POLICY BRIEF 2: DATA CENTRES: HOW DIGITALISATION AND GREEN INVESTMENTS COME TOGETHER[1]

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There is a clear message amongst South African policymakers about the need to build a more resilient and sustainable economy in light of the impacts of COVID-19.[4] The details on South Africa's plans to build such an economy are still emerging. Globally, it is commonly understood that climate change and environmental sustainability are important aspects of building resilience and sustainability. As such, it is important that South Africa's post-COVID-19 economy is greener. At the same time, the fourth industrial revolution (4IR) and increased digitalisation of economic activity mean that 4IR and green economy strategies may need to be combined or design so that they are mutually reinforcing.

This brief proposes practical steps that can be taken in this regard, using the example of data centres and builds on a series of panel discussions hosted by the Industrial Development Think Tank (IDTT) that brought together policymakers as well as local and international experts on digital platforms and economic development. Data centres are increasingly becoming critical infrastructure for the digital economy; however, they consume large amounts of electricity and with South Africa's power largely generated from coal, this means that they can have a high carbon footprint. This brief considers how South Africa could become the hub for data centres in Southern Africa while simultaneously ensuring that the transition is greener and more environmentally sustainable going forward.

Opportunities presented by trends in data storage and changing customer needs

South Africa is in the fortunate position of being an attractive location for investment in data centres not just for the country but for the region. South Africa's data centre market, both in terms of service supply and construction demand, is thriving[5] compared to the rest of Africa

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[1] This policy brief draws from Rashmi Banga's note "Benefits/Incentives provided by countries to encourage data centers and clouds" as part of the Expert Panel on Regulating Digital Platforms for Economic Development hosted by Industrial Development Think Tank.

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[3] The Industrial Development Think Tank (IDTT) is supported by the Department of Trade, Industry and Competition (the dtic) and is housed at CCRED in partnership with the SARChI Chair in Industrial Development at the University of Johannesburg.

[4] 'Minister Ebrahim Patel: Trade, Industry and Competition Dept Budget Vote 2020/21'. Available: https://www.gov.za/speeches/minister-ebrahim-patel-trade-industry-and-competition%C2%A0dept-budget-vote-202021-24-jul-2020 [Accessed: 28 July 2020].

[5] Ayley, D. (2019). Global data centre growth continues. Turner & Townsend [Accessed: 9 July 2020]

with the gap set to widen[6] in the next two years. The entry of South Africa's major telecommunications operators into this market has provided necessary competition in the sector[7] and the increased investments by local and international firms such as Microsoft in data centre infrastructure is proving the potential of South Africa as a data centre hub.

Emerging trends in data storage and changing needs of customers due to the COVID-19 pandemic will only drive the growth of data centres in Africa. The growing requirement for real-time processing of data that is commensurate with new technologies such as edge computing means that data centres need to locate closer to customers. The introduction of data localisation as part of wider data governance policies requires data centres within their borders or regions.

The COVID-19 pandemic has accelerated the trend towards digitalisation as people and firms maintain social distancing through working from home, increasing online commerce[8] and increasing adoption of technologies associated with the 4IR. A major data infrastructure player connecting South Africa to the world, SEACOM, has reported a 15% increase in data traffic across its network between March 2020 and April 2020.[9] Similarly, Vodacom also noted a 40% rise in the demand for data between March 2020 and April 2020.[10] These increases are over and above projections made prior to COVID-19 that mobile data traffic in South Africa would increase tenfold between 2016 and 2021.[11]

The services that are seeing increased demand are better provided through cloud computing rather than individual firm servers and large-scale data centres are the backbone infrastructure for this. Given customer concerns about data security and efficiencies from the close locating of data centres, cloud computing service providers are also looking to spread the footprint of their data centres.

The construction of data centres can also bring about positive economic impacts in the South African economy. These include increased investments leading to boosts in productivity, competitiveness, and employment creation. For example, it is estimated that Microsoft's cloud services will create approximately 112 000 jobs in South Africa by 2022 with approximately 50 000 of these coming directly from Microsoft's ecosystem.[12] Though most of these jobs are created in the construction phase, the high levels of unemployment in South Africa mean that even temporary employment is important to retain while longer term policy solutions are being implemented.

Furthermore, creating the environment for a pipeline and ecosystem of data infrastructure investments to develop in South Africa means that many of these jobs could be recreated over an extended period, on aggregate. More importantly, these investments create opportunities to build other skills related to the running and management of data centres. In order to see the

[6] Xalam Analytics (2018). The Absolutely, Positively Burning Hot South African Data Center Market. [Accessed: 14 July 2020]

[7] Frost & Sullivan (2011). Data Centre Market in South Africa. [Accessed: 10 July 2020]

[8] Das Nair, R. and Krishnan, A. (2020). Combating Covid-19: The promise of foodtech in SA.

[9] Vermeulen, J. (2020). How much Internet traffic in South Africa has increased due to the coronavirus. MyBroadband. [Accessed: 16 July 2020]

[10] Mchunu, S. (2020). Vodacom sees 40% data traffic growth with surge in demand. IOL. [Accessed: 16 July 2020]

[11] CISCO (2016). South Africa 2021 Forecast Highlights.

[12] Gilbert, P. (2020). Cloud to generate 112 000 new SA jobs by 2022. [Accessed: 16 July 2020]

skills gap close, South Africa should place conditionalities relating to high skills transfers as part of the criteria for these investments.

How does South Africa ensure that the data centres are green?

A key question that needs to be addressed is how South Africa can ensure that investments in data-related infrastructure are aligned with the goal of building a resilient and sustainable economy?

Over recent years, data centres have become more energy efficient in large part due to improvements in power efficiency and shifts towards cloud computing. Additionally, there has been a shift towards data centres using renewable energy (going green) in recent years as international regulators become increasingly strict on carbon emissions. Thus, reliable and clean energy are key selling points for the major data centre players.[13] In South Africa, there is a general increase in the uptake of green technologies in response to the rapidly rising costs of electricity. This also has benefits for a data centre's operational efficiency.[14]

Given the persistent challenges with electricity supply from Eskom, it makes sense that South Africa takes advantage of the opportunity to go green from the onset with the various data centre investment projects. This approach could be entrenched in a proactive framework at this stage of the development of the sector. This should include allowing data centres to self-generate and/or to purchase renewable energy directly from independent power producers. A similar allowance has been made for the South African mining industry[15], which is a significant contributor to the economy as well as being a large consumer of electricity. It is important that in the selection of industries that can generate or purchase power directly, South Africa does not only focus on legacy industries that are in decline but also those that are important for the future economy. Adopting this strategy as part of a call for investment will reduce the pressure on the country's already-fragile energy infrastructure and begin a transition towards a greener data centre industry.

A supportive policy and regulatory environment

South Africa is seeing increasing investments in data centres including by multinational firms due to the country's well-established data infrastructure and networks, as well as proximity to the Southern African markets. However, it is important to be aware of factors that could undermine this attractiveness and growth as a data centre hub for the region. First, there are clear challenges with access to stable electricity at competitive prices. Second, an overly restrictive policy approach to data localisation requirements could lead to 'retaliatory' policies and protections by neighbouring countries including disallowing the storage of their data in South Africa, which would undermine South Africa as a regional data centre hub. Third, there is significant risk if there is insufficient protections for foreign data located in South Africa, particularly non-personal data, which is not covered by POPIA.[16] This is important in light of

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[13] Bullard, N. (2017). Microsoft Wants Clean Energy for South African Data Centers. Bloomberg View. [Accessed: 15 July 2020]

[14] Tech Smart (2014). Greening the South African Data Centre. [Accessed: 16 July 2020]

[15] The BRICS Post (2020). South African Energy Minister allows mines to self-generate electricity. [Accessed: 16 July 2020]

[16] Nyamwena, J. and Mondliwa, P. (2020). Data governance matters: Lessons for South Africa. CCRED, IDTT Policy Brief 2.

recent reports on data security flaws, globally, which have exposed sensitive documents[17] and personal information[18]. Fourth, South Africa's attractiveness as a destination for investments can be undermined by disruptions in the availability and cost-competitiveness of complementary infrastructure and services such as the cost and reliability data.

The shift to a greener economy can be achieved by supporting greener investments in technology markets, and employing targeted sector-specific strategies to stimulate investments. Policy alignment will be necessary to ensure a successful transition. The support for the development of South Africa as a regional data centre that is green, calls for actions by the Department of Communications and Digital Technologies (DCDT), the Independent Communications Authority of South Africa (ICASA), the Competition Commission of South Africa (CCSA), and the Department of Mineral Resources and Energy (DMRE).

First, the DMRE could grant permissions for data centre investors to self-generate renewable power or purchase from independent power producers, as is the case in the mining industry. Power Purchase Agreements between data centres and independent producers would also provide a long-term buying commitment, which can facilitate the financing of plants and promote investment in renewables and the transition towards green energy. This also takes away the risk of Eskom being the only customer.

Second, DCDT should ensure that when a data governance framework is developed it provides sufficient protection to personal and non-personal data including foreign data stored in South Africa. The data governance framework should also provide a workable solution for the flow of data within the region.[19]

Third, ICASA should ensure that the planned auction for spectrum results in competitive outcomes in the market to incentivise the necessary investment in infrastructure and more affordable data. Building on this, the CCSA should ensure that the mobile operators implement and monitor the settlement agreements reached with the mobile operators to reduce data prices following the data market inquiry. This will assist in realising further reductions in data costs and related services, which will make South Africa more attractive as an investment destination for data centres and innovation in the digital economy.

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[17] Financial Times (2020). Data security flaw exposes details of thousands of legal documents. [Accessed: 8 July 2020]

[18] The Guardian (2020). Home affairs data breach may have exposed personal details of 700,000 migrants. [Accessed: 8 July 2020]

[19] See Nyamwena and Mondliwa (2020).