

# Digital Dynamics in BRICS: Exploring Digital Access and Policy Challenges

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## Abstract

As the global economy continues to digitize, BRICS nations are at a pivotal juncture in leveraging digital technologies for economic growth. This paper investigates the dynamics of digitalization in these countries focusing on the three major parameters of digitalization- internet penetration, cost of internet and digital payment. It also analyses government strategies in these countries. As BRICS accounting for a significant share of global GDP yet experiencing disparities in digital service export and adoption, understanding these dynamics is essential for adopting comprehensive policies that harness their digital potential. The research highlights the historical context of BRICS as an influential economic bloc, its rapid digital transformation influenced by emerging technologies. Additionally, the study emphasizes the importance of internet penetration as a fundamental enabler of socio-economic activities, correlating better internet infrastructure with increased economic participation through qualitative analysis. Employing a comparative analysis methodology, this research examines the performance of individual BRICS nations, revealing challenges and opportunities in enhancing connectivity and fostering financial inclusion through digital payment systems. The study also analyses the relationship between cost of internet and internet users in the BRICS countries. This study ultimately aims to put forward analysis about the diverse digital ecosystems within BRICS, advocating for collaborative strategies to navigate inherent challenges while maximizing economic growth and inclusivity.

**Keywords:** BRICS, Digital Infrastructure, Internet Cost, Digital Payments, Economic Growth, Policy Challenges.

## Introduction

Over the past two decades, many economic blocs have evolved and one of the most dominant one among them is BRICS. BRICS comprises of five dominant developing economies – Brazil, Russia, India, China, South Africa. The acronym BRIC – Brazil, Russia, India, China – was mentioned by Jim O’Neill, an economist at Goldman Sachs in his paper entitled ‘Building Better Global Economic BRICs’ (O’ Neill, 2001), analyzed the spectacular economic growth this bloc and the implications of these future trends for international political economy [1]. According to the World Bank, the share of BRICS in global GDP grew from 18 per cent in 2010 to 26 per cent in 2021 [2]. At present, the bloc represents more than one quarter of global GDP and 42 per cent of the world’s population. Significantly, the BRICS have seen their economic influence increase over the past decades, as drivers of global growth, trade and investment [3]. Recently in 2024, Egypt, Ethiopia, Iran and United Arab Emirates joined the bloc making it BRICS+. This research focuses on the core members of the BRICS bloc.

The world is already experiencing a new wave of digital transformation. With emergence of technologies

like 5G, Internet of Things, Artificial Intelligence, big data analysis and new digital platforms, the entire course of economy is evolving accelerating the growth. Collectively, BRICS countries account for about 30% of the global export of information and communication technology (ICT) goods, but only 11% of global export of digitally deliverable services (International Trade Centre, 2022). BRICS countries have significant economic potential, however the challenge in front of the countries is tapping the digital potential fully [4]. Considering the same, this research focuses on comparative analysis of digital dynamics such as digital infrastructure, internet accessibility and digital payments.

It has been proved that the areas with good internet infrastructure have the opportunity to attract better socio-economic activities (L. Melgaço, 2021). Additionally, people and organizations that have access to ICTs are empowered and in a better position to participate in the global economy (W. Marler, 2018) and as a consequence can enhance their socioeconomic status.

### Literature review:

According to National Informatics Centre (NIC), India, Digital payments have emerged as a key driver of the digital economy, fundamentally transforming the way transactions are conducted, businesses operate, and consumers engage with services. This transformation is particularly evident in India, where initiatives aimed at increasing digital payment adoption have fostered economic growth, financial inclusion, and technological advancement. Here's how digital payments are driving the growth of the digital economy:

- Increased Convenience and Accessibility
- Encouragement of E-commerce Growth
- Financial Inclusion
- Government Initiatives and Policy Support
- Technological Advancement
- Data-Driven Insights
- Growing Acceptance of Digital Transactions
- Development of Payment Infrastructure
- Impact on GDP and Economic Performance

Digital infrastructure has been identified as a critical enabler of economic development. According to Xiaoyang Mao (2023), digital infrastructure supports development in the society. Digital infrastructure influences economic development by enhancing productivity, attracting capital, and facilitating innovation. It reduces transaction costs for enterprises and improves the overall economic efficiency.

According to the World Bank (2016), digital infrastructure is one of the key drivers of economic growth in developing countries, enhancing opportunities for trade, innovation, and social development. As noted by Litan (2001), economies that improve their digital infrastructure can experience long-term economic growth through the promotion of technology adoption, entrepreneurship, and increased productivity. Internet can significantly reduce transaction costs, improve management efficiencies, and foster greater competition, thereby benefiting consumers with lower prices and enhanced choices. While past productivity growth has been influenced by technological advancements in the 1990s, the article notes that projections of future growth may vary, with official government forecasts estimating a potential decline in productivity growth rates.

While considerable research has been conducted on the economic impacts of the Internet, particularly in developed nations, a significant gap exists in the literature concerning BRICS countries (Brazil, Russia, India, China, and South Africa). Numerous studies have explored the Internet's role in enhancing

productivity, reducing transaction costs, and increasing competition in economies like the United States, yet there is a notable absence of recent data and analysis specifically focused on how these dynamics play out in the BRICS nations.

### **Objectives**

This study aims to evaluate the digital infrastructure and internet accessibility across BRICS countries, with an emphasis on understanding regional disparities and the effectiveness of government initiatives aimed at enhancing connectivity. Another objective is to examine the growth and impact of digital payment systems within these nations, as they play a crucial role in financial inclusion and economic transformation. The study aims to identify policy challenges faced by these nations in their digital journey and to produce comparative analysis of the countries on the three digital parameters.

### **Methodology:**

The research applies a comprehensive comparative analysis framework to evaluate the dimensions of internet accessibility through digital penetration, cost of internet and digital payment within the BRICS bloc. This analysis is based on a qualitative analysis of the data from credible and authentic source such as the World Bank, the International Telecommunication Union, International Trade Centre, Statista and respective national statistical agencies.

### **Quantitative Data Analysis:**

A detailed quantitative analysis is conducted, examining the following variables:

- Internet penetration rates across different demographics
- Cost of internet
- Volumes of digital transactions as indicators of financial inclusion and economic activity.

By synthesizing these diverse elements, the research is present a holistic view of the digital ecosystems within BRICS countries. The interplay of various stakeholders, challenges and policy initiatives will be critically analyzed to draw insightful conclusions about the current state and future trajectories of digital transformation in these nations.

### **Analysis:**

#### **1. Internet Penetration**

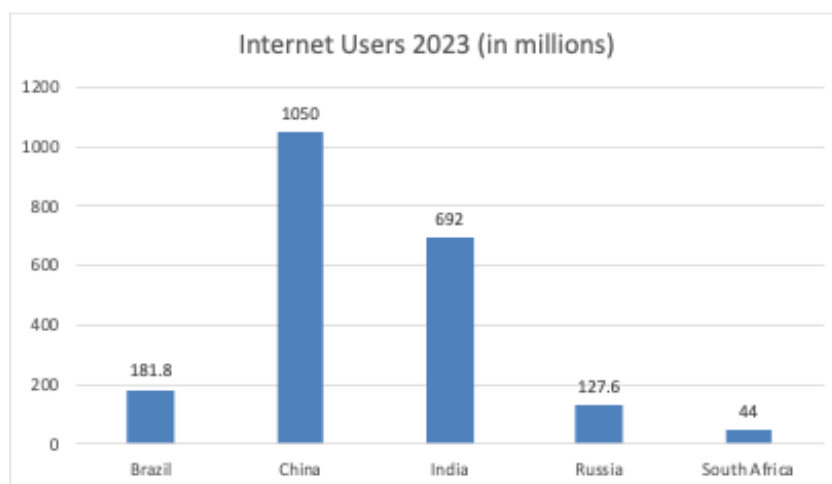
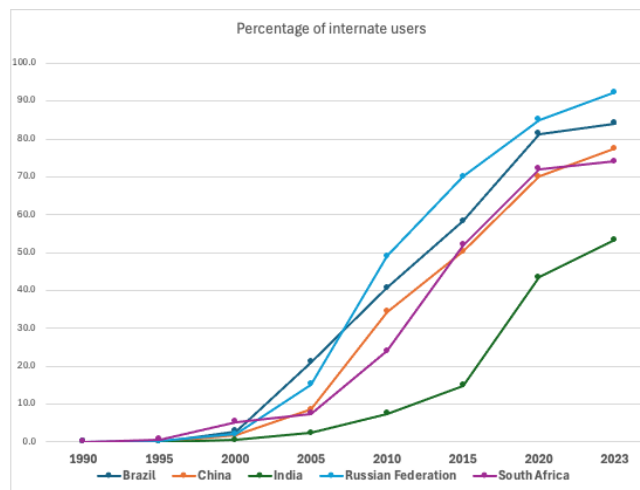
Internet penetration refers to the percentage of a population having access to the Internet in a specific country. It is commonly used as an indicator of how widespread Internet use is in a particular region, country or globally. This measurement encompasses not only individuals who actively use the Internet but also those who can access it through various means, such as broadband, mobile networks, or public Wi-Fi.

Approximately 67 per cent of the world's population, or 5.4 billion people are using internet. This represents a growth of 4.7 per cent since 2022, an increase from the 3.5 per cent recorded from 2021 to 2022. The number of people without internet (offline) in 2023 decreased to an estimated 2.6 billion people, which is around 33 per cent of the global population. [15]

**Table 1: percentage of population with internet access**

Country Name	Brazil	China	India	Russian Federation	South Africa
1990	0.0	0.0	0.0	0.0	0.0
1995	0.1	0.0	0.0	0.1	0.7
2000	2.9	1.8	0.5	2.0	5.3
2005	21.0	8.5	2.4	15.2	7.5
2010	40.7	34.3	7.5	49.0	24.0
2015	58.3	50.3	14.9	70.1	51.9
2020	81.3	70.1	43.4	85.0	72.1
2023	84.2	77.5	53.4	92.2	74.0

Source: World Bank and Digital Data Insights



Source: World Population Review

**Brazil:**

As of 2023, Brazil boasts approximately 181 million internet users, representing a robust penetration rate of 84% within the population [14]. However, there are significant regional disparities in internet access;

urban centres enjoy much higher connectivity, while rural areas face considerable challenges due to limited infrastructure and resources [10]. To address these disparities, Brazil's Ministry of Science, Technology, and Innovation has prioritized various projects aimed at expanding internet access to rural regions, ensuring that more citizens can participate in the digital economy and access essential services.

### **China:**

China has surpassed 1.05 billion internet users in 2023. The internet penetration in China is around 77% of the nation's population in 2023 [11]. The Chinese government has heavily invested in national digital initiatives, such as the 'Internet Plus' strategy. The strategy aims to integrate internet technologies across diverse sectors, enhancing overall productivity and innovation. These government initiatives are not only focusing on the expanding access, but also aims to upgrade the industries digitally and promote more connected society. This reflects China's commitment to digital transformation and economic growth.

### **India:**

In 2023, India had approximately 692 million internet users, resulting in a penetration rate of around 53% [12][14]. The country boasts one of the fastest-growing mobile user bases in the world, with over 750 million smartphone users, which has significantly contributed to the increasing accessibility of mobile internet [13]. The Digital India Initiative is the flagship program of Indian government. The Digital India Initiative aims to transform the nation into a digital society and knowledge power. It aims to increase digitalisation in India, improving digital literacy among citizens and providing better services online. Under the initiative, India started many government e-services, through which citizens can avail many government services digitally.

### **Russia:**

Among the BRICS, Russia has the highest level of digital penetration, with around 127 million internet users and a penetration rate of roughly 92% [14]. The internet penetration is commendable and reflects strong digital access in the country. At the same time, there are concerns about the freedom over internet and limited access to specific digital services. [13] This affects online usage at a large level [13].

Despite the facts, Russia is making large investments in the field of information technology (IT) an effort of modernized digitalisation and enhanced connectivity. The goal of this investment is to strengthen the digital economy and nudge for the Russian citizens to participate in the international online community in an efficient manner.

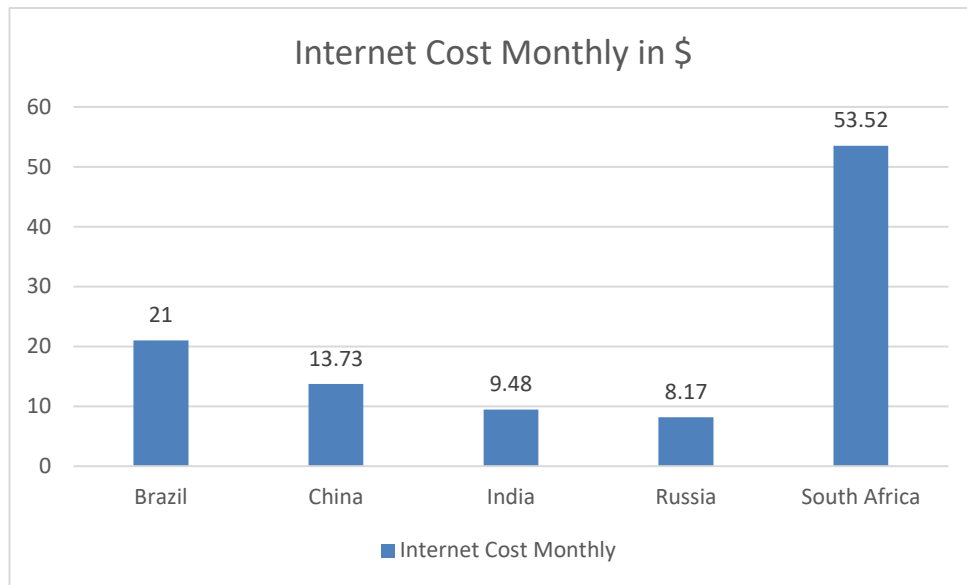
### **South Africa:**

As the data suggests, there are 44 million internet users in South Africa and the digital penetration rate is about 74% [12]. There are significant differences in the internet access between rural and urban area causing a great digital divide [13]. Government is aiming to improve digital infrastructure and encourage digital literacy. The agenda is specifically mentioned in the National Development Plan to reduce the digital divide in the country. The government aims to promote more inclusivity and guarantee that all residents may profit from the digital revolution by emphasizing digital literacy and accessibility.

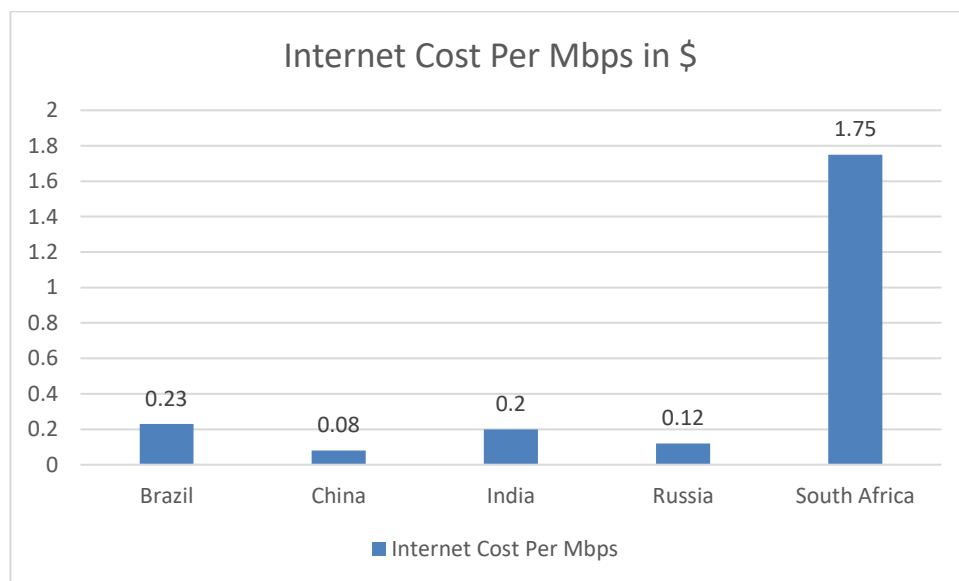
## **2. Cost of Internet**

Better accessibility and lower costs are the important reasons behind the continued increase in number of

internet users in BRICS countries is (ITC, 2022)[7].



Source: World Population Review



Source: World Population Review

The data by World Population Review provides insights into internet costs across five BRICS countries. The research considers two important parameters to access the cost of internet- monthly internet cost and the cost per Mbps (megabit per second). South Africa is the costliest among BRICS when it comes to cost of internet. Monthly internet in Africa is around \$53.52, which is substantially higher than in the other countries, indicating a much greater internet expense for users. Brazil is the second costliest among BRICS with a monthly cost of \$21, though it is still considerably lower than South Africa's. On the other hand China, India, and Russia have relatively affordable monthly internet costs, with China at \$13.73, India at \$9.48, and Russia at \$8.17. This clearly suggests that the internet services are more economically accessible in these three nations, resulting in a greater number of users compared to the countries having

higher cost.

Considering the cost per Mbps as a measure of internet cost relative to speed, South Africa again has the highest rate, \$1.75 per Mbps. This high cost per unit of speed indicates less value for money in terms of internet speed. The other countries show significantly lower costs per Mbps, which indicates greater affordability and higher value for internet speed. China offers the most affordable rate at \$0.08 per Mbps, followed by Russia at \$0.12, India at \$0.20, and Brazil at \$0.23.

Overall, while South Africa has the highest internet costs both monthly and per Mbps, China, Russia, and India provide more affordable internet options, both in terms of monthly costs and value for internet speed. This comparison reveals that consumers in South Africa face higher costs with comparatively lower speed value, whereas Chinese consumers benefit from the lowest cost per Mbps, offering them the best affordability relative to speed among the BRICS nations.

### 3. Digital Payments

The digital payments market is experiencing significant growth, primarily fueled by the rising adoption of e-commerce and mobile payment solutions. The COVID-19 pandemic has further accelerated this trend, particularly with the increased use of contactless payments. Consumer preferences have shifted towards digital wallets and mobile payment platforms such as PayPal, Venmo, and Cash App, which offer secure and convenient transaction options.[9]

Several key factors are contributing to the robust expansion of this market: [9]

**Convenience and Speed:** Digital payments are preferred due to their quick and easy processing, especially among younger generations who favor seamless and quick transaction experiences.

**Digitization of Businesses:** As digital payments provide streamlined payment solutions that reduce additional cost, enhance efficiency and easy to monitor from any place, more businesses embrace digital transformation.

**E-commerce Growth:** The rise of online marketplaces necessitates secure payment systems capable of handling cross-border transactions efficiently. It is also time effective and easy to access.

As the internet penetration and cost differ country wise, the digital payments system is also different in different countries.

#### Brazil

In 2020, the Central Bank of Brazil introduced a real-time payment system PIX. The digital payment landscape in Brazil has been primarily transformed by the launch of PIX. It facilitated instant money transfers using QR codes, phone numbers and unique identifiers which contributed to a sharp increase in the digital transactions. Over 1.5 billion transactions have been observed in the end of 2022, which clearly shows rapid adoption among consumers and businesses alike. Brazil also faces challenges such as cybersecurity threats and issues related to user privacy, due to which concerns about potential fraud and data breaches involved in digital transactions. Ensuring equitable access to digital payment systems across diverse socio-economic groups is also a significant hurdle in Brazil.

#### China

Alipay and WeChat Pay are the two platforms who dominated the China's digital payment landscape. These platforms facilitate a wide range of services, from online shopping to utility bill payments, effectively injecting digital payments into the daily lives of consumers. The data on digital transaction

volume in China varies. The rapid growth of digital payments in China has not come without challenges. China faces intense regulatory scrutiny focused on the concerns related to data privacy and anti-competitive practices among dominant fintech firms. To ensure consumer protection in the market, strong competition is a necessity which is not present in China. Deregulation and boost for monopolistic behaviour are critical steps for China for fostering a healthy digital payments ecosystem moving forward.

### **India**

India has emerged as a global leader in digital payments, which is primarily driven by Unified Payments Interface (UPI). UPI launched by National Payment Corporation of India (NPCI) to facilitate an easy and immediate transfer of funds between bank accounts using a mobile device. The data shows that over 50 billion transactions have been recorded in the fiscal year 2022-2023 alone. The Reserve Bank of India (RBI) reported a total worth of approximately INR 13,462 crore digital transactions in the financial year 2022-23[17]. While India's digital payment ecosystem is flourishing, there are significant challenges persisting around the same. One of the primary concerns includes a substantial digital divide exists, particularly in rural areas, where limited access to the internet and digital literacy pose further obstacles to widespread adoption. Cybersecurity and frauds is also a major concern when it comes to digital payments. Overcoming the challenges is essential to maintain the momentum of India's digital payment revolution.

### **Russia:**

Russia's digital payment ecosystem is largely dominated by the Faster Payments System (FPS), which enables instant transfers between bank customers. FPS was jointly developed by Bank of Russia and the National Payment Card System (NSPK) and was launched in 2019. Since its launch, the FPS processed approximately 1 billion transactions in 2022, reflecting the growing popularity of digital payment methods amid increasing consumer demand for convenience. The system faces challenges linked to the broader geopolitical disputes, particularly international sanctions that complicate cross-border transactions and limit the integration of Russian payment systems with global platforms. Two larger players Visa and Mastercard already left the market. Furthermore, addressing consumer trust in digital payments and enhancing cybersecurity measures are vital for sustaining growth.

### **South Africa:**

In South Africa, the digital payment arena is characterized by a diverse mix of platforms, with PayFast and SnapScan being notable examples along with Zapper and mobile money services like MTN MoMo.. These services have facilitated around 160 million transactions in 2022, empowering both consumers and small businesses to engage in electronic commerce more readily. Despite this growth, South Africa grapples with several challenges, notably the persistent digital divide that leaves many rural communities underbanked and without access to reliable internet services. Additionally, as the volume of online transactions increases, concerns over cybersecurity become paramount, necessitating robust security measures to safeguard consumer information and prevent fraud. Addressing these challenges is crucial for South Africa to capitalize on the growing trend of digital payments and ensure inclusivity for all citizens. The global digital payments market is projected to continue its positive trajectory according to all the international reports. The Asia-Pacific region is anticipated to lead this growth, followed by North America and Europe. The digital growth is driven by the regional adoption of digital payment systems.



Additionally, the growing collaborations among payment service providers and advancements in technologies such as blockchain and artificial intelligence are expected to further increase of digital payments and market expansion in the upcoming years. Forecasts indicate that the digital payments market in BRICS nations will expand by 8.96% from 2024 to 2028, potentially reaching a market volume of approximately US\$6,069 billion by 2028 [9].

## Conclusion:

**1. Internet Accessibility:** Internet penetration and number of users are considered as a proxy for understanding internet accessibility. Though the number of users in India and China are among the highest in the world, India is lacking being in penetration of internet leaving 47% population without internet access. And that is why is important to look at the both measures at the same time, to get wholesome perspective. Russia has the highest level of penetration, followed by Brazil.

There is a disparity in internet reach in rural and urban areas of China, India and South Africa. For the three countries, there is great need to create inclusive digitalisation reaching the rural population.

**2. Internet cost:** Internet cost show a significant impact on the number of internet users in BRICS countries. Brazil faces high cost of internet, especially affecting rural connectivity, though government efforts aim to improve access. China and India benefits from low cost and substantial government investment boosting widespread digital integration through initiatives like the ‘Internet Plus’ strategy. India’s affordable internet has driven mobile access growth and supported the ‘Digital India Initiative’, but still infrastructure gaps remain.

Russia also enjoys low internet cost which promotes high connectivity. Government regulations is still a concern despite having low cost internet. South Africa’s higher internet costs is a challenge for broad access, with government initiatives working to improve affordability and infrastructure.

In nutshell lower internet cost is fostering digital accessibility in China, India, and Russia. Brazil also comes under comparatively lower cost category. In contrast, extravagant cost in South Africa poses constraints and it needs to be addressed.

**3. Diverse Digital Ecosystems:**

The research shows that while the BRICS nations share similar objectives and goals for digitalisation, they have own developmental paths and priorities set for themselves. China’s digitalisation is backed by government investment initiatives and fundings. India’s emphasis is on grassroot level inclusion through initiatives like digital India Mission. Russia has a robust infrastructure with less reliance on western technologies due to geopolitical tensions. Brazil’s approach is more focused on inclusion though payment systems like PIX. PIX has already showcased rapid response. South Africa also has advanced digital infrastructure and focuses on mobile payment solutions and e-commerce payments.

**4. Stakeholders:**

Russia is dominated by state-owned enterprises and government agencies and has strong push for BRICS digital payment system as a response to sanctions. On the similar lines, there are stringent regulations on the digital landscape in China and the government heavily regulates digital initiatives. South Africa has strong influence from the private sector with fintech innovations driving growth and has supportive government policies. India and Brazil have more open regulatory environment which fosters diverse digital stakeholder participation.

**5. Future Trajectories of Digital Transformation:** The research anticipates that as BRICS nations increasingly prioritize digital strategies, there may be a convergence of interests toward shared goals,

such as enhancing cybersecurity, fostering digital literacy, and ensuring equitable access to technology. Russia is focused to enhance its technological independence which might provide further stronger cooperation among BRICS as an alternative to the western technology. In South Africa mobile payments is a evolving creating more scope for collaborations in the sphere. Evolving nature of global digital markets suggests greater possibility of collaboration among BRICS nations. This can be comparative advantage and resilience in the face of external pressure.

Overall, these findings provide detailed overview of the current state and future of digitalisation and collaborations among BRICS nations. This analysis serves as a foundational resource for policymakers and other stakeholders seeking to leverage potential for digitisation and opportunities

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