynamics indicates that India successfully exports information and communication services to the world

6. GDP per capita is highly positively significantly correlated with Internet users (0.938). Proportion of the population using the internet, which is reflected in the growth.

7. The analysis has shown that the following factors have a positive impact on the average per capita GDP in purchasing power parity

8. The analysis suggests that increasing the intensity of ICT use, i.e increasing the share of the population using the internet has a positive impact on economic stability. The development of digital infrastructure has positively affected Indian economy

9. Based on the interpretation of correlation coefficients, we can conclude that the constraints in terms of ensuring India's sustainable development are: increasing the share of fixed telephone subscribers (-0.878). The negative correlation is a consequence of obsolescence technology and decreasing demand for it.

10. The dynamics of imports of ICT goods in India has a positive correlation (0.509) with GDP. ICT imports have had a positive impact on India's economy, contributing to economic growth and the development of the ICT sector. ICT imports improve the quality of intermediate inputs to capital goods, which can lead to higher economic growth. The ICT industry has seen rapid advancement in the last 20 years, fuelled by liberalization policies and the sector's own growth.

11. India's export-oriented ICT sector has helped improve the efficiency of its service economy. Computer software and IT-enabled services have become an important part of India's balance of payment, leading to significant net exports.

12. India's ICT sector is expected to continue growing, with the country aiming to grow it to $1 trillion by 2025. The ICT industry is also a lucrative opportunity for foreign investors, who are attracted by the sector's growth in revenue, workforce, and innovation. The positive correlation (.216) is a sign of stability

13. The development of digital infrastructure, high speed internet, and increased number of internet users has contributed to sustainable economic growth.

Strong Positive Correlations with GDP per Capita

14. **Fixed Broadband Subscriptions (r = 0.97, p < 0.001)**: This suggests that higher broadband subscription rates are strongly associated with higher GDP per capita, reinforcing the importance of high-quality internet infrastructure for economic growth.

15. **Internet Users (r = 0.938, p < 0.001)**: Similarly, a high percentage of internet users correlates strongly with GDP per capita, likely due to the role of internet access in facilitating economic participation and productivity.

Negative Correlation with Fixed Telephone Subscriptions

16. **Fixed Telephone Subscriptions (r = -0.878, p < 0.001)**: The negative correlation here indicates that countries with higher GDP per capita tend to have fewer fixed telephone subscriptions, possibly because wealthier economies rely more on mobile and broadband services instead of traditional telephony.

Moderate Correlation with ICT Goods Imports and Exports

- **ICT Goods Imports (r = 0.509, p = 0.013)**: This positive but moderate correlation implies that higher imports of ICT goods may be associated with economic growth, possibly because these goods support technological infrastructure.
- **ICT Goods Exports (r = 0.216, p = 0.321)**: This non-significant correlation suggests that exports of ICT goods may not directly impact GDP per capita as much as imports, which could be due to the nature of exported goods or the level of value-added processes within the country.

Low or Non-Significant Correlations with ICT Services

- **ICT Services Exports (r = 0.206, p = 0.346)**: The lack of a strong relationship here might suggest that the economic impact of exporting ICT services is more nuanced, possibly depending on the type and quality of services.

Yearly Trends

- The variable (year) shows a strong positive correlation with several predictors, including GDP per capita ($r = 0.981$, $p < 0.001$), indicating that over time, there is an upward trend in GDP and ICT indicators. This aligns with general trends of increased ICT adoption and economic growth.
- **Recommendation**: Develop policies to increase internet accessibility and affordability for the broader population, as a high percentage of internet

users is strongly linked to higher GDP per capita (r = 0.938).

Table 2: Model Fit Measures.

Model Fit Measures			
Regression Model	R	R^2	Adjusted R^2
1	0.991	0.983	0.975

Table 3: Omnibus ANOVA Test.

Omnibus ANOVA Test					
	Sum of Squares	df	Mean Square	F	P
X6 ICT goods exports	4881	1	4881	0.0496	0.827
X1 Mobile cellular subscriptions	61401	1	61401	0.6234	0.443
X2 Fixed broadband subscriptions	624922	1	624922	6.3444	0.025
X3Fixed telephone subscriptions	139346	1	139346	1.4147	0.254
X4 ICT goods imports	153526	1	153526	1.5586	0.232
X5 ICT services exports	677655	1	677655	6.8797	0.02
X7 Internet users	149064	1	149064	1.5133	0.239
Residuals	1.38E+06	14	98500		
Note. Type 3 sum of squares					
Model Coefficients - GDP per capita					
Predictor	Estimate	SE	t	p	
Intercept	7112.2	2167	3.282	0.005	
X6 ICT goods exports	29.8	133.8	0.223	0.827	
X1 Mobile cellular subscriptions	-12.8	16.2	-0.79	0.443	
X2 Fixed broadband subscriptions	2215	879.4	2.519	0.025	
X3Fixed telephone subscriptions	-415.6	349.4	-1.189	0.254	

X4 ICT goods imports		79		63.3		1.248		0.232			
X5 ICT services exports		-77.5		29.5		-2.623		0.02			
X7 Internet users		29.5		24		1.23		0.239			

Model Fit Summary

- **R = 0.991** indicates a very high correlation between predictors and GDP per capita.
- **R^2 = 0.983** means that approximately 98.3% of the variance in GDP per capita is explained by the predictors.
- **Adjusted R^2 = 0.975** accounts for the number of predictors, indicating that the model has high explanatory power even after adjustment.

ANOVA Results

- **Significant Predictors**:
  - **X2 (Fixed broadband subscriptions)**: F=6.344,p=0.025F = 6.344, p = 0.025F=6.344,p=0.025
  - **X5 (ICT services exports)**: F=6.880,p=0.020F = 6.880, p = 0.020F=6.880,p=0.020
- These predictors are significant, suggesting they have a notable impact on GDP per capita.

Coefficient Estimates

- **Intercept**: 7112.2 (p = 0.005), significant at the 1% level.
- **X2 (Fixed broadband subscriptions)**: Estimate = 2215 (p = 0.025), indicating that each unit increase in fixed broadband subscriptions is associated with an increase in GDP per capita.
- **X5 (ICT services exports)**: Estimate = -77.5 (p = 0.020), suggesting an inverse relationship with GDP per capita.

Insights

- **Fixed broadband subscriptions (X2)** have a significant positive association with GDP per capita, suggesting that increased broadband access contributes to economic growth.
- **ICT services exports (X5)** have a significant negative association, which may indicate competitive pressures or external dependencies in ICT services.

Fixed Broadband Subscriptions (X2)

- **Positive Association**: The coefficient estimate for **fixed broadband subscriptions** (2215) suggests that for each additional unit (presumably per 100 people or per 1000 people, depending on the metric), GDP per capita increases by approximately 2215 units, holding other variables constant.
- **Statistical Significance**: With a p-value of 0.025, this predictor is significant at the 5% level, indicating that there's a strong likelihood that this positive relationship is not due to random chance.
- **Economic Interpretation**: This positive association aligns with the idea that broadband access contributes to economic productivity. Increased broadband connectivity likely improves information flow, enables e-commerce, facilitates remote work, and supports digital skill development, all of which are valuable to economic stability and growth. For policymakers, this finding suggests that investing in broadband infrastructure could be a key driver of economic development.

ICT Services Exports (X5)

- **Negative Association**: The coefficient for **ICT services exports** is -77.5, which implies that each additional unit increase in ICT services exports is associated with a decrease in GDP per capita by 77.5 units, holding other variables constant.
- **Statistical Significance**: With a p-value of 0.02, this predictor is also significant at the 5% level.
- **Economic Interpretation**: The negative association here might seem counterintuitive but could suggest certain economic dependencies or vulnerabilities associated with ICT service exports. For instance:
  - **Dependency on External Markets**: Economies heavily dependent on exporting ICT services may be vulnerable to fluctuations in global demand, impacting domestic economic stability.
  - **Income Leakage**: If the benefits of ICT service exports are not widely distributed across the economy, the broader population may not experience significant economic gains.
  - **Potential Outsourcing Effects**: If a country is a major exporter of ICT services but relies on cheaper labor or infrastructure investments abroad, the economic gains may be limited domestically.
- This finding might encourage policymakers to investigate the structure of ICT services exports to

ensure that the sector supports broad economic stability.

Other Predictors (Non-Significant)

- **Mobile Cellular Subscriptions (X1)**, **Fixed Telephone Subscriptions (X3)**, **ICT Goods Exports (X6)**, **ICT Goods Imports (X4)**, and **Internet Users (X7)** were not statistically significant predictors (p-values > 0.05). This means that, in this model, these variables did not show a strong enough association with GDP per capita to be considered reliable predictors of economic stability.
- However, these factors could still have indirect impacts or might be significant in other contexts or with additional data.

Mobile Cellular Subscriptions (X1)

- **Interpretation**: The estimate for mobile cellular subscriptions is -12.8, but it is not statistically significant (p = 0.443). This suggests that, within this dataset, mobile cellular subscriptions do not have a strong association with GDP per capita.

Potential Reasons:

- **Saturation**: In many economies, mobile phone penetration is already very high, leading to diminishing marginal returns in terms of economic impact.
- **Primary Use for Communication**: In many regions, mobile phones are primarily used for communication rather than productivity-enhancing activities. Without widespread usage of mobile internet or advanced mobile services, the economic impact may be limited.

Examining the impact of mobile internet subscriptions specifically, rather than general mobile subscriptions, could yield a different result, as mobile internet access can directly enhance productivity.

Fixed Telephone Subscriptions (X3)

- **Interpretation**: Fixed telephone subscriptions have a negative estimate (-415.6) but are not statistically significant (p = 0.254). This might suggest a slight negative relationship, but it's not robust enough to be conclusive.

Potential Reasons:

- **Decline in Relevance**: With the rise of mobile and internet-based communication, fixed telephones have become less relevant for economic growth, especially in developing and highly digital economies.
- **Infrastructure Costs**: Fixed telephone lines can also be costly to maintain, and resources allocated to this infrastructure may not contribute as much to GDP compared to digital infrastructure investments like broadband.
- Fixed telephone subscriptions may only be relevant in specific contexts, such as in areas without reliable mobile coverage. Examining its relevance in rural or underdeveloped regions could provide more insight.

ICT Goods Exports (X6) and ICT Goods Imports (X4)

- **Interpretation**: ICT goods exports and imports show non-significant associations with GDP per capita (p = 0.827 for exports and p = 0.232 for imports).

Potential Reasons:

- **Trade Balances and Production Structure**: The economic impact of ICT goods exports and imports may depend heavily on the country's production structure. For example, if a country primarily imports ICT goods for consumption rather than for business use, the impact on GDP might be limited.
- **Focus on Value-Added Production**: The economic benefits from ICT goods exports may also be higher in countries that engage in high-value manufacturing, research, or innovation rather than simply assembling or reselling imported components.

Internet Users (X7)

- **Interpretation**: Internet users have a non-significant positive estimate (29.5) with a p-value of 0.239, suggesting a positive but weak association with GDP per capita.

Potential Reasons:

- **Quality of Internet Access**: The economic benefits from internet use depend on connection quality, speed, and data access
- **Digital Literacy**: Internet use alone does not necessarily translate to economic growth; digital literacy and the ability to use the internet for productive purposes are critical.

Recommendations Based on Findings

1. **Broadband Investment**: Given the positive impact of fixed broadband on GDP per capita, expanding broadband infrastructure may improve economic stability and growth, particularly in underserved areas.
2. **Diversify ICT Services Exports**: Countries might benefit from exploring ways to make ICT services exports more resilient to global demand fluctuations or ensuring that the gains from these exports are widely shared.
3. **Further Analysis of Non-Significant Predictors**: Some predictors might require a closer look or additional data. For instance, mobile cellular subscriptions or internet user rates could have different impacts if studied at a more granular level or with a focus on specific sectors.

4. Offering affordable data plans, providing public Wi-Fi, and investing in mobile infrastructure can encourage greater internet penetration. Additionally, educational programs on digital literacy can help individuals maximize internet use for economic activities.

5. The study recommends to **Reduce Reliance on Traditional Telephony and Transition to Digital Platforms**

6. Encourage a shift away from fixed telephone lines to mobile and internet-based communication, given the negative correlation between fixed telephone subscriptions and GDP per capita (r = -0.878).

7. Offer incentives for households and businesses to transition to mobile or internet-based communication. Governments can work with telecommunication providers to phase out landlines in favour of more efficient and flexible digital options.

8. It is strongly recommended to **Encourage ICT Goods Imports for Technological Development.** Increase imports of essential ICT goods that can support local technological infrastructure, as there is a positive correlation between ICT goods imports and GDP per capita (r = 0.509). Lower import tariffs on essential ICT hardware, like computers and networking equipment, could make these technologies more accessible and affordable. Additionally, incentives for businesses to adopt ICT tools can drive productivity.

9. This study strongly recommends to support ICT Services Sector with Skill Development and Export Incentives. Although ICT services exports showed a weaker correlation, fostering this sector could still be valuable, especially if tied to high-value services (like software development or data analysis). Establish training programs to increase skills in high-demand ICT areas and provide support to start-ups and small businesses offering ICT services. Tax breaks or grants for companies exporting ICT services could help develop this sector further.

10. We strongly recommend to encourage the Export of High-Value ICT Goods. While ICT goods exports alone do not show a strong correlation with GDP, focusing on high-value or innovative goods could create economic opportunities. Support R&D initiatives to develop unique, high-value ICT goods for export. Government grants and R&D tax incentives can encourage companies to innovate and expand into international markets.

5 CONCLUSION

Implementing these recommendations can help bridge the digital divide and leverage information and communication technology (ICT) infrastructure to promote economic stability and growth. By fostering an environment that supports ICT adoption, nations can enhance productivity, spur innovation, and improve inclusivity within the digital economy.

REFERENCES

Dildora Ibragimova, & D. R. Akabirkhojaeva. (2023). Analyzing the importance of digitalization of economy in developing countries. *Yosh Tadqiqotchi Jurnali. 2181-3132.* https://doi.org/10.5281/zenodo.7654703.

Đorić, Ž. (2022). Digitalization of the economy and the issue of inequality in the global society. *International Journal of Economic Practice and Policy*, 19(2), 123-155.

Singh, S., & Singh, G. A. (2021). Assessing the impact of the digital divide on indian society: A study of social exclusion, 2021. *Research in social change*, 181-190.

Dwivedi, Y. K., (2010). Explaining Factors Influencing the Consumer Adoption of Broadband. *International Journal of Business Information Systems*, 393-417.

Popov, E. V., (2018). Problems of Economic Security for digital Society in the context of globalization. *Economy of Region,, 14(4)*, 1088-1101.

Popova, A. L., Nuttunen, P. A., Kanavtsev, M. V., & Serditov, V. A. (2020). The impact of the digital divide on the development of socio-economic systems. In IOP Conference Series: *Earth and Environmental Science* (Vol. 433, No. 1, p. 012022). IOP Publishing.

Pullattu, J., 2024. Digital Divide and its impact on financial inclusive in tribal kerela. *Santhigir Institute of Management*.

Sanjay Kumar Singh b, A.-N. E.-K., Feb 2022. The digital divide : A review and future research agenda. *175.* Technological forecasting and social change.

Selwyn, N. a., 2007. Beyond the Digital Divide: .

Uddin, M. R., 2024. The role of the digital economy in Bangladesh's economic development . *Sustainable Technology and Entrepreneurship*.

Zhang, 2013. Income Disparity and digital divide: The internet Consumption model and cross country Empirical Research. *Telecommunications Policy 37*, pp. 515-529.

Hargittai, E., 2002. Second-Level Digital Divide: Differences in People's Online Skills. *First Monday*, 7(4).

International Telecommunication Union (ITU), 2019. *Measuring the Information Society Report*.

Putnam, R. D., 2000. *Bowling Alone: The Collapse and Revival of American Community*. Simon & Schuster.

Van Dijk, J., 2005. The Deepening Divide: Inequality in the Information Society. *SAGE Publications*.

Warschauer, M., 2003. Technology and Social Inclusion: Rethinking the Digital Divide. *MIT Press*.

Zook, M. A., Graham, M., 2007. The Creative Reconstruction of the Internet: The Role of the Digital Divide in the Global Economy. *Geographical Review*, 97(2), 203-220.