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Financing Regional Digital Infrastructures in the South: Development Banks, Funds and Other Policy Options

Abstract

Regional digital infrastructures can help developing countries become more regionally integrated, diversified, sustainable and inclusive. The key question this paper addresses is how national governments of a regional grouping can act collectively to finance regional digital infrastructures. The paper suggests that sub-regional development banks in particular could provide long-term finance and play a coordination role where needed. However, their financing capacity is limited, when contrasted with the scale of needs. A way forward is to inject more capital into these banks and create funds for regional digital infrastructure. An articulation between development banks and such funds could thus form what might be termed a financial model for regional digital development, something similar to what the European Union has already in place for the development of a European digital economy.

Key words: south-south cooperation, development banks, digital infrastructures, regional integration



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1. Introduction

The promotion of regional digital infrastructures through south-south cooperation has been recently proposed by UNCTAD in a ten-point South-South digital cooperation agenda (UNCTAD, 2018a and b). Of the agenda's ten points, the first four relate to the buildup of a data economy, cloud computing, broadband and e-commerce at the regional level.¹ These digital agenda items and their underlying infrastructures are essential building blocks to help southern economies to become more regionally integrated, diversified, sustainable and inclusive.² This agenda is also important to help overcome technical and other constraints faced especially by small developing economies.

Regional infrastructures create synergies and interconnectivity, which are regional public goods underprovided by private investors. The key question this paper addresses is how national governments belonging to a regional grouping can act collectively to overcome the hurdles to finance regional digital infrastructures. These hurdles are linked to budgetary constraints, lack of regional funds and limited lending capacity of regional development banks. The paper proposes as a way forward the creation of regional public digital funds, which development banks could draw upon to help finance regional digital infrastructure projects. An articulation between such funds and development banks could thus form what might be termed a financial model for regional digital development. This would be something similar to what the European Union has already in place for the development of a European digital economy.

This paper has 7 sections. Section 2 initially provides a brief summary of financing the various components of the digital economy. The purpose is to contrast the relatively uncomplicated access to finance by digital startups, established digital firms and firms incorporating digital technologies against the challenges in financing digital infrastructure. The section then discusses the specific challenges in financing publicly owned and regional digital infrastructures. Section 3 looks at what can be learned from the European experience, paying special attention to the various regional funds the European Union has created to support regional digital development. Section 4 discusses what role development banks are playing worldwide in this area. Section 5 focuses on challenges that sub-regional development banks in the South might face if they decide to support more actively regional digital infrastructures. Section 6 suggests possible new funding sources and mechanisms. Section 7 concludes.

¹ A regional data economy involves the pooling of data that may be stored in regional data centres (i.e., physical facilities), which can be then processed with the help of data analytics, enabling, *inter alia*, the development of artificial intelligence and digitized products; cloud computing provides remotely computer services such as data storage, networks, softwares and applications, reducing the need for applications on individual computers and in-house IT support; broadband is a wide bandwidth data transmission that can provide high-speed internet access; e-commerce, the exchange of goods and services online, connects different sides of a market drawing on digital platforms and different technologies such as online transaction processing, electronic funds transfer and data collection systems (UNCTAD, 2018b; UNCTAD, 2019:5).

² The other 6 proposed items by UNCTAD are: “promoting regional digital payments; progressing on single digital market in the region; sharing experiences with e-government; forging partnerships for building smart cities; promoting digital innovations and technologies; and building statistics for measuring digitization.” (UNCTAD 2018a: 92).

2. Financing the different components of a digital economy: A straightforward business?

Overall, the perceived wisdom is that the digital economy is a sector that can provide sizeable returns to investors, due to its technology- and market-driven dynamism relative to other sectors. However, the ease with which the sector can have access to finance may not apply in equal measure to all its segments.

Financing the digital economy typically involves different sources, institutions and mechanisms.³ Established digital firms often have access to different forms of finance, including traditional bank loans and private equity; such firms may also go public through initial public offering (IPO) in the stock markets. Non-digital businesses that incorporate digital technologies similarly have access to several financing sources.⁴

Unlike established firms, digital startups are too new and small to provide a track record; in addition, they lack collateral and operate using a higher risk model, factors that restrict their access to more traditional financing. To their advantage, digital startups require less capital for expansion, partly because the digital sector is based more on intangible assets (data, design, software, marketing) than tangibles assets (machines, buildings). In advanced economies, venture capital and the rapid development of digital finance have figured as main institutions and mechanisms providing finance for startups seeking patient capital (Staab, 2018). In the US alone, venture capital funds reached 99.5 billion in 2018. Of that total, \$36.7 billion was invested in internet business, and other \$14.8 billion in mobile & telecommunications (Richter, 2019; PwC, 2019).

2.1 Financing digital infrastructure

In contrast with established digital firms and digital startups, availability of finance for digital infrastructures is less straightforward. The latter have components whose buildup involves high capital costs, may need to operate at scale to be economically viable and involve relatively long gestation periods,⁵ even though projects that are smaller and have shorter execution periods may also be the case – see Box 1 on costs and sizes of projects. In addition, there are strong interdependencies within digital infrastructure (i.e., between data, platforms, software), and between digital infrastructure and other types of infrastructure such as the energy sector. These technical characteristics and strong interdependencies are factors that may taper the interest of private investors in digital infrastructure. Moreover, specific regulatory issues such as covering licensing conditions, taxation concerning devices and services and local standards, may further discourage such investors (UNCTAD, 2017:200-202).

³ In terms of sources, these can be of public (including tax based) or private nature; in terms of institutions, these can involve both banks, including development banks and other development finance institutions, and capital markets; and in terms of mechanisms, these may include innovative ones, for example those emerging from digital finance such as crowdfunding. On recent trends in digital finance and as a potential new source of finance for micro, small, and medium-sized enterprises across the developing world, see, *inter alia*, ADB (2016), Manyika et al. (2016) and Lund and Manyika (2019).

⁴ The categorization of the various components of the digital economy adopted here follows UNCTAD's World Investment Report, which in its 2017 edition divides the digital economy in three pillars: "digital infrastructure, digital firms (the digital sector) and digital adoption in the broader economy" (UNCTAD, 2017:193).

⁵ On this point see, for example, Zhao (2017), in discussing the financing of the internet industries in China.

It is true that, of all infrastructure types, private sector participation is the highest in the telecoms sector, and the digital parts of it, since adjusted returns still can be very attractive despite risks. In Asia, for example, private investment is predominant in telecommunications (ADB, 2017). But the interests of private investors in digital infrastructure are selective. They do not reach poorer or remote geographic areas, nor do they have much interest in smaller developing countries, or those judged as riskier. In reference to remote or rural areas, a report commissioned by the European Parliament on investment in broadband infrastructure notes that:

“Rural areas present a special challenge: lower population densities and hence higher per user costs often make the rollout of fixedline broadband to these areas unattractive on a commercial basis. Public funding needs to be considered in these areas in order to avoid a digital divide where parts of society remain disadvantaged.” (Davies, 2015: 14)

There is, therefore, a clear case for public investment in digital infrastructure. In addition, this paper shares **the view, articulated in UNCTAD’s work, that public ownership in the sector is essential** if the State has the ambition to have ownership and control over the large pools of data that the digital infrastructure captures and stores (UNCTAD, 2018a: 81). Thus, the case for a State role in this area is not just to address possible market failures, but to give it control over a resource of exceptional value and which can be part of a development strategy it may wish to adopt.⁶

⁶ On the notion that the State should undertake public investment not just to address market failures but also as part of a broader developmental role it may wish to play, see Hermann (2010) and Mazzucato (2013).

Box 1: Digital infrastructure and their investment costs

Digital infrastructure consists of interrelated systems that support digital technologies and enable their use in the economy and society at large. Two key pillars of digital infrastructure are data centres and broadband networks. Data centres host in a same physical space a network of computer resources and services. They include hardware components such as physical installations, backup generators, racks and cabling, cooling systems and IT equipment; and software components such as data and cloud computing. Broadband networks transmit high-speed data from core networks to businesses, governments, public services (schools, hospitals, police, urban transport) and households. Different types of broadband technology (fixed, wireless) may include physical components such as copper and fiber-optic cables, ducts, masts, satellite dishes and computer systems; and various software components such as control and management servers and IT applications (EC, 2014). It is difficult to ascertain the costs of building digital infrastructure since the latter encompasses so many different sizes and technological components. A relatively small firm may be able to install a data centre in its own premises for just over \$1 million, while large data centres such as those owned by Facebook and Google can cost over \$1 billion (TEC, 2017; Theengprojects, 2018). Capital costs incurred by firms providing wireless broadband networks serving small urban communities are incomparably smaller than those linked to adoption of the latest broadband technologies to cover an entire country. In Germany, broadband rollout using copper-based infrastructure was estimated back in 2014 at 20 billion euros while more advanced fibre optic investments would cost at least 90 billion euros (Davies, 2015: 9). The UK envisaged in its 2018 digital infrastructure plans full-fibre broadband by the year 2033, with costs estimated at £30 billion (DCMS, 2018). In Africa, Kenya had a total expenditure forecast for the implementation of its national broadband strategy at \$3 billion over the years 2013-2017, of which \$2.1 billion was to cover the infrastructure costs alone (UNECA, 2017: 18). Thus, capital costs of large-scale projects can be quite daunting and even more so considering that most of the estimates just reported do not include costs associated with connecting end users, maintenance or upgrading. Software components of digital infrastructure often have short life spans. Therefore, upgrading is a particularly important cost item for consideration when estimating overall costs of digital infrastructure investments.

2.2 Financing publicly-owned digital infrastructure projects

A point of central interest in this paper thus is how developing country governments can finance publicly-owned digital infrastructures. Essentially, they can draw on both public and private sources of finance. In broad terms, public finance may include government budgetary resources, borrowing from national and international development banks, official development assistance and other forms of official finance. Private sources of finance, in turn, can be tapped through loans and bonds. In addition, governments may use public-private partnerships (PPPs) as an alternative financing modality. Under PPPs, resources from various types of investors can be brought together through project finance. Investors may include private banks, institutional investors, non-financial corporates and private equity firms. Project finance is a common mechanism whereby a company is set up to deliver the whole project, and even manage it (Bhattacharya and Romani, 2013; Institute for Government, 2019a; Katz, 2014; OECD, 2015a; World Bank, 2019).⁷

An important aspect to take into account is a clear difference that exists between financing, which are resources used to meet the upfront costs of a project, and funding, which is how to pay for a project over its entire life cycle.⁸ Private finance might be made

⁷ In this case, however, full public sector ownership and control may be no longer assured.

⁸ On this point see, for example, the Institute for Government (2019b).

available to pay for the upfront costs of a public infrastructure project, but this will be the case only if project funding is guaranteed – that is, resources that can pay for the project over its entire life cycle, and not just the construction phase. Typically, funding for public infrastructure projects comes from government taxes and/or user charges.⁹ Project funding, therefore, is critical for the financial viability of a project. Moreover, this is true for projects financed from private sources as well those from public sources – unless, of course, the project is fully financed with government budgetary resources and/or grants and thus does not involve debt finance. The reality on the ground is that government taxes and user charges are forms of project funding that are not always available. This is especially the case for regional infrastructure projects.

2.3 Financing regional public digital infrastructures

Indeed, an even bigger challenge is how to finance public digital infrastructure projects at the regional level. Regional projects, once ready, may not be able to generate enough revenue streams to pay back frontloaded finance, due to demand shortages. That is, such projects typically are large for technical reasons (e.g., rollout of broadband network) and, therefore, anticipate considerably future demand. The latter may also grow only slowly, due, in part, to the need for complementary soft infrastructures such as a common regulatory framework and payments system at the regional level. The challenge, therefore, is to find regionally articulated budgetary resources to make such projects financially viable. Unlike national projects – e.g., in health, education – which once completed can have their debt services met with national budgetary resources (if user charges are not available or are not enough), such resources for regional projects are not readily available. In this case, regional coordination is required for setting up specific funding arrangements. These arrangements thus can help unlock finance, including from development banks, to pay for the upfront costs of a project.

3. Supporting regional digital development: The European experience

In the advanced world, the European Union (EU) is a regional body that has adopted a related type of coordination initiative, which can serve as a template for similar undertakings in the South.

The EU has in place several funds it can draw upon to support the development of a EU digital single market. To achieve this policy goal, these funds finance a complex web of programs and initiatives, such as the European Cloud Initiative, aimed at creating world-class data infrastructure, high-speed connectivity and high-performance computers.

The EU funds include:

- The European Fund for Strategic Investments, one of three pillars of the Investment Plan for Europe (the Juncker Plan), which has been set up to support key areas such as infrastructure and digital technology, with total investment **target of €500 billion until the end of 2020. In the digital sector, it supports**

⁹ In addition, rents' capture is a further way by which projects might be funded. These rents arise when a property value increases as a result of new infrastructure in the area where the latter is built (Institute for Government, 2019).

greenfield digital infrastructure and business. As of December 2018, the Fund had already approved €69.5 billion of direct finance and leveraged €371.2 billion in total investments, 11 per cent of which were in the digital sector (EU, 2019a, b and c).

- **Horizon 2020, a fund that prioritizes research and innovation. The fund has €80 billion of resources available over the years 2014-2020 (EU, 2019d).**
- The European Structural and Investment Funds, which have digital technologies as one of their five focus areas targeted through 5 different sub-funds; their main aim is to contribute to the enhancement the EU single market in order to make it “fit for the digital era” (EU, 2019e).
- **The Connecting Europe Facility (CEF), with a budget of over €24 billion covering the years 2014-2020, a funding instrument that supports the development of interconnected trans-European networks. It targets regional infrastructure investment that includes digital infrastructures, with a focus on synergy-oriented projects (EU, 2019f).**

These funds do not operate alone. They work in close articulation with the European Investment Bank (EIB). The EIB stands out as the regional development bank that manages such public (as well as private) funds to support the creation of a single digital market in the EU. Drawing on these funds, the bank prioritizes high-speed internet, mobile networks and cloud computing (EIB, 2019). In partnership with the Connecting Europe Facility of the European Union, the EIB also manages the Connecting Europe Facility Broadband Fund, established to support investment in broadband infrastructure across Europe. Thus, the EIB in articulation with these various European funds, supports initiatives that have clear public and regional dimensions, aimed at promoting access to data and knowledge by different stakeholders and at developing a regional digital market.

The EU economy is, thus, a powerhouse with financial clout and budgetary resources to set up all these funds for fully digitizing its single market with cutting edge technologies. A good deal of the initiatives these funds support is for public digital infrastructures with open access whereby research, business and consumers can extract and exchange information freely. In the developing world, emulating the European digital integration experience is a task of tall order. Still, creation of regional digital funds, discussed further below, is a possibility to be considered. These can be stand-alone funds. Alternatively, they can be part of the buildup of a financial model for regional digital development, as is the case in Europe. As just discussed, the EIB manages significant portions of the EU funds and provides the various instruments and mechanisms through which these funds are made available for digital development, targeting in various forms a wide range of clients with very different profiles (e.g., researchers; business across different sectors).

4. Financing regional digital infrastructures in developing countries: Are development banks doing enough?

Multilateral and large regional development banks have adopted programs and guidelines for supporting the development of the digital economy in their borrowing countries. The World Bank has a Digital Development Partnership (DDP), launched in 2016 to support digital innovation with a focus on private digital solutions. DDP is **demand driven and seeks to maximize World Bank's leveraging capacity in financing**. Priority areas include data and indicators, internet access for all, and mainstreaming digital services, solutions and platforms. It is designed to be private sector led and thus the partnership involves both public and private sector actors, including bilaterals and private companies such as Microsoft (World Bank, 2018). The Asian Development Bank (ADB), in turn, has created a Digital Technology for Development Unit and is supporting the buildup of Information and Communications Technology (ICT) infrastructure, including submarine cable systems linking borrowing countries. Overall, ADB has approved 450 projects with ICT content in the past eight years (ADB, 2019).

The Inter-American Development Bank (IADB) and the African Development Bank (AfDB) are other two large regional development banks also supporting digital development. The IADB has published jointly with the OECD a digital economy toolkit addressing different topics including infrastructure bottlenecks, broadband access and digital strategies, to encourage expansion of broadband networks and services in the Latin America & the Caribbean region (IADB, 2019). The AfDB, in turn, is a lead coordinator of the global partnership Connect Africa Initiative to mobilize resources – human, technical, financial – to help bridge gaps in ICT infrastructure in Africa (AfDB, 2019).

These banks adopt similar financing models to support the digital sector. They draw on their own resources and on investment platforms **to leverage partners' resources**; and the private sector is expected as a major provider of both financial resources and digital solutions. The investment platforms have been around for some time, but it is not clear yet whether they are able to provide finance to the scale needed for infrastructure projects. They contain seed money, which are not proper funds like the EU funds that the EIB manages (see previous section). Moreover, their coverage is general and thus not specific to digital components of infrastructure.¹⁰ New, public funds designed to support public digital infrastructures are still lacking.

¹⁰ Examples of these platforms, which are also called funds, are: IADB's Infrastructure Fund and Regional Infrastructure Integration Fund; ADB's Leading Asia's Private Sector Infrastructure Fund; Africa 50; and New Partnership for Africa's Development (NEPAD) Infrastructure Project Preparation Facility (NEPAD-IPPF). For a description of these platforms and funds, see UNCTAD (2018c:12-13).

5. Financing regional digital infrastructures in the South: What can sub-regional development banks do?

The European funds mentioned in section 3 have been established as part of a financial model for regional digital development in Europe. Regional groupings in the South could consider adopting something similar for the purpose of financing regional digital infrastructures. They would need, however, not just funds to help finance upfront costs of digital infrastructure projects. In addition, they would need funds to serve as mechanisms to support projects over their entire life cycle, as argued earlier.

Various long-established regional groupings in the South have their own sub-regional development banks, which they can use to try to emulate the European model for regional digital infrastructure development. Most of these banks are based in Africa and the Latin America and the Caribbean (LAC) region, but there are also a few in West and Central Asia. In Africa, the East African Community (EAC) has the East African Development Bank (EADB) created back in 1967; the West African Economic and Monetary Union (WAEMU) has its member countries served by the West African Development Bank (BOAD), created in 1973; the Central African Economic and Monetary Community (CEMAC) has the Central African States Development Bank (BDEAC) serving its member countries since 1977 following its creation in 1975; while the Common Market for the Eastern and Southern African States (COMESA) can count on the Trade and Development Bank (TDB), established in 1985.

Latin America has the Development Bank of Latin America (CAF), created in 1970 by the Andean countries and currently serving Latin American countries and a few countries from the Caribbean region; the Caribbean countries have the Caribbean Development Bank, established in 1969; and the Central American countries created, also in 1970, the Central American Bank for Economic Integration (CABEI) to serve their region. In Asia, the Russian Federation and Kazakhstan established the Eurasian Development Bank (EDB) in 2006, which currently serves the current member countries from the Eurasian Economic Union (EAEU), plus Tajikistan.¹¹

Most of these sub-regional development banks have thus been around for at least 40 years, supporting through their operations development projects from the regional groupings to which they belong, and beyond.¹² Borrowing countries of these banks vary from just a few in the case of EAC to over 20 countries in the case of COMESA. **Geographic coverage can be quite extensive, in COMESA's case going from Egypt in North Africa down to Eswatini in Southern Africa (see Table 1); in the case of CAF, covering goes from Mexico in the north of Latin America down to Argentina and Chile in the Southern Cone of the region.**

¹¹ Other sub-regional development banks from the South, not discussed here, include: The Arab Bank for Economic Development in Africa (BADEA); the Black Sea Trade and Development Bank (BSTDB); ECO Trade and Development Bank (ETDB); and ECOWAS Bank for Investment and Development (EBID).

¹² TDB, created as the financial arm of COMESA, has expanded its membership since inception to include countries from across EAC and the Southern African Development Community (SADC).

Table 1. Selected Sub-Regional Development Banks

Sub-Regional Banks	Current Borrowing Countries	Mother Organization/Region
BDEAC	Cameroon; Central African Republic; Chad; Congo; Equatorial Guinea; Gabon	CEMAC
BOAD	Benin; Burkina Faso; Côte d'Ivoire; Guinea Bissau; Mali; Niger; Senegal; Togo	WAEMU
CABEI	Argentina; Belize; Colombia; Costa Rica; Cuba; Dominican Republic; El Salvador; Guatemala; Honduras; Mexico; Nicaragua; Panama	Central American Region
CAF	Argentina; Barbados; Plurinational State of Bolivia; Brazil; Chile; Colombia; Costa Rica; Dominican Republic; Ecuador; Jamaica; Mexico; Panama; Paraguay; Peru; Trinidad and Tobago; Uruguay; Bolivarian Republic of Venezuela	Latin America & the Caribbean
CDB	Anguilla; Antigua and Barbuda; Bahamas; Barbados; Belize; British Virgin Islands; Cayman Islands; Dominica; Grenada; Guyana; Haiti; Jamaica; Montserrat; Saint Kitts and Nevis; Saint Vincent and the Grenadines; Suriname; Trinidad and Tobago; Turks and Caicos Islands	The Caribbean
EADB	Kenya; Rwanda; Tanzania; Uganda	EAC
EDB	Armenia; Belarus; Kazakhstan; Kyrgyzstan; Russian Federation; Tajikistan	EAEU
TDB	Burundi; Comoros; Democratic Republic of Congo; Djibouti; Egypt; Eritrea; Eswatini; Ethiopia; Kenya; Malawi; Mauritius; Mozambique; Rwanda; Seychelles; Somalia; South Sudan; Sudan; Uganda; United Republic of Tanzania; Zambia; Zimbabwe.	COMESA

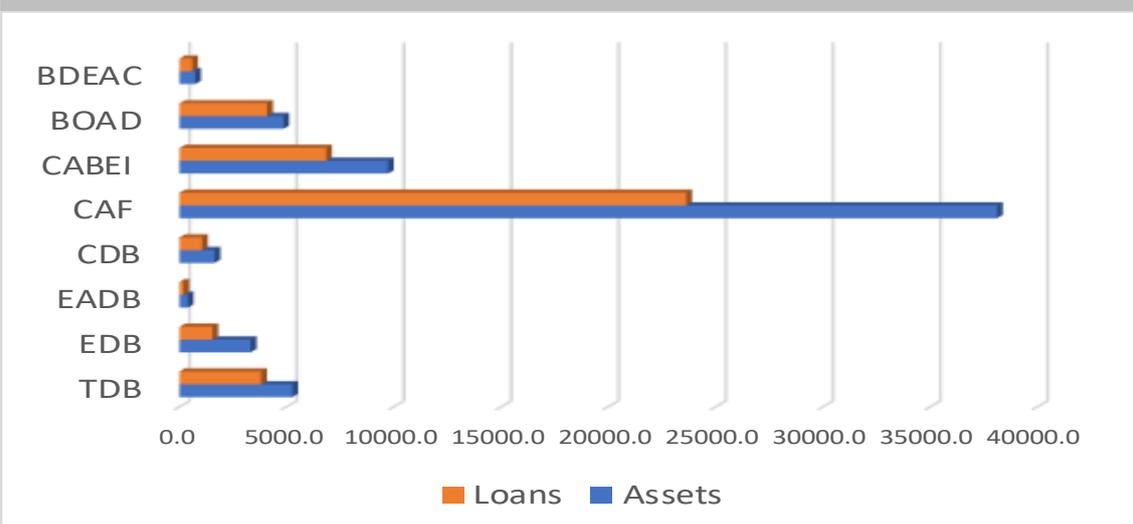
Sources: Banks' websites and annual reports. Note: BDEAC: Central African States Development Bank; BOAD: West African Development Bank; CABEI: Central American Bank for Economic Integration; CAF: Development Bank of Latin America; CDB: The Caribbean Development Bank; EADB: East African Development Bank; EDB: Eurasian Development Bank; TDB: Trade and Development Bank; CEMAC: The Central African Economic and Monetary Community; COMESA: The Common Market for the Eastern and Southern African States; EAC: The East African Community; WAEMU: The West African Economic and Monetary Union.

These development banks could establish clear guidelines for regional digital infrastructure, and scale up finance to the sector. In terms of guidelines, CAF already has a visible policy, posted on its website, to support digital infrastructure development. This policy targets coverage, quality and accessibility of broadband infrastructure (CAF, 2019).

Naturally, banks loaning to such projects would need to be paid back, as they are accountable to their creditors and shareholders. These projects can generate potentially large revenues, but, given their regional nature, a hurdle is that this may take some time, as discussed above. Another hurdle is that lending capacity among sub-regional development banks seems generally very limited. This is reflected in their total portfolios of assets and loans, which are very small, though somewhat varying across banks depending on how these portfolios are measured. In absolute terms, CAF has comparatively large portfolio of loans (Figure 1). However, portfolio sizes, scaled by combined GDPs of borrowing members, shows that BOAD and CABEI have the largest portfolios while that of CAF is smaller since the bank has large economies such as Argentina, Brazil and Mexico, as borrowing members (Figure 2).

Figure 1. Selected Sub-Regional Development Banks – Total Assets and Outstanding Loans

\$ Million Year 2017



Source: Author's elaboration, based on banks' annual reports. BDEAC: Central African States Development Bank; BOAD: West African Development Bank; CABI: Central American Bank for Economic Integration; CAF: Development Bank of Latin America; CDB: Caribbean Development Bank; EADB: East African Development Bank; EDB: Eurasian Development Bank; TDB: Trade and Development Bank.

Figure 2. Selected Sub-Regional Development Banks – Total Assets and Outstanding Loans

% Region's GDP Year 2017



Source: Author's elaboration, based on banks' annual reports. BDEAC: Central African States Development Bank; BOAD: West African Development Bank; CABI: Central American Bank for Economic Integration; CAF: Development Bank of Latin America; CDB: Caribbean Development Bank; EADB: East African Development Bank; EDB: Eurasian Development Bank; TDB: Trade and Development Bank.

The financing capacity of these banks is limited by their narrow equity base. In addition, they lack not only equity but also partnerships in funds such as those the EIB manages or even those platforms which the World Bank and the large regional development banks have established or have a role as facilitators. But, with capital injection and the

setting up of meaningful public funds, sub-regional development banks could finance new regional digital infrastructure and help accelerate the execution of existing projects. Africa, for example, is a continent where regional economic communities have already in place digital infrastructure initiatives supporting concrete regional projects – e.g., the Central African backbone, the East Africa broadband network, the Southern Africa region backbone and West Africa network (UN ECA, 2017: Box 6). However, these projects need more financing to reach completion.

These projects are typical regional public goods – that is, projects that are “public in nature and...[generate] shared benefits for the participating countries and whose production is a result of collective action by the participating countries” (Wollrad, 2007:2).¹³ They fit in well within regional banks’ mandates, by: generating cross-border spillovers, enhancing inter-connectivity and contributing to regional integration, goals these banks support.¹⁴ Moreover, such regional projects are even more relevant when they are undertaken by regional groupings that include small countries, countries with low-income per capita, and, also, countries that are landlocked. Such countries have limited resources to undertake digital infrastructure projects and therefore can benefit enormously from regional ones.

6. Financing regional digital infrastructure projects: Policy suggestions

Regional digital infrastructures are public goods that generally face underfunding despite the benefits they can bring to developing countries. This paper argues that development banks are well suited institutions to take on a leading role in this area. They can design and execute complex regional projects and provide patient capital. Their financing capacity, however, is limited. This is the case especially among sub-regional development banks. A major binding constraint is their narrow capital base. **Thus, the first line of action is to support banks’ capital expansion, so that they can raise more resources in the financial markets and thus expand their loan portfolios to support regional digital infrastructure projects.** But sub-regional development banks face an additional constraint, which is the fact that their main shareholders are developing countries, which in many cases lack the budgetary resources to be able to inject more capital into them. In face of this, alternatives must be explored.

Sub-regional development banks, including those in Africa such as the TDB, EADB, BOAD and BDEAC, typically have member states as class A shareholders as well as class B shareholders that include non-member states such as banks, pension funds, insurance companies and non-financial corporations.¹⁵ Developing countries could **bring new class B shareholders, which would be a way to expand banks’ capital without committing their own resources or losing control over decision making.**¹⁶ A new shareholder could be a Sovereign Wealth Fund (SWF), from the region the bank serves

¹³ According to Ferroni, such projects would not be considered pure regional public goods, though. The latter generate benefits that are non-rival and non-excludable. Such goods would, nonetheless, apportion “significant elements of non-rivalry and non-excludability” (Ferroni, 2001: 3).

¹⁴ Indeed, development banks are designed to support such projects particularly those that generate positive developmental impacts and not just those demonstrating strict financial viability (UNCTAD, 2018a: chapter 4).

¹⁵ CAF has class A, B and C shareholders.

¹⁶ Alternatively, they could encourage existing class B shareholders to contribute more capital.

or from outside. If a small share of resources of a large SWF is invested in a small regional development bank, this might go a long way for a substantial capital expansion to materialize. A limiting factor to the idea of bringing new, strong shareholders such as **a large SWF is that banks' charters may have ceilings to capital contribution** of a single shareholder.¹⁷ To benefit effectively from new, strong shareholders, these banks would **have to consider, where possible, amending their charters' articles. Banks' charters** show that Class A shareholders have headroom for raising the ceilings of other shareholders while simultaneously maintaining banks' overall control.

A complementary line of action is to follow the EU example and set up regional digital funds drawing on member-country budgetary resources. Countries could tax undertaxed multinational technology firms already operating in their territories in order to expand budgetary resources.¹⁸ Digital funds could, in addition, tap other sources as well, including donors. Other possible sources of resources for a regional digital fund could include: digital bonds, which could be issued in national and regional capital markets and even diaspora bonds, which could tap those more affluent segments of a **country's diaspora, including those engaged in technology-based business**, who might be keen to consider this type of investment (see Table 2 below for a summary of these various financing options). In the developing world, funds for digital infrastructure already exist. An example is the Telecommunications Investment Fund¹⁹ created in Peru in the wake of privatization in the early 1990s, to fund access expansion. The Fund is based on contributions by telecommunication companies of one per cent of their gross revenues (UNCTAD 2017: Box IV.10).

In light of the discussion above, it would be important that these new digital funds are designed in ways that they can help not only finance the upfront costs of infrastructure projects (i.e., their construction phase) but also to help fund such projects over their whole life cycles – otherwise financing may not be made available even if resources, from banks and others, exist. The emulation of the European experience with the necessary adaptation to the reality of regional groupings in the South could thus help underpin regional cooperation initiatives that include development of a strong regional digital economy.

¹⁷ TDB is a case in point, in that no individual shareholder can hold more than 15 per cent of total subscribed capital. See TDB Charter on the bank's website, available at:

https://www.tdbgroup.org/wpcontent/uploads/documents/Charter_Document_ENGLISH_1w5062017.pdf

¹⁸ As these multinational companies often escape taxation by diverting taxable resources to low-tax jurisdictions, coordinated action among countries from a regional grouping would be needed to confront this type of illicit action. On this issue see, *inter alia*, OECD (2015b).

¹⁹ *Fondo de Inversión en Telecomunicaciones* in Spanish.

Table 2. Proposed lines of action to increase finance available for regional digital infrastructure projects

Actors	What could they do?	
Sub-regional development banks	➤ Let more capital contribution from banks' class B shareholders	
	➤ Attract new shareholders, such as sovereign wealth funds	
National governments from regional groupings	➤ Inject more capital into their development banks	
	➤ Set up regional digital funds, whose resources could be raised by:	○ Taxing technology firms
		○ Tapping new and existing donors
		○ Issuing digital bonds
○ Issuing diaspora bonds		

Source: see text above.

7. Conclusions

Unlike digital firms, financing digital infrastructure is more difficult. The sector is more intensive in capital and technical skills, involve larger and more complex projects and have longer-gestation periods, thus giving rise to risks private investors are reticent to take. However, even when the private sector shows willingness in digital infrastructure, this paper argues that, for strategic reasons, the public sector has a critical role to play. That is, public initiatives for the provision of digital infrastructure are important to assert public control over data and knowledge derived from the digital economy.

Small countries face the additional challenges of scale, resources and technical capacity to undertake digital infrastructure projects. Regional initiatives can be an answer to some of these problems. At the regional level, digital infrastructure is a public good that regional development banks could support by providing long-term finance and playing a coordination role where needed. However, their financing capacity is limited, when contrasted with the scale of needs. One cannot forget, moreover, that competing demands exist arising from different SDGs and even within the infrastructure sector (e.g., between non-digital and digital infrastructure projects).

A way forward is to inject more capital into these banks and create new funding sources for digital infrastructure. The EU initiative of creating dedicated funds – and articulating **these funds with EIB, Europe's main regional development bank** – in support of the digital economy is instructive and this paper argues that regional groupings in the South could try to emulate the European experience. But there is no definitive blueprint. Each country or regional grouping in the developing world should design its own digital development strategy and put in place its own financing institutions – and funding arrangements – to back such a strategy.

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