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Artificial Inteligence for Inclusion: A Public BRICS Financial AI Platform

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ABSTRACT

The paper is a result of a comprehensive and systematic approach to reviewing the growing opportunities for BRICS countries in introducing artificial intelligence into a mutual financial platform. The subject of the study is the AI as a factor of BRICS cooperation and its growth in finance. The **purpose** of the study is to identify measures that stimulate the introduction of AI into a shared public financial infrastructure platform by implementing the methodological combination of structured and reproducible guidelines, incorporating elements of the PRISMA method in particular. The **task** of the research team is to search for scientific answers to the urgent questions of current artificial intelligence inequality between nations and to come to the conclusion that BRICS nations should develop and implement a shared public AI platform to enhance accessibility to general and specialized information as well as equity for marginalised communities in all member countries. It is pointed out that such AI platform have to be organized in a way that enshrines principles of data sovereignty. Mechanisms and international AI strategies for meeting the challenges are introduced. The developed proposal is unique. Other initiatives have not yet received adequate justification. The project of such a scale demands not only funding, but also dedicated professionals as well as open-source software development instruments. These issues represent promising areas for further research.

Keywords: BRICS; artificial intelligence; platform; developing countries; finance; strategy; data sources; digital infrastructure; data empowernment

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ОРИГИНАЛЬНАЯ СТАТЬЯ

Внедрение искусственного интеллекта: публичная финансовая платформа ИИ БРИКС

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АННОТАЦИЯ

В статье представлен результат всестороннего исследования потенциала стран БРИКС в области применения искусственного интеллекта (ИИ) для создания общей финансовой платформы. Предметом исследования является искусственный интеллект как фактор расширения сотрудничества стран БРИКС в финансовой сфере. Основываясь на методологической комбинации структурированных подходов, включающих, в частности, элементы метода PRISMA, определена **цель** исследования, направленная на разработку мер, стимулирующих внедрение ИИ в формирующуюся межгосударственную финановую платформу БРИКС. **Задачей** исследовательской группы является раскрытие существующего странового неравенства использования искусственного интеллекта в БРИКС. Сделан вывод о необ-

ходимости разработки и внедрения совместной общественной платформы ИИ в целях расширения доступа потребителей к общей и специализированной информации, а также обеспечения равенства использвания данных во всех странах-членах. Отмечено, что платформа искусственного интеллекта должна быть организована таким образом, чтобы обеспечить соблюдение принципов суверенитета данных. В целях решения поставленных задач предложены механизмы и международные стратегии внедрения искусственного интеллекта в публичную финансовую платформу БРИКС. Проект такого уровня требует не только финансирования, но и преданных своему делу экпертов, а также применения инструментов программного обеспечения с открытым кодом доступа. Эти вопросы представляют значительный интерес для дальнейших исследований.

Ключевые слова: БРИКС; искусственный интеллект; платформа; развивающиеся страны; финансы; стратегия; источники данных; цифровая инфраструктура; усиление применением данных

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INTRODUCTION

Artificial intelligence (AI) continues to advance rapidly, with its development led by the private sector. In the West, companies like Microsoft, Alphabet and Meta are investing massively in AI infrastructure, recognising this pivotal model in global economic development. Researchers at the International Monetary Fund describe our world as on the brink of technological revolution, with AI driving productivity and economic growth [1]. However, if managed poorly, it can simultaneously replace jobs and exacerbate existing inequalities.[1] If the world is on the brink of revolution, with such risks, nations must ask if they are comfortable with the private sector driving this transition. Can one be confident that the private sector's underlying profit motive will allow them to develop AI models that prioritise inclusion or benefit humanity? Given these concerns, nations must explore alternative paths for AI development. One alternative is public AI development, but to be successful, this model would require similar investments made by the public sector [2].

Given current economic challenges, it is not viable for every nation to invest in AI infrastructure at a scale similar to those of the private sector's technology giants. For example, in recent years, Microsoft has spent 8.6 billion USD on the introduction of artificial intelligence into practice and one Google deal in this area amounts to 3.2 billion US dollars. However, by pooling resources and capabilities, multinational groups can coordinate a development project to build a shared AI platform that can benefit all countries. A group like the BRICS is well-resourced to develop such a project but requires a strategy to coordinate such developments. This strategy must address how the BRICS can coordinate access to computational resources and energy production while managing data privacy and sovereignty concerns.

Notably, under India's leadership of BRICS in 2021, the Reserve Bank of India (2021)[2] produced a BRICS Digital Financial Inclusion Report describing the efforts made by the BRICS to promote financial inclusion in their countries. The report further describes the progress made by India in developing Digital Public Infrastructure to promote financial inclusion, security and innovation. Given India's vast experience with public digital infrastructure, the report advocates expanding this form of infrastructure across BRICS countries. Such infrastructure can provide BRICS countries with a digital foundation that is not just resilient, inclusive, and secure but also critical for promoting inclusion and economic development.

Building upon this 2021 BRICS argument, in 2023, under India's leadership, the G20's Think Tank, the Think20 (T20), produced a communique that advocated for affordable, accessible and inclusive digital public infrastructure. Through the collective insights of researchers contributing to various task forces, the T20 called for:

"G20 members should leverage public-private partnership models to strengthen joint and in-country initiatives for building Digital Public Infrastructure (DPI) ecosystems that are scalable, open-access, and innovation-friendly".[3]

In addition, the T20 called for digital public infrastructure and initiated a special diplomatic track that allows nations to share ideas and models

[1] Georgieva K. AI Will Transform the Global Economy. Let's Make Sure It Benefits Humanity. IMF. Org. 16.01.2024. URL: https://www.imf.org/en/Blogs/Articles/2024/01/14/ai-will-transform-the-global-economy-lets-make-sure-it-benefits-humanity (accessed on 20.01.2025).

[2] Reserve Bank of India. BRICS Digital Financial Inclusion Report. 2021. URL: https://brics2021.gov.in/brics/public/uploads/docpdf/getdocu-53.pdf (accessed on 18.01.2025).

[3] G20 Task Force Report on Digital Public Infrastructure. URL: https://www.medianama.com/2024/07/223-g20-task-force-report-digital-public-infrastructure/ (accessed on 18.01.2025).

that promote inclusive, agile and responsible digital public infrastructure. The argument made for the G20 nations is equally valid in the BRICS context, especially considering its recent expansion at the start of 2024.

In 2023, President Xi also announced the launch of a BRICS AI Study Group during the BRICS Heads of State Summit in Johannesburg. This study group was tasked to monitor the developments in AI and explore strategies to catalyse innovation in AI that benefits BRICS nations. President Xi declared it was essential that the BRICS promote AI cooperation and informational exchange. Such activities involve developing AI governance frameworks and standards.[4]

In response to this call from the 2023 T20 and President Xi's announcement, this chapter concentrates on the need for Public AI Infrastructure in BRICS. These views expand the discourse on Public Digital Infrastructure and provide input to the BRICS AI Study Group. This study recognises the opportunities a public alternative to AI development enables in BRICS nations. Thus, recognising this pivotal moment in technological advancement and its implications on socioeconomic development, the chapter explores the following two research questions.

(RQ1) How can the BRICS nations develop and implement a shared public AI platform to enhance accessibility and equity for marginalised communities in all member countries?

(RQ2) What is the ideal architecture for the proposed shared AI platform that enshrines principles of data sovereignty?

In answering these questions, this study first presents the methodology that was followed by the research team to collect and analyse relevant data. This is followed by a review of the progress made by the private sector in developing large AI models. In contrast, the following section explores the progress made in delivering public digital infrastructure, concentrating specifically on the model adopted by India. Given the experiences from India, the article then explores the need for public AI infrastructure before discussing the positions adopted by BRICS nations towards public digital infrastructure and public AI. Lastly, before sharing recommendations for the BRICS, the study discusses the advances in developing a distributed and public AI architecture.

[4] Moyo A. BRICS bloc commits to secure, equitable artificial intelligence. IT Web2. 2023. URL: https://www.itweb.co.za/article/brics-bloc-commits-to-secure-equitable-artificial-intelligence/mQwkoq6YpLzM3r9A (accessed on 18.01.2025).

METHODOLOGY

This study employs a comprehensive and systematic approach to review the opportunities for BRICS countries to introduce a shared public AI financial infrastructure platform, drawing from the literature mentioned below. The process aligns with structured and reproducible guidelines, incorporating elements from Briner and Denyer [3] and the Preferred Reporting Items for Systematic Reviews and Meta--Analyses (PRISMA) guidelines by Moher et al. [4], as well as Proceedings of the 25th International Conference on Soft Computing and Measurements [5].

Information Sources and Search Process

A multi-step search strategy was implemented, and articles were scanned and shared from Elicit.com, Google Scholar and Google News. Initially, the research team examined public, sovereign and decentralised AI infrastructure research sourced from Google Scholar. Three of the original five papers on public AI infrastructure were found to be relevant and were incorporated into this study's analysis. No papers on sovereign AI infrastructure were suitable through Google Scholar.

Due to the insufficient information sourced from Google Scholar, a semantic search tool was preferred to find relevant results related to the study's research question. Using Elicit.com, four questions were asked, and the top 24 papers on each question were reviewed. Firstly, the question "What are the emerging opportunities resulting from decentralised AI systems?" was asked. After reviewing the first 24 results, 13 articles were available and relevant. On the second question, which focused on "What is public or sovereign AI infrastructure", seven of the initial 24 articles were available and relevant. To find literature related to the adoption of public digital infrastructure, two additional questions were asked related to the value of public digital infrastructure, which produced eight relevant articles from a search of 24 papers.

To explore the investments and progress made by the private sector in rolling out AI infrastructure, a review of recent news reports from 2023 and 2024 about investments made by Alphabet, Meta, Microsoft, Open AI, Nvidia, and Apple were examined. Individual internet searches were conducted for each company, and 13 articles were reviewed and found relevant.

In addition, a comprehensive scan of AI strategies from countries including G20 and the expanded BRICS countries, the Organisation for Economic Cooperative Development (OECD), the African Union, and the European Commission was included to provide a global context and incorporate diverse perspectives on AI implementation (*Table*).

Table

System Search Results

Source	Keyword	Result	Available and Relevant
Google Scholar	Public AI Infrastructure	5	3
	Sovereign AI Infrastructure	1	0
	Decentralised AI (since 2023)	51	0
Elicit.com	What are the emerging opportunities resulting from decentralised AI systems?	24	13
	What is public AI infrastructure or sovereign AI?	24	7
	What is the value of public digital infrastructure?	24	7
	What is the impact of public digital infrastructure in India	24	8
Google News	Private Investments in AI	60	13

Source: Compiled by the authors.

Study Selection

The study selection process involved an initial screening of titles and abstracts to determine relevance, followed by a detailed full-text review to confirm the suitability of each article. This two-tiered screening ensured that the final selection of literature was directly relevant to exploring AI's potential in enhancing anti-corruption measures.

Key themes, methodologies, outcomes, and gaps in the existing research were identified through in-depth analysis of the selected articles. This process provided a comprehensive overview of the current landscape of public AI infrastructure as it applies to BRICS countries. The systematic review process, guided by the methodologies of Briner and Denyer [3] and the PRISMA guidelines [4], ensured transparency, reproducibility, and relevance of the findings to academic scholars and practitioners in the field.

ADVANCES IN PROPRIETARY AI

Investments in Proprietary AI

The private sector continues to advance with rollouts of new AI models. Microsoft, in partnership with Open AI, is investing heavily in AI infrastructure in the form of data centres to maintain a leading position in the market. Reports indicate that these partners are investing US$ 100 billion in a project named Stargate. This data centre is expected to shape the future of AI and the new models produced by Open AI.[5] Similarly, Google, Apple and Amazon have similar projects where they are making sizeable investments in AI infrastructure. Google is reportedly matching or exceeding Microsoft's investments in AI infrastructure. Its investments are reportedly over US$ 100 billion and are used to train new large language models (LLMs). The CEO of Google's Deepmind project describes the need for massive computing power to produce the capabilities of the leading LLMs like Google Gemini or Open AI's GPT4 models.[6] Amazon invested $ 4 billion in Open AI competitor Anthropic in 2023 and continues investing in their WS Trainium and Inferentia chips. The Anthropic models are built upon this digital foundation laid by Amazon.[7] Apple

[5] VARINDIA. Microsoft-OpenAI To Develop AI Data Centre Stargate Roadmap of $ 100 Billion Project. VARINDIA. Com. 2024. URL: https://www.varindia.com/news/microsoft-openai-to-develop-ai-data-centre-stargate-roadmap-of-100-billion-project (accessed on 18.01.2025).

[6] Nguyen B. Google will spend more than $ 100 billion on AI, exec says. QZ. Com. 2024. URL: https://qz.com/google-spend-100-billion-ai-development-deepmind-ceo-1851412787 (accessed on 18.01.2025). Porat R. Our newest investments in infrastructure and AI skills. Blog.Google.Com. 2024. URL: https://blog.google/inside-google/infrastructure/google-data-centers-ai-skills-investments/ (accessed on 18.01.2025).

[7] Amazon. Amazon and Anthropic deepen their shared commitment to advancing generative AI. AboutAmazon. Com. 2024. URL: https://www.aboutamazon.com/news/company-news/amazon-anthropic-ai-investment (accessed on 18.01.2025).

reportedly invests $ 1 billion annually to match the development pace set by Microsoft and Google.[8] Meta reportedly invests between $ 35 and 40 billion in their data centres and network expansion projects. This foundation is needed to produce their AI models and services.[9] Unlike Microsoft and Google, after making these substantial investments in AI infrastructure, Meta has decided to make their models available to the public in an open-source format. Lastly, Nvidia continues to make rapid strides in AI chip development. As a leading AI chip designer, Nvidia's market value has grown substantially between 2023 and 2024. This growth follows recognition of their pivotal role in providing AI infrastructure to other proprietary AI companies.[10]

Implications for the Global Economy and Finance

With the massive investments made by these companies into AI infrastructure, one can expect these companies to dominate the market for the foreseeable future. Furthermore, these companies will likely control the public's access to AI resources and capabilities.[11] These sizeable investments are made as these companies compete to achieve artificial general intelligence (AGI), where the AI can reason at the level of an average human performer. These companies plan to leverage their data sources and substantial digital infrastructure to make the AGI breakthrough. This breakthrough could further cement their power in the future digital economy, where their infrastructure could provide a foundation that replaces human labour with AI capabilities.[12] Such advances offer an existential risk to global economic development and give AGI system owners great control over the globe's economic trajectory.[13] According to forecast aggregator Metaculus, the global consensus is that AGI will be tested and publicly announced in 2031.[14] This prospect raises several concerns about its economic impact, effect on employment, and quality of life.[15] Predictions of the future are generally impossible, but it appears these considerable investments in AI infrastructure signal the intentions of the big technology companies to hedge their bets in a rapidly evolving digital economy in international financial relations.

ADVANCES IN PUBLIC DIGITAL INFRASTRUCTURE

India's Commitment to Public Digital Infrastructure

While the private sector attempts to consolidate its power in the digital sector, India has long faced digital exclusion challenges. These challenges have contributed to considerable financial exclusion and public sector service delivery inefficiencies. India also needed a strategy to promote broad economic transformation. To this end, the country invested in public digital infrastructure to solve these challenges through technology. Through its investments in public digital infrastructure, it has developed solutions related to identity management, payments and document management.[16] These applications, collectively referred to as the India Stack, have become a global exemplar of public digital infrastructure.[17] India's public sector was

[8] Gurman M. Inside Apple's Big Plan to Bring Generative AI to All Its Devices. Bloomberg.Com. 2023. URL: https://www.bloomberg.com/news/newsletters/2023–10–22/what-is-apple-doing-in-ai-revamping-siri-search-apple-music-and-other-apps-lo1ffr7p (accessed on 18.01.2025).

[9] Moss S. Meta to "accelerate infrastructure investments" for AI, raises capex to $ 35bn-$40bn. DataCenterDynamics.Com. 2024. URL: https://www.datacenterdynamics.com/en/news/meta-to-accelerate-infrastructure-investments-for-ai-raises-capex-to-35bn-40bn/ (accessed on 18.01.2025).

[10] McDowell S. AI Infrastructure Takes Center Stage At Nvidia GTC. Forbes.Com. 2024. URL: https://www.forbes.com/sites/stevemcdowell/2024/03/26/ai-infrastructure-takes-center-stage-at-gtc-2024/ (accessed on 18.01.2025).

[11] O'Reilly T., Strauss I., Mazzucato M., Rock R. To understand the risks posed by AI, follow the money. The Conversation. 2024. URL: https://theconversation.com/to-understand-the-risks-posed-by-ai-follow-the-money-225872 (accessed on 18.01.2025).

[12] SingularityNE T. The Race for AGI: Big Tech vs Decentralized Approaches. Medium.Com. 2024. URL: https://medium.com/singularitynet/the-race-for-agi-big-tech-vs-decentralized-approaches-739fd332332b#:~: text=Today%2C Big Tech companies like, elements for advancing AGI research (accessed on 18.01.2025).

[13] O'Brien M. Tech companies want to build artificial general intelligence. But who decides when AGI is attained? AP News2. 2024. URL: https://apnews.com/article/agi-artificial-general-intelligence-existential-risk-meta-openai-deepmind-science-ff5662a056d3cf3c5889a73e929e5a34 (accessed on 18.01.2025).

[14] Pethokoukis J. AI and the Economy: Scenarios for a World with Artificial General Intelligence. AEI. Org. 2024. URL: https://www.aei.org/articles/ai-and-the-economy-scenarios-for-a-world-with-artificial-general-intelligence/ (accessed on 18.01.2025).

[15] Pethokoukis J. AI and the Economy: Scenarios for a World with Artificial General Intelligence. AEI. Org. 2024. URL: https://www.aei.org/articles/ai-and-the-economy-scenarios-for-a-world-with-artificial-general-intelligence/ (accessed on 18.01.2025).

[16] Chetty K., Josie J., Kripalani M., Anandaram S. Digital Inclusion Strategies for the G20 — Lessons in Public-Private Cooperation from India and Africa. T20 Policy Briefs. 2021. URL: https://www.t20italy.org/2021/08/26/digital-inclusion-strategies-for-the-g20-lessons-in-public-private-cooperation-from-india-and-africa/ (accessed on 18.01.2025).

[17] Alonso C., Bhojwani T., Hanedar E., Una G., Zhabska K. Stacking up the Benefits. Lessons from India's Digital Journey (WP/23/78; IMF Working Papers); Chetty K., Josie J., Kripalani M., Anandaram S. (2021). Digital Inclusion Strategies for the G20 — Lessons in Public-Private Cooperation from

able to leverage its advancing software development capabilities to develop a robust digital ecosystem that supports innovation and market expansion.[18] Furthermore, the country needed to improve its public sector efficiency and transparency in providing service delivery. This was necessary to overcome a history of inefficiency and corruption.[19] Through services like the Unified Payment Interface (UPI), India was able to accelerate access to financial services, reduce corrupt financial activities and improve efficiencies in public expenditure.[20] In addition, the country provided its citizens greater control over their data, improving privacy and reducing risks associated with data access.[21] The success of the India Stack demonstrates the transformative potential of public digital infrastructure, offering valuable insights for other countries aiming to leverage digital technologies for socio-economic development.

The India Stack

The India Stack's success lies in its ability to leverage the trio of community-driven initiatives, government support, and market innovations to create digital public goods available to the entire population of India. It did so by providing open, interoperable, scalable, and inclusive services, as exemplified by platforms like Aadhaar, CoWIN, and DIKSHA [6]. Through a community of open-source software developers, the public sector was able to produce alternative innovative open-banking solutions [7]. The India Stack, designed as a modular architecture, supports interoperability and scalability principles. The model allowed public and private service providers to participate in an interoperable financial ecosystem. Various financial services could be offered to the public by the public sector, managing efficient and secure data storage facilities.[22] India's success in managing these data repositories highlights the feasibility of public sector data providers managing the data centres needed for public digital infrastructure. By adopting this model, an AI Stack of AI-based services benefits from a rich ecosystem of developers, entrepreneurs, and users, all contributing to a common goal. The open-source nature ensures the tools are accessible, adaptable, and cost-effective, making them ideal for marginalised communities.[23] This approach democratises access to advanced technology and aligns with the T20's interest in inclusive digital transformation.

Through India's Code for GovTech (C4GT) project, the public sector actively encourages the open-source community of software developers to mentor and guide other emerging developers. By using platforms like Discord, developers can connect and network with other mentors and contributors to the project.[24] The project encourages hackathons, innovation challenges, and collaborative platforms where developers work on government-related digital solutions. These initiatives encourage the creation of open-source tools and applications that address public sector challenges. The Aadhaar and UPI systems are prime examples of how collaborative efforts between the public sector and the developer community can lead to scalable and impactful digital solutions. These systems have benefited from contributions by numerous developers and tech firms, highlighting the effectiveness of an open, collaborative approach. Crucially, these achievements in India highlight how an open, collaborative approach drives innovation and

India and Africa. T20 Policy Briefs. 2023. URL: https://www.t20italy.org/2021/08/26/digital-inclusion-strategies-for-the-g20-lessons-in-public-private-cooperation-from-india-and-africa/ (accessed on 18.01.2025); Global Partnership for Financial Inclusion. G20 Policy Recommendations for Advancing Financial Inclusion and Productivity Gains through Digital Public Infrastructure. 2023. URL: https://documents1.worldbank.org/curated/en/099092023121016458/pdf/P178703046f82d07c0bbc60b5e474ea7841.pdf (accessed on 18.01.2025).

[18] D'Silva D., Filková Z., Packer F., Tiwari S. The design of digital financial infrastructure: lessons from India. In BIS Papers No 106 (No. 106; BIS Papers, Issue 106). 2019. URL: https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3505373 (accessed on 18.01.2025).

[19] Alonso C., Bhojwani T., Hanedar E., Una G., Zhabska K. Stacking up the Benefits. Lessons from India's Digital Journey (WP/23/78; IMF Working Papers). 2023. URL: https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4423373 (accessed on 18.01.2025).

[20] Alonso C., Bhojwani T., Hanedar E., Una G., Zhabska K. Stacking up the Benefits. Lessons from India's Digital Journey (WP/23/78; IMF Working Papers). 2023. URL: https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4423373 (accessed on 18.01.2025).

[21] Dattani K. "Governtrepreneurism" for good governance: The case of Aadhaar and the India Stack. Area, 52(2), 411–419. 2020. URL: https://doi.org/10.1111/area.12579 (accessed on 18.01.2025).

[22] di Castri S., Grasser M., Kulenkampff A. The "Datastack": A Data and Tech Blueprint for Financial Supervision, Innovation and the Data Commons. 2020. URL: https://bfaglobal.com/wp-content/uploads/2020/05/DataStack_final_13May2020.pdf (accessed on 18.01.2025).

[23] NITI Aayog. National Strategy for Artificial Intelligence #AIFORALL. 2018. URL: https://www.niti.gov.in/sites/default/files/2023–03/National-Strategy-for-Artificial-Intelligence.pdf (accessed on 18.01.2025).

[24] Code for GovTech. Code For GovTech 2023. Studocu.Com. 2023. URL: https://www.studocu.com/in/document/don-bosco-institute-of-technology/computer-science/646c3a4a41534-c4gt-unstop-brief-document/64789881 (accessed on 18.01.2025).

provides the platform for open-source public digital infrastructure.[25]

THE NEED FOR PUBLIC FINANCIAL AI INFRASTRUCTURE

Economic Growth and Innovation

As technologies continue to advance and AI models become increasingly more complex, AI service providers are expected to become drivers of global economic growth. In this respect, the current digital divide becomes a critical barrier influencing economic activity and is a risk for nations as they attempt to secure their economic growth trajectory [8].

In this light, the European Union and the United Kingdom are investing in public AI infrastructure to stimulate the demand for locally developed AI solutions. Such investments are expected to foster public sector innovation and economic growth.[26] Similarly, as discussed, India's national strategy involves investing in public digital infrastructure to provide its citizens with a platform for digital services.[27] Crucially, without public AI infrastructure, a country becomes dependent on proprietary AI. Consequently, technology companies can act as gatekeepers for your country's economic opportunities, possessing the right to arbitrarily exclude users, organisations or countries from such tools. Private companies can also set the access costs for such services, which can exclude certain parties. Without a public alternative, private technology companies will control a country's participation in the digital economy[9]. Further, the developmental trajectory of these tools is decided by private companies, and their choices may not address the local challenges experienced in certain countries [10].

Proprietary AI systems are built upon public knowledge repositories or data owned by the technology company. Potentially, organisations may wish to develop AI systems based on private data, but they may not wish to share this with certain actors or an international audience. The proprietary model currently does not give the user control over their data. A tailored public AI model could be built following data sovereignty principles that enhance privacy controls as recognised by several BRICS countries.[28]

Empowerment and Inclusivity

As a principle, proprietary AI models will be built following a profit motive and will likely exclude users who cannot afford the service. Subsequently, cost becomes a critical barrier that blocks one's participation in the digital economy. A public model promotes access to such services and encourages technological development and innovation in less-developed areas. Depending on the design of the public system, more functionality of the model could be distributed in a decentralised fashion, allowing the local infrastructure to provide AI services to local users [11].

Public AI can offer broader access to AI resources supporting a range of institutions. This approach democratises access to AI services, encouraging innovation and contributing to economic growth.[29] Public AI initiatives reduce the barriers to entry, with the state investing in the computing power needed to run computationally complex models. As seen in the experiences from India and its development of the India Stack model, public digital infrastructure investments allow such services to become more accessible and affordable.[30]

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[25] Department of Economic Affairs. Report of India's G20 Task Force on Digital Public Infrastructure. 2024. URL: https://dea.gov.in/sites/default/files/Report of Indias G20 Task Force On Digital Public Infrastructure.pdf (accessed on 18.01.2025).

[26] European Commission. Communication from the Commission to the European Parliament, the European Council, the Council, the European Economic and Social Committee and the Committee of the Regions. 2018. URL: https://eur-lex.europa.eu/legal-content/EN/ALL/?uri=CELEX%3A52012DC0673 (accessed on 18.01.2025); Secretary of State for Digital Culture Media and Sport. National AI Strategy. 2021. URL: https://assets.publishing.service.gov.uk/media/614db4d1e90e077a2cbdf3c4/National_AI_Strategy_-_PDF_version.pdf (accessed on 18.01.2025).

[27] Kripalani M., Kacholiya H., Ramanathan M. P. Private Innovation in Digital Public Infrastructure. India Writes. 2023. URL: https://www.indiawrites.org/diplomacy/private-innovation-in-digital-public-infrastructure/ (accessed on 18.01.2025); NITI Aayog. National Strategy for Artificial Intelligence #AIFORALL. 2018. URL: https://www.niti.gov.in/sites/default/files/2023–03/National-Strategy-for-Artificial--Intelligence.pdf (accessed on 18.01.2025).

[28] Artificial Intelligence Commission. Our AI: Our Ambition for France (Issue March). 2024. URL: https://www.info.gouv.fr/upload/media/content/0001/09/02cbcb40c3541390be391feb3d963a4126b12598.pdf (accessed on 18.01.2025); China's State Council. A Next Generation Artificial Intelligence Development Plan. 2017. URL: https://d1y8sb8igg2f8e.cloudfront.net/documents/translation-fulltext-8.1.17.pdf (accessed on 18.01.2025); Die Bundesregierung. Strategie Künstliche Intelligenz der Bundesregierung Inhalt. 2020. URL: https://www.bundesregierung.de/resource/blob/997532/1550276/3f7d3c41c6e05695741273e78b8039f2/2018-11-15-ki-strategie-data.pdf (accessed on 18.01.2025).

[29] Ho D. E., King J., Wald R. C., Wan C. Building a National Resource: A Blueprint for the National Research Cloud. 2021. URL: https://hai.stanford.edu/sites/default/files/2021-10/HAI_NRCR_2021_0.pdf (accessed on 18.01.2025).

[30] NITI Aayog. National Strategy for Artificial Intelligence #AIFORALL. 2018. URL: https://www.niti.gov.in/sites/default/files/2023–03/National-Strategy-for-Artificial-Intelligence.pdf (accessed on 18.01.2025).

Future Proofing Society

A crucial benefit of public AI infrastructure is that it allows countries to develop a robust foundation for innovation. This foundation can catalyse new economic activity and innovation, where new businesses can leverage the collective insights of the underlying model to produce locally relevant solutions. Such infrastructure is crucial as countries transition towards efficient smart economies that apply innovative business models.[31] Such a foundation has been a core driver of innovative successes in China, where businesses can access a shared data pool. This data pool provides the foundation for China's future developments in AI that benefit various sectors.[32]

Investing in this technology is crucial to developing social innovations addressing critical societal concerns. Each BRICS country must grapple with issues of environmental constraints, urbanisation, increasing inequality, and poverty. As recognised in the Russian and Italian AI Strategies, AI offers many benefits for officials exploring policy solutions to these grand challenges.[33] Countries like India are working on using AI to improve outcomes in agriculture, health, and education.[34] For instance, in India, several local home-grown public and private sector initiatives exist in this space, including AI4Bharat, Bhashini, and Sarvam.[35]

Future generations will require a platform that promotes educational reforms, allowing education systems to be more responsive to the advances of technology and demands from employers. A public AI platform accessed by education systems across the BRICS has several benefits, such as cultivating talent, modernising the education sector, and creating a new generation of innovators. Such ideas were referenced by the South African ICT Roadmap and China's AI Strategy.[36]

Lastly, a shared AI platform accessed by innovators across BRICS countries is inherently geared to promote knowledge sharing and cooperation, especially in finance as the most risky activity of economic entities. The platform transcends geographic boundaries and allows researchers, developers, and product managers to explore new innovative ideas. The platform can also be set up to initiate partnership building by making contact details accessible if added to the model's training data. Organising the model in such a manner leverages the model as a global collaboration hub that promotes innovative ecosystems. The South African ICT Roadmap strongly supports these values, China's AI strategy, and Russia's and Italy's strategies.[37]

ANALYSIS OF INTERNATIONAL AI STRATEGIES

Recognising the opportunities offered by public AI infrastructure makes assessing the BRICS nation's readiness for such a concept important. This is assessed by their understanding of these concepts within their national AI strategies. The following section outlines their collective views on public AI infrastructure.

An Improved Public Service

All BRICS nations emphasise the opportunities to apply AI technologies to improve the quality of

[31] DigiChina. Full Translation: China's 'New Generation Artificial Intelligence Development Plan'. 2017. URL: https://digichina.stanford.edu/work/full-translation-chinas-new-generation-artificial-intelligence-development-plan-2017/ (accessed on 18.01.2025).

[32] DigiChina. Full Translation: China's 'New Generation Artificial Intelligence Development Plan'. 2017. URL: https://digichina.stanford.edu/work/full-translation-chinas-new-generation-artificial-intelligence-development-plan-2017/ (accessed on 18.01.2025).

[33] Alliance for Artificial Intelligence. Russian National Strategy for the Development of Artificial Intelligence for the Period Up to 2030. 2024. URL: https://a-ai.ru/wp-content/uploads/2024/03/Национальная_стратегия_развития_ИИ_2024.pdf (accessed on 18.01.2025); Ministero dell Sviluppo Economico. Strategia Nazionale per l'Intelligenza Artificiale. 2020. URL: https://www.mimit.gov.it/images/stories/documenti/Strategia_Nazionale_AI_2020.pdf (accessed on 18.01.2025).

[34] PIB Delhi. Use of AI to tackle problems in agriculture. Ministry of Agriculture and Farmers Welfare. 2024. URL: https://pib.gov.in/PressReleaseIframePage.aspx? PRID=2002010 (accessed on 18.01.2025).

[35] Jindal S. Sarvam AI, AI4Bharat, and IIT Madras Unveil IndicVoices, India's First Comprehensive Speech Dataset. AnalyticsIndiaMag.Com. 2024. URL: https://analyticsindiamag.com/ai-news-updates/sarvam-ai-ai4bharat-and-iit-madras-unveil-indicvoices-indias-first-comprehensive-speech-dataset/ (accessed on 18.01.2025).

[36] DigiChina. Full Translation: China's 'New Generation Artificial Intelligence Development Plan'. 2017. URL: https://digichina.stanford.edu/work/full-translation-chinas-new-generation-artificial-intelligence-development-plan-2017/ (accessed on 18.01.2025); South African Department of Science and Technology. ICT RDI Roadmap. 2012. URL: https://www.dsti.gov.za/images/ict_rdi_roadmap.pdf (accessed on 18.01.2025).

[37] Alliance for Artificial Intelligence. Russian National Strategy for the Development of Artificial Intelligence for the Period Up to 2030. 2024. URL: https://a-ai.ru/wp-content/uploads/2024/03/Национальная_стратегия_развития_ИИ_2024.pdf (accessed on 18.01.2025); DigiChina. Full Translation: China's 'New Generation Artificial Intelligence Development Plan'. 2017. URL: https://digichina.stanford.edu/work/full-translation-chinas-new-generation-artificial-intelligence-development-plan-2017/ (accessed on 18.01.2025); South African Department of Science and Technology. ICT RDI Roadmap. 2012. URL: https://www.dsti.gov.za/images/ict_rdi_roadmap.pdf (accessed on 18.01.2025).

service the public sector offers. Use cases apply to healthcare, education, public administration, environmental protection, urban management, smart cities, social services, defence, agriculture, logistics, finance, public safety and judicial services. This technology is expected to reduce bureaucracy, enhance efficiencies, and make governmental departments and agencies more intelligent in performing their duties.[38]

Economic Transformation

Several nations recognise the opportunities linked to economic transformation, wishing to leverage AI to drive industrial innovations. For instance, South Africa's ICT Roadmap describes how the public service can apply smart technologies to boost its economic competitiveness and improve socio-economic outcomes.[39] China's development plan discusses how the country plans to assume global leadership in AI by 2030. China also recognises AI's central role in driving future economic growth.[40] Brazil, China, Italy, Iran, South Africa, and the United Arab Emirates (UAE) also describe opportunities linked to public-private partnerships that can promote long-term sustainable innovations. This platform enables further research and development and educational reforms, which the countries believe are crucial to providing their businesses with a competitive advantage.[41] Interestingly, the US strategy details developing public datasets and open-source AI tools to democratise access to AI.[42] In sum, most nations recognise the transformative potential of AI. Differences emerge in how these nations approach AI development and governance.

Inclusive AI Deployment

Like India's support of open-source development, Brazil's AI Strategy highlights the opportunities emerging from open-source AI development and describes this as a path to enhancing innovation and promoting inclusive AI usage.[43] Nations with

[38] Alliance for Artificial Intelligence. Russian National Strategy for the Development of Artificial Intelligence for the Period Up to 2030. 2024. URL: https://a-ai.ru/wp-content/uploads/2024/03/Национальная_стратегия_развития_ИИ_2024.pdf (accessed on 18.01.2025); Brazil Ministry of Science Technology and Innovations. Summary of the Brazilian Artificial Intelligence Strategy. 2021. URL: https://www.gov.br/mcti/pt-br/acompanhe-o-mcti/transformacaodigital/arquivosinteligenciaartificial/ebia-summary_brazilian_4–979_2021.pdf (accessed on 18.01.2025); Centre for AI Innovation and Development. Draft Roadmap for National AI Development. 2022. URL: https://ai-center.ir/portal/file/?237143/پيشنويس-نقشه-راه-توسعه-ملي-هوش-مصنوعي.pdf (accessed on 18.01.2025); China's State Council. A Next Generation Artificial Intelligence Development Plan. 2017. URL: https://d1y8sb8igg2f8e.cloudfront.net/documents/translation-fulltext-8.1.17.pdf_(accessed on 18.01.2025); Ethiopian Government. A National AI Policy Ethiopia. Draft for the International Ayurvedic Medical Journal. 2020;8(12). URL: https://www.iamj.in/posts/2020/ (accessed on 18.01.2025); National Council for Artificial Intelligence. Egypt National Artificial Intelligence Strategy. 2021. URL: https://www.middleeastainews.com/api/v1/file/0d1d6708–245c-45f3–87d1–308196831563.pdf (accessed on 18.01.2025); NITI Aayog. National Strategy for Artificial Intelligence #AIFORALL. 2018. URL: https://www.niti.gov.in/sites/default/files/2023–03/National-Strategy-for-Artificial-Intelligence.pdf (accessed on 18.01.2025); Saudi Data & AI Authority. National Strategy for Data and AI. Realising our Best Tomorrow. Strategy Narrative. 2020. URL: https://ai.sa/Brochure_NSDAI_Summit version_EN.pdf (accessed on 18.01.2025); South African Department of Science and Technology. ICT RDI Roadmap. 2012. URL: https://www.dsti.gov.za/images/ict_rdi_roadmap.pdf (accessed on 18.01.2025); U.A.E Ministry for Artificial Intelligence. UAE National Strategy for Artificial Intelligence 2031. 2018. URL: https://ai.gov.ae/wp-content/uploads/2021/07/UAE-National--Strategy-for-Artificial-Intelligence-2031.pdf (accessed on 18.01.2025).

[39] South African Department of Science and Technology. ICT RDI Roadmap. 2012. URL: https://www.dsti.gov.za/images/ict_rdi_roadmap.pdf (accessed on 18.01.2025).

[40] DigiChina. Full Translation: China's 'New Generation Artificial Intelligence Development Plan'. 2017. URL: https://digichina.stanford.edu/work/full-translation-chinas-new-generation-artificial-intelligence-development-plan-2017/_(accessed on 18.01.2025).

[41] Brazil Ministry of Science Technology and Innovations. Summary of the Brazilian Artificial Intelligence Strategy. 2021. URL: https://www.gov.br/mcti/pt-br/acompanhe-o-mcti/transformacaodigital/arquivosinteligenciaartificial/ebia-summary_brazilian_4–979_2021.pdf; Centre for AI Innovation and Development. Draft Roadmap for National AI Development. 2022. URL: https://ai-center.ir/portal/file/?237143/پيشنويس-نقشه-راه-توسعه-ملي-هوش-مصنوعي.pdf (accessed on 18.01.2025); DigiChina. Full Translation: China's 'New Generation Artificial Intelligence Development Plan'. 2017. URL: https://digichina.stanford.edu/work/full-translation-chinas-new-generation-artificial-intelligence-development-plan-2017/ (accessed on 18.01.2025); Ministero dell Sviluppo Economico. Strategia Nazionale per I'Intelligenza Artificiale. 2020. URL: https://www.mimit.gov.it/images/stories/documenti/Strategia_Nazionale_AI_2020.pdf (accessed on 18.01.2025); South African Department of Science and Technology. ICT RDI Roadmap. 2012. URL: https://www.dsti.gov.za/images/ict_rdi_roadmap.pdf (accessed on 18.01.2025); U.A.E Ministry for Artificial Intelligence. UAE National Strategy for Artificial Intelligence 2031. 2018. URL: https://ai.gov.ae/wp-content/uploads/2021/07/UAE-National-Strategy-for-Artificial--Intelligence-2031.pdf (accessed on 18.01.2025).

[42] Select Committee on AI. National Artificial Intelligence Research and Development Strategic Plan 2023 Update. 2023. URL: https://www.nitrd.gov/pubs/National-Artificial--Intelligence-Research-and-Development-Strategic-Plan-2023-Update.pdf (accessed on 18.01.2025).

[43] Brazil Ministry of Science Technology and Innovations. Summary of the Brazilian Artificial Intelligence Strategy. 2021. URL: https://www.gov.br/mcti/pt-br/acompanhe-o-mcti/transformacaodigital/arquivosinteligenciaartificial/ebia-summary_brazilian_4–979_2021.pdf (accessed on 18.01.2025); Reserve Bank of India. BRICS Digital Financial Inclusion Report. 2021. URL: https://brics2021.gov.in/brics/public/uploads/docpdf/getdocu-53.pdf (accessed on 18.01.2025).

different political ideologies, such as Canada and Iran, advocate for developing AI resources ethically and inclusively. Thus, AI tools must embrace principles that promote public trust, transparency, legitimacy and inclusion. An inclusive AI system ensures the tools are available to a wide range of users, including disabled and underrepresented communities. Further, the tools must reflect the experiences of diverse groups and should be developed by integrating their views during design, development and deployment.[44] Similarly, in Europe, recent legislation was introduced in 2024 to ensure that AI systems accessed by the public must be developed according to democratic principles and the rule of law.[45] Thus, in principle, despite ideological differences, countries agree on the need for an inclusive AI agenda.

International Collaboration in Setting Standards

As AI models are developed, China and the European Union have declared that systems operating in their countries will abide by global AI standards. Both regions have advocated for introducing global AI governance practices and greater international collaboration to achieve relevant standards across countries.[46] Brazil's AI strategy calls for international collaboration to promote fair and transparent standards that align with democratic values.[47] In this vein, Egypt also highlights the value of regional cooperation between Africa and the Arab world to leverage AI for the benefit of its citizens.[48] Similarly, the United Kingdom sees international collaboration as essential for establishing global standards and ensuring that AI systems are built safely and ethically, while the United States notes that international collaboration can help their AI sector maintain global competitiveness.[49] The European Union has called for establishing international AI regulatory sandboxes that allow developers a safe space to test new models, which competent authorities can assess.[50] Thus, there is broad support for international collaboration when establishing standards that govern AI systems.

Public Sector AI Financial Infrastructure Development

Public AI financial infrastructure is often indirectly referred to by BRICS nations, with many working closely with proprietary AI service providers. However, upon closer review of their national AI strategies, we see that commitments have been made to invest in public infrastructure in the form of data centres and computing infrastructure. For instance, China proposed that the state develop government-managed data centres to promote AI research and access to AI applications across sectors.[51] Similarly, Brazil discusses their plans to promote research through public data centres and by sharing AI software development platforms, while Ethiopia discusses the need for digital infrastructure to promote collaboration specifically between academia and industry.[52] The European

[44] Canadian Department of National Defence. Artificial Intelligence Strategy. 2024. URL: https://www.canada.ca/content/dam/dnd-mdn/documents/reports/ai-ia/dndcaf-ai-strategy.pdf (accessed on 18.01.2025); Centre for AI Innovation and Development. Draft Roadmap for National AI Development. 2022. URL: https://ai-center.ir/portal/file/?237143/سي‌ون‌ش‌ي‌پ-ي‌ع‌ون‌ص‌م‌-ش‌و‌ه‌-ي‌ل‌م‌-ه‌ع‌س‌و‌ت‌-ه‌ا‌ر‌-ه‌ش‌ق‌ن.pdf (accessed on 18.01.2025).

[45] Foo, C. EU AI Act Published in the Official Journal of the European Union; Clock Starts for Compliance. Ropes and Gray. 2024. URL: https://www.ropesgray.com/en/insights/viewpoints/102jd2c/eu-ai-act-published-in-the-official-journal-of-the-european-union-clock-starts-f (accessed on 18.01.2025).

[46] DigiChina. Full Translation: China's 'New Generation Artificial Intelligence Development Plan'. 2017. URL: https://digichina.stanford.edu/work/full-translation-chinas-new-generation-artificial-intelligence-development-plan-2017/ (accessed on 18.01.2025); European Commission. Communication from the Commission to the European Parliament, the European Council, the Council, the European Economic and Social Committee and the Committee of the Regions. 2018. URL: https://eur-lex.europa.eu/legal-content/EN/ALL/?uri=CELEX%3A52012DC0673 (accessed on 18.01.2025).

[47] Brazil Ministry of Science Technology and Innovations. Summary of the Brazilian Artificial Intelligence Strategy. 2021. URL: https://www.gov.br/mcti/pt-br/acompanhe-o-mcti/transformacaodigital/arquivosinteligenciaartificial/ebia-summary_brazilian_4–979_2021.pdf (accessed on 18.01.2025).

[48] National Council for Artificial Intelligence. Egypt National Artificial Intelligence Strategy. 2021. URL: https://www.middleeastainews.com/api/v1/file/0d1d6708–245c-45f3–87d1–308196831563.pdf (accessed on 18.01.2025).

[49] Select Committee on AI. National Artificial Intelligence Research and Development Strategic Plan 2023 Update. 2023. URL: https://www.nitrd.gov/pubs/National-Artificial--Intelligence-Research-and-Development-Strategic--Plan-2023-Update.pdf (accessed on 18.01.2025); UK Secretary of State for Digital Culture Media and Sport. National AI Strategy. 2021. URL: https://assets.publishing.service.gov.uk/media/614db4d1e90e077a2cbdf3c4/National_AI_Strategy_-_PDF_version.pdf (accessed on 18.01.2025).

[50] European Commission. Communication from the Commission to the European Parliament, the European Council, the Council, the European Economic and Social Committee and the Committee of the Regions. 2018. URL: https://eur-lex.europa.eu/legal-content/EN/ALL/?uri=CELEX%3A52012DC0673 (accessed on 18.01.2025).

[51] DigiChina. Full Translation: China's 'New Generation Artificial Intelligence Development Plan'. 2017. URL: https://digichina.stanford.edu/work/full-translation-chinas-new-generation-artificial-intelligence-development-plan-2017/ (accessed on 18.01.2025).

[52] Brazil Ministry of Science Technology and Innovations. Summary of the Brazilian Artificial Intelligence Strategy. 2021. URL: https://www.gov.br/mcti/pt-br/acompanhe-o-

Union discussed establishing public data centres to house and leverage their stores of public sector data. These systems must be available at national and regional levels, requiring developers to recognise the distributed nature of Europe's data collection.[53] Russia's interest in public AI infrastructure relates to producing public sector applications that promote the country's technological and data sovereignty.[54] Thus, AI financial strategies from BRICS and Europe have expressed some support for public AI development to leverage their data or promote innovation in their countries.

Interest in Open-Source AI Development

Given that open-source AI models offer an alternate development path, it is important to understand how the BRICS nations view this approach to software development. Firstly, Brazil's strategy encourages open data and data-sharing to promote collaboration.[55] The UAE describes the value of open-access AI libraries to boost research and collaboration, while Iran calls for open-source AI development to stimulate innovation and promote equitable beneficiation from AI across society.[56] Similarly, China's plan advocates for using open-source models as a means to promote innovation across academia and industry. China also highlights the need for security evaluation models to manage any risks resulting from such models.[57] Lastly, from the BRICS, India describes open-source development as a path to democratising access to AI technology, which fosters an innovative ecosystem and promotes participation in the digital economy across different sectors of the population.[58]

Outside BRICS countries, the United States' position is to make open-source AI models available to researchers, developers and public sector organisations. It similarly supports sharing AI software libraries and toolkits but recognises potential security threats related to the trustworthiness of the AI system's output.[59] Canada's national AI strategy describes the value of open data and source tools to promote innovation and develop an inclusive AI development ecosystem. Its strategy also notes that open-source AI models must adhere to strict ethical and technical standards to prevent unintended harm.[60] The European Union has also appreciated open-source development in building transparent AI systems that promote trust in such tools. The Organisation for Economic Cooperation and Development (OECD) also notes the value of open-source in democratising access to technology to drive innovation, but it also stresses that such systems should be managed to guard against potential misuse.[61]

As nations approach open-source development, it is critical that standards are applied to ensure that the AI model can unlock the value of its data in a safe, consented, private, and secure manner. This approach must enable third parties to test, verify, and validate these models. In learning from India's approach

mcti/transformacaodigital/arquivosinteligenciaartificial/ebia-summary_brazilian_4–979_2021.pdf (accessed on 18.01.2025); Ethiopian Government. A National AI Policy Ethiopia. Draft for the International Ayurvedic Medical Journal. 2020;8(12). URL: https://www.iamj.in/posts/2020/ (accessed on 18.01.2025).

[53] European Commission. Communication from the Commission to the European Parliament, the European Council, the Council, the European Economic and Social Committee and the Committee of the Regions. 2018. URL: https://eur-lex.europa.eu/legal-content/EN/ALL/?uri=CELEX%3A52012DC0673 (accessed on 18.01.2025); European Parliament. Artificial Intelligence Act P9_TA(2023)0236 2023;0106;2023. URL: https://www.europarl.europa.eu/doceo/document/TA-9–2023–0236_EN.pdf (accessed on 18.01.2025).

[54] Alliance for Artificial Intelligence. Russian National Strategy for the Development of Artificial Intelligence for the Period Up to 2030. 2024. URL: https://a-ai.ru/wp-content/uploads/2024/03/Национальная_стратегия_развития_ИИ_2024.pdf (accessed on 18.01.2025).

[55] Brazil Ministry of Science Technology and Innovations. Summary of the Brazilian Artificial Intelligence Strategy. 2021. URL: https://www.gov.br/mcti/pt-br/acompanhe-o-mcti/transformacaodigital/arquivosinteligenciaartificial/ebia-summary_brazilian_4–979_2021.pdf (accessed on 18.01.2025).

[56] Centre for AI Innovation and Development. Draft Roadmap for National AI Development. 2022. URL: https://ai-center.ir/portal/file/?237143/يعونصم-شوه-يلم-هعسوت-هار-مشقن-سيونشيپ.pdf (accessed on 18.01.2025); U.A.E Ministry for Artificial Intelligence. UAE National Strategy for Artificial Intelligence 2031. 2018. URL: https://ai.gov.ae/wp-content/uploads/2021/07/UAE-National-Strategy-for-Artificial-Intelligence-2031.pdf (accessed on 18.01.2025).

[57] China's State Council. A Next Generation Artificial Intelligence Development Plan. 2017. URL: https://d1y8sb8igg2f8e.cloudfront.net/documents/translation-fulltext-8.1.17.pdf (accessed on 18.01.2025).

[58] NITI Aayog. National Strategy for Artificial Intelligence #AIFORALL. 2018. URL: https://www.niti.gov.in/sites/default/files/2023–03/National-Strategy-for-Artificial-Intelligence.pdf (accessed on 18.01.2025).

[59] Select Committee on AI. National Artificial Intelligence Research and Development Strategic Plan 2023 Update. 2023. URL: https://www.nitrd.gov/pubs/National-Artificial--Intelligence-Research-and-Development-Strategic--Plan-2023-Update.pdf (accessed on 18.01.2025).

[60] Canadian Department of National Defence. Artificial Intelligence Strategy. 2024. URL: https://www.canada.ca/content/dam/dnd-mdn/documents/reports/ai-ia/dndcaf-ai-strategy.pdf (accessed on 18.01.2025).

[61] European Commission. AI Watch National strategies on Artificial Intelligence. A European perspective. 2021. URL: https://doi.org/10.2760/069178 (accessed on 18.01.2025).

to open-source development, these are important elements to its approach.[62]

Implications for a Shared AI Financial Platform

Reflecting on the aforementioned views, several BRICS countries recognise how AI can produce a more innovative economy, which could drive economic growth. Hence, there is a need to invest in the relevant infrastructure to provide this foundation for growth. These nations must also promote cooperation to establish an agreed set of norms and standards that will define how the financial technology platform will be governed. Concerning data governance, there is a need for data-sharing agreements to facilitate data sharing across borders and to develop protocols that define the rules for data interoperability and standardisation. BRICS nations will need to coordinate their efforts in pooling resources, expertise, and data to collaborate on research needed to manage a shared AI platform. In addition, their strategies indicate an interest in open-source AI technologies, which could allow the nations to develop an independent technology platform collectively owned by the participating nations. However, these models need to be leveraged in a controlled manner to limit risks related to potential misuse.

A DISTRIBUTED INTERNATIONAL PUBLIC AI ARCHITECTURE

Given the BRICS's interest in a public AI alternative and open-source software development, describing a potential public AI architecture is valuable for these nations. In this light, this section explores the literature on public and decentralised AI systems to understand the implications of a distributed AI architecture.

Decentralised or Federated AI Deployment

Since 2022, an increasing body of knowledge has focused on developing a decentralised AI architecture. Federated learning models offer various benefits for scalability, flexibility, and efficiency. A federated learning model is best suited to draw from data inputs received from devices on the edge of a network. These devices could hold private data repositories or be equipped with data sensors. These models are scalable and can expand depending on the number of devices and local servers that need to connect to the AI model [12–14]. From an efficiency perspective, a decentralised model minimises the need for extensive central storage facilities, reducing the costs associated with data storage and management, making this architecture more economically viable [15, 16]. Distributing the computational load across multiple edge devices reduces processing time, providing performance benefits. There are also energy efficiency benefits associated with this architecture. Through distributed computation, energy consumption is spread geographically and doesn't place energy demand on a centralised energy supply. This distribution offers energy savings and a lower environmental impact. Investing in renewable energy to power these data centres and green AI technologies, such as energy-efficient processors and cooling systems, are also beneficial. These technologies can reduce the carbon footprint of data centres.[63] The system's distributed nature also requires a coordinated and dynamic resource allocation management system. This system can dynamically share workloads between central servers and computational nodes, allowing the system to ensure optimal performance and scalability[11].

Data Sovereignty Through Decentralised AI

A distributed AI architecture allows data to remain within the jurisdiction of its origin, addressing data sovereignty concerns. This allows each nation to retain control over its data and ensures that sensitive data is stored on the local edge device. As nations contribute to a shared AI architecture, they can decide on infrastructure choices and how data is shared with the international system. This is consistent with views held by Turkiye and the European Commission on data sovereignty. The European Commission refers to the work of the GAIA-X Project initiated by Germany and France, which is studying the federated data model design [15].[64]

[62] Indian Computer Emergency Response Team (CERT-In) Ministry of Electronics and Information Technology. Guidelines for Secure Application Design, Development, Implementation & Operations. 2023. URL: https://www.csk.gov.in/documents/Application_Security_Guidelines.pdf (accessed on 18.01.2025).

[63] Chan K., West D., Teo M., Brown H., Westgarth T.O.M., Smith T. Greening AI: A Policy Agenda for the Artificial Intelligence and Energy Revolutions. 2024. URL: https://eprints.lse.ac.uk/123705/1/Chan_greening-ai—published.pdf (accessed on 18.01.2025).

[64] European Commission. AI Watch National strategies on Artificial Intelligence. A European perspective. 2021. URL: https://doi.org/10.2760/069178 (accessed on 18.01.2025); Republic of Turkiye Ministry of Industry and Technology. National Artificial Intelligence Strategy 2021–2025. 2021. URL: https://cbddo.gov.tr/SharedFolderServer/Genel/File/TRNationalAIStrategy2021-2025.pdf (accessed on 18.01.2025).

The distributed architecture also allows nations to maintain control over data privacy and security, potentially providing them with more confidence about the exposure of their sensitive data [16]. Blockchain technologies are also well suited to providing countries with greater security in managing a distributed data architecture. Through the blockchain's immutable ledger, one can track edits to the database, providing transparency for all participants [17]. In addition, the distributed model is more accommodating of local regulations and allows countries the control to adhere to national privacy laws, which is crucial in a cross-border data-sharing system [18].

A step towards establishing this distributed data architecture will require addressing the security, privacy and confidentiality of AI models, paying attention to their underlying data, training, and inference procedures. In this regard, the Osaka G20 declaration included positions on cross-border data flows supported by data free flow with trust (DFFT),[65] which could lay the foundation for the design and governance of this architecture. Furthermore, India provides guidance in implementing these principles through the proposed Data Empowerment and Protection Architecture, which can be adapted by the BRICS nations.[66]

Distributed Knowledge Sharing

The distributed model supports collaboration between organisations and nations. In such a model, organisations can contribute to the machine learning model without sharing raw data. The federated learning approach offers a shift in how AI models are trained and offers greater control of sensitive data. In the traditional AI model, data is stored centrally, and the AI model is trained on this central repository. In the federated model, model training is decentralised, which is ideal for a decentralised international model dependent on data-sharing. In this decentralised model, each nation would train an AI model independently at their local node in the international network. The model's weights are shared with a centralised AI model; therefore, instead of sharing raw data, each nation shares updates about their respective model weights with the central server [19, 20].

This form of data sharing enables an indirect knowledge transfer where one can gain insights about the patterns, trends and concepts discussed in a data artifact without accessing its raw data. This approach maintains privacy while still enabling knowledge sharing. Thus, the model provides an ideal method to balance privacy and knowledge exchange, which can help promote cross-border innovations [19, 20]. This disaggregation of data sharing can be conducted at both the organisational and national levels, allowing the data producers to control their data locally [21]. The relevant model weights can then be processed and aggregated at the national level, which is thereafter shared with the international model [16]. In essence, this model promotes knowledge sharing without data sharing, allowing one to share valuable insights without compromising data privacy.

Federated learning supports knowledge transfer by enabling collaborative model training across multiple organisations without sharing raw data. This approach preserves data privacy, addresses data sovereignty concerns, and leverages diverse datasets to create more robust and generalised models [22]. By facilitating iterative improvements and incorporating privacy-preserving techniques, this approach ensures that valuable insights are shared while maintaining the confidentiality of the underlying data.

CONCLUSION

AI is a highly transformative technology offering developmental opportunities for marginalised communities across developing and emerging countries. However, the costs of proprietary AI access are becoming exclusionary, negating these opportunities. AI development and advancements depend on three inputs: algorithmic ingenuity, computing power and input data. Private AI companies, largely Western, have invested heavily in these three inputs, offering commercial services at a fee. Given the trajectory of AI advancements, its reasoning capabilities are becoming increasingly impressive. The investment costs required for large language models allow the private sector to position itself as a central enabler of the future digital economy. Nations must ask if it is an acceptable risk for their economic growth to depend on these technology giants.

If this risk is too great for BRICS nations, these countries must explore alternative strategies

[65] G20 2019 Japan. G20 Osaka Leaders' Declaration. Mofa.Go.Jp. 2019. URL: https://www.mofa.go.jp/policy/economy/g20_summit/osaka19/en/documents/final_g20_osaka_leaders_declaration.html (accessed on 18.01.2025).

[66] NITI Aayog. Data Empowerment And Protection Architecture--Draft for Discussion. A Secure Consent-Based Data Sharing Framework to Accelerate Financial Inclusion. 2020. URL: https://www.niti.gov.in/sites/default/files/2023-03/Data--Empowerment-and-Protection-Architecture-A-Secure--Consent-Based.pdf (accessed on 18.01.2025).

to make the advantages of AI available to all. To promote equity, the BRICS nations have an opportunity to make similar investments and launch a public offering benefiting all citizens. An enabling platform providing transformative AI financial services can be the public good shared by the BRICS. Such offerings can complement the private sector's offering and must coalesce the three inputs for AI: algorithms, computing power and sovereign data.

To develop the necessary algorithms, the BRICS can organise around the open-source software development community. The lessons from India's Code for GovTech (C4GT) demonstrate the potential of mobilising a large talent pool to run complex models and projects, ensuring continuous innovation and sustainability. These models must follow inclusive principles and incorporate multiple languages and cultural dimensions. The novel federated learning model exhibits how a distributed machine-learning model can advance knowledge-sharing without explicit data-sharing. Adapting these advances into available open-source architecture will be crucial for the BRICS.

To add computing strength, the BRICS, through public-private partnerships, can invest in and launch distributed AI-focused data and computing centres outfitted with the necessary hardware to support mass access to a public AI platform. This infrastructure can be creatively powered by green energy, keeping with the BRICS's environmental and climate goals. Through a decentralised model, there are benefits in distributed computing, leveraging the computational power of data centres located at the edge of a shared network. This method also shares the energy consumption requirements for a large AI model.

For the model's input data, the BRICS must adopt data-sharing principles to develop custom models informed by national datasets; this will ensure the models overcome inherent biases and help to manage financial risks. The model must respect national data privacy laws, promoting the training of AI across multiple data sets without necessarily moving the data across borders. To this end, the model can follow the advances of the federated learning model, allowing nations to control their data sovereignty. By sharing AI model weights across borders instead of data artifacts, countries retain control of their data and promote sharing insights and knowledge gained from the aggregate data collection across the network.

To make AI further accessible to marginalised communities, it is proposed that an AI Stack, an evolved concept based on the India Stack, be developed. This AI Stack can offer a series of public digital financial services built upon the shared AI platform. The AI Stack can be a comprehensive set of AI services designed to give small business owners access to advanced business functions to enhance their competitiveness.

Beyond the technical infrastructure, the BRICS's AI efforts are sure to attract a dedicated group of professionals from across the BRICS countries, capable of coordinating the efforts of the open-source software development community. This will require a pooling of resources, knowledge, and expertise from all member countries, alongside strategic partnerships with technology firms, financial and academic institutions, and non-governmental organisations.

Creating this will require the energies of the BRICS countries, all developing countries with technical and financial talent and populations with need. If it is successful, a pilot between India, Brazil, South Africa and other countries can be attempted and rolled out to takers in the expanded BRICS. If it succeeds, it will result in a truly collaborative BRICS. The developed proposal is unique. Other initiatives have not yet received adequate justification.

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N. Gopal — contributed to the initial conceptual framing. She supported the analysis by reviewing international AI strategies and evaluating economic inclusion priorities, enhancing the paper's socio-economic focus. She also supported language editing and structured key concepts for clarity and coherence.
J. Josie — contributed to the initial conceptual framing, ensuring the balance between technical considerations and socio-economic inclusion. Acting as the lead editor of the paper, Josie harmonized technical and inclusion-focused aspects across the manuscript.
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I. Yarygina — contributed to the initial conceptual framing of the research, and also to language editing, ensuring the paper's alignment with BRICS-specific priorities.
M. Yudina — conducted a literature review of international AI strategies and technical details. She also supported language editing, ensuring technical accuracy, readability throughout the manuscript as well as it's compliance with the journal's guidelines for authors.

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Криш Четти — концептуализировал структуру первоначального варианта текста, обеспечив соответствие ключевым приоритетам развития развивающихся и формирующихся стран и адаптировав акцент к контексту БРИКС. Он был автором первоначального проекта и объединил все усилия команды в окончательной версии, обеспечивая руководство на протяжении всего процесса написания.
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