Quality Infrastructure in 21st Century Africa

OECD DEVELOPMENT CENTRE

ACET African Center for Economic Transformation

Quality Infrastructure in 21st Century Africa

PRIORITISING, ACCELERATING AND SCALING UP
IN THE CONTEXT OF PIDA (2021-30)

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Foreword

At the 18th International Economic Forum on Africa, at the Organisation for Economic Co-operation and Development (OECD) in October 2018, President Nana Akufo-Addo of Ghana gave our two organisations a challenge. He requested a technical investigation into why African governments are increasingly turning to emerging economies, notably China, for large infrastructure projects, with the more compact timeframes that their policy banks and contractors offer, compared with Africa's mainstream development partners. This report is a response to that challenge and a result of our work together through a programme of case studies, research and high-level expert discussions, to contribute elucidating this phenomenon.

The trend itself was first noticed in the 2009 World Bank Report *Building Bridges* and in the 2011 AfDB-OECD-ECA-UNDP *African Economic Outlook* on "Africa and its emerging partners". It garnered much attention when the President of China unveiled the Belt and Road Initiative (BRI) in 2013. However, China's engagement in development co-operation with African countries dates back to 1960 and earlier. In 1964, Prime Minister Zhou Enlai announced on a visit to Ghana China's Eight Principles for economic aid and technical assistance. By the 1970s, China had built the Tazara Railway linking Zambia to Tanzania.

The case studies in this report (before they were curtailed by the COVID-19 crisis) showed that large infrastructure projects often take decades to fall into place, in Africa and elsewhere, with political history being a major factor. Our expert discussions ranged across various approaches to infrastructure development in Africa and underscored the relevance of the duality noted by President Akufo-Addo. On the one hand, there are mainstream development partners and their increasingly elaborate upstream processes for project preparation, with detailed environmental, social and governance requirements, aimed at developing both institutions and infrastructure. On the other hand, there are other partners, notably China, with readily available financial and corporate structures, and a constellation of actors that can quickly develop different types of infrastructure projects, emerging from their own ongoing development experience.

For China, institutional development is an outcome rather than a starting point, and early infrastructure investment is necessary to leapfrog the development process – further underlining the fundamental difference of the two approaches. However, Chinese actors, and the international community at large, are increasingly recognising the relevance of environmental, social and governance factors, and of local ownership of the development process. Work in the G20 on quality infrastructure investment and on addressing debt overhangs in the wake of COVID-19 does promise some underlying convergence of approaches. The African Union (AU)'s Agenda 2063, the United Nations (UN) agenda for climate change and the UN Sustainable Development Goals promote this convergence more fundamentally, albeit amidst rising global tensions.

The efforts we set in motion after President Akufo-Addo's challenge have nevertheless resulted in a rich body of work on reforming the upstream processes of project development. They confirmed the importance of looking at the whole infrastructure policy process and placing infrastructure within a country's overall sustainable development strategy. A common complaint is that it is not finance, but rather the shortage of "ready to go", bankable projects and programmes, that is the biggest constraint to infrastructure development. In this context, mainstream agencies like the World Bank Group are rethinking their conceptual and policy frameworks, and design processes for infrastructure programmes.

Importantly, this issue has become central to the design of the Programme for Infrastructure Development in Africa (PIDA) 2021-30 proposal, which will be put forward to African Heads of State and Government in early 2021. The challenge we set out to confront has thus led to close collaboration with the African Union and its Development Agency (AUDA-NEPAD). The two recommendations that have emerged from our collaborative work support and extend the PIDA reforms on: *i)* embedding structure and timeframes into more standardised project preparation processes; and *ii)* generating a programme for peer learning among infrastructure professionals and stakeholders across Africa.

The AU Agenda 2063 and the African Continental Free Trade Area provide the context for these two lines of action, with their vision to transform Africa's economic geography and human development through integrated regional economic corridors, by leveraging new technology, and by turning the demographic drama of an additional one billion people by 2050 into a demographic bonus.

Our two organisations are deeply concerned with transformation and development dynamics in Africa. Individually, our commitment to regional integration and local economic development is long-standing (K.Y. Amoako as former Executive Secretary of the UN Economic Commission for Africa [UNECA], and Mario Pezzini who led OECD's extensive work on territorial development). Looking forward, we are eager to support the AU Commission and AUDA in their efforts to provide replicable structured approaches to infrastructure development in Africa and work with all interest partners and stakeholders to grow the capabilities and energy devoted to achieving this goal.

Mario Pezzini

Director of the OECD Development Centre and Special Advisor of the OECD Secretary-General on Development

K.Y. Amoako

President of the African Center for Economic Transformation

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List of Abbreviations

ACET	African Center for Economic Transformation
AU	African Union
AUC	African Union Commission
AUDA-NEPAD	African Union Development Agency and New Partnership for Africa's Development
AFC	Africa Finance Corporation
AFD	Agence française de développement (French Agency for Development)
AfDB	African Development Bank
AfCFTA	African Continental Free Trade Area
BMZ	German Ministry for Economic Co-operation and Development
CwA	G20 Compact with Africa
CEXIM	Export-Import Bank of China
DEV	OECD Development Centre
DFI	Development finance institution
EIB	European Investment Bank
EU	European Union
ESG	Environmental, social and governance
GDP	Gross domestic product
GIZ	German Agency for International Co-operation
HKB	Henri Konan Bédié Bridge
ICA	Infrastructure Consortium for Africa
ICB	International competitive bidding
ICT	Information and communication technology
JICA	Japan International Co-operation Agency
MDB	Multilateral development bank
ODF	Official Development Finance
OECD	Organisation for Economic Co-operation and Development
O&M	Operations and maintenance
PPP	Public-private partnership
PIDA	Programme for Infrastructure Development in Africa
REC	Regional Economic Committee
SEIA	Social and environmental impact assessment
TICAD	Tokyo International Conference of African Development
SDM	PIDA Service Delivery Model
UN	United Nations
UN DESA	United Nations Department of Economic and Social Affairs

Executive summary: Context, findings and pathways forward

Africa is facing a monumental task to prioritise, accelerate and scale up quality infrastructure development. It can take several decades for an infrastructure project to go from idea to operation, but with 28 African countries having doubled their population in the 25 years between 1990 and 2015, the UN projects that another 26 countries will double their population between 2017 and 2050 (UNDESA, 2019[1]). The status quo will clearly not suffice to meet Africa's demographic challenges and its development objectives, as enshrined in the African Union (AU)'s Agenda 2063. With this background, this report identifies the impediments to progress as well as emerging new practices, and sets out strategic recommendations for the way ahead. It draws on recent analyses and entrepreneurial initiatives, case studies and high-level expert meetings. While the report is independent, it is also inspired by and supports the innovative infrastructure business models being developed by the AUC and the AU Development Agency-New Partnership for Economic Development (AUDA-NEPAD) in the context of the Programme for Infrastructure Development in Africa (PIDA) for building up integrated regional economic corridors.

New models for infrastructure development are necessary as Africa's demographics transform its economic geography

Investment in African infrastructure is a global public good in the context of the worldwide significance of Africa's demographic evolution and its necessary productive transformation. The largest addition to the workforce in the 21st century will be in the African continent, which is set to experience a 40% increase in its working age population in just the 12 years from 2018 to 2030. In 25 years from now, Africa's population will be 70% larger, adding nearly as much as the entire current population of the Americas, which is 1 billion. By 2050, Africa's population will reach 2.4 billion, the share of African people increasing from 17% of the global population in 2018 to 26% in 2050, that is, one quarter of the world's total. Population in sub-Saharan Africa will more than double by above 1 billion in just these 30 years.[1]

Urban population is projected to increase from 472 million or 40% of the total in 2015 to 1.3 billion or 56% in 2050. There will be some 120 cities of more than 1 million people, including several megacities and a significant number of other very large cities, although two-thirds of the urban transition will take place in smaller intermediary cities and towns, alongside new kinds of rural agglomerations.

Digitalisation is creating leapfrogging opportunities in communications, design, production and marketing. Africa counts almost 500 million mobile banking accounts, with 181 million of them active users, more than all other developing regions. Transformational impacts are evident on both private business models and social investment models, with interactive opportunities across renewable energy, public health – including water and sanitation –, education, housing, agriculture and industry. They promise employment creation and poverty reduction as part of the transition to a green and digitalised economy. Africa's entrepreneurial

culture and development finance institutions are responding to these opportunities.[2] A growing pension fund industry can be tapped for long-term investments.

Despite the progress made, Africa still needs significant infrastructure investments to boost universal access to digital infrastructure (AUC/OECD, 2019[2]; OECD, forthcoming[3]). Nearly 300 million African people live more than 50 kilometres away from a fibre or cable broadband (ITU/UNESCO, 2019[4]). The cost of closing the digital divide in Africa is estimated at approximately USD 100 billion or USD 9 billion a year, which would include laying out at least 250 000 kilometres of fibre across the region (ITU/UNESCO, 2019[5]). In 2018, Information and Communication Technology (ICT) Infrastructure financing was USD 7 billion, with 80% of this amount coming from private sector investments (ICA, 2019[6]).

Successful global and local efforts to manage the COVID-19 pandemic, and related global financial and economic impacts, are vital for Africa. Then, rising national savings, public revenues and regional financial markets should provide the financial sustainability for a dynamic African development scenario, as mapped out in the AU 2063 Vision and the UN Sustainable Development Goals (SDGs). A decentralisation of infrastructure development is required to ensure a well-functioning dynamic urbanisation process in Africa. This will assist the development of municipal bond markets as an investment vehicle for pension funds and other investors, with rising land values creating the revenue base for servicing this finance (ICA, 2019[6]).

In other words, Africa is rapidly outgrowing its post-colonial economic geography and existing rural-urban configurations to become a continent with new economic landscapes, as well as regional and local value chains. Integrated regional economic corridors will link countries together, transforming Africa's current burden of high cost logistics, giving a huge boost to real incomes and international competitiveness. The African Continental Free Trade Area (AfCTA) will foster the transformation of African economic geography with new cross-border linkages within the continent and to the global economy. However, lack of quality infrastructure is a binding constraint on the development of regional value chains: African producers source only 13% of their inputs regionally, compared with 22% in Southeast Asia.

In this context of fast-moving economic scenery, African governments have been turning to Chinese infrastructure finance and construction firms, whose response times and upstream processes are fast and competitive in providing transport, power generation and telecoms infrastructure. With a focus on these sectors, China currently commits more infrastructure finance to Africa than all other external sources combined – second only to the African governments' own infrastructure financing (ICA, 2019[6]). Furthermore, in 2016, it established a Hong Kong-based China Overseas Infrastructure and Investment Corporation as a subsidiary of the China Africa Development Fund, to take projects from the concept stage to feasibility studies, to financial closure and commercial operation. At the same time, the Chinese model for developing infrastructure suffers from its own shortcomings, including in the areas of governance, ownership, and transparency.

The new infrastructure business models: Scope and scale

Infrastructure in Africa is lagging behind, but not only because of financial or technical constraints. New infrastructure business models are needed to build up integrated regional corridors, functional urban-rural agglomerations and dynamically evolving value chains, with associated infrastructure services propelling human development, reducing poverty and providing an exit road for fragile States.

The study investigated a number of recent bridge projects in Africa, including: the Maputo-Catembe Bridge as a regional corridor project, improving connectivity between Maputo in Mozambique and the Gauteng Province in South Africa; the second Wouri river Bridge in Douala (Cameroon), a key regional hub; and the Henri Konan Bédié Bridge, cutting traffic impasses and travel times in Abidjan, the commercial centre of Côte d'Ivoire. The research illustrated that the time taken for all the elements of each of these projects to come together stretched over many years, counting interruptions of political history on various sides.

Such problems are by no means exclusive to infrastructure in Africa. But Africa's demographic and transformation challenges are unique at this point in history.

Current upstream processes are not generating pipelines of "ready to go" quality infrastructure investment projects and programmes on a scale commensurate with the demographic dynamics. Effective commitment between and within countries and financing mechanisms are missing for the creation of cross-border infrastructure essential in a large continent, with many landlocked countries.[3]

Fundamentally, slow project development processes cannot match the dynamics and interactions involved in integrated regional corridor development or programmes that generate the many small projects that will provide the bulk of infrastructure services at the national level. New upstream processes are required for cross-border and national co-ordination on sectoral and multisectoral plans, along with commitment and financing mechanisms that make implementation possible and sustainable. This was a key finding from the three policy dialogue meetings held in February and June 2020.

Without such new business models, the provision of the infrastructure services essential to this scenario will not catch up with needs nor keep pace with the extraordinary demographic dynamics and shifting challenges, global and local, including climate change, pandemics and armed conflict. An Infrastructure Business Model 2.0 is thus necessary.[4]

Pathways forward: New infrastructure business models and professional capability development

Out of the many issues that arose in the research and discussion process, two strategic and complementary pathways already emerging in Africa have been identified that can help resolve this existential problem of matching infrastructure development to the urgency and breadth of Africa's development agenda:

Apply structure and time frames to the upstream processes for project and programme development, integrating quality issues – environmental, social and governance (ESG) –, economic linkages and job creation, social returns, community consultations and financial modelling.

This approach has been emerging in the context of PIDA, in the form of a PIDA Service Delivery Model (SDM) with associated problem-solving and networking processes. Within the SDM, the PIDA Quality Label (PQL) certification recognises excellence in the preparation process of infrastructure. This framework can thus now function as a point of reference for PIDA infrastructure projects and programmes, but also for infrastructure at all levels in Africa, adapted to specific contexts. It can also serve as a point of reference for African governments in their international contract negotiations. In other words, it should become an internationally-recognised African brand for infrastructure.

Alongside this framework, a Presidential Infrastructure Champions Initiative (PICI) has been working to provide political leadership to overcome bottlenecks in cross-border projects. In line with these approaches, African development finance institutions (DFIs) have been working on a venture capital basis to generate new value chains connecting to international and African markets, and to replicate successful business models. The World Bank Group's International Finance Corporation (IFC) is also creating new processes for upstream programme development for a major scaling up of its activities in low-income countries in Africa, with profound shifts in the incentives facing its staff. The African Development Bank (AfDB) has also innovated with multisectoral co-ordination processes.

Construct a learning platform on African infrastructure development to foster a multilevel-multidisciplinary community of African infrastructure professionals.

Such a community already exists in nascent form. It could be brought into a confederation under the aegis of the AUDA-NEPAD, the African Capacity Building Foundation (ACBF), the African Center for Economic Transformation (ACET), and the OECD Development Centre. It would use the latest online technologies and media to generate real-time learning from case studies as well as from online university courses and professional exchanges across Africa and beyond. The construction of an African Infrastructure Learning Platform (LEAP) can speed up the professional capabilities needed within national and local governments, particularly in the areas of law, finance, construction and skilled trades to get infrastructure projects up and running and managed on a life cycle basis.

The pathways described in this report are already emerging and mapping the way ahead.

1 Introduction: The duality in building Africa's infrastructure

1.1. Setting the scene

Traditional business models for infrastructure development have been failing to generate the pace and scale of infrastructure services needed to match the dynamics of African demography and economic geography. With traditional multilateral and bilateral development partners taking time to build up their infrastructure programmes and commit and execute major projects on the scale implied by population growth, there is a striking evolution of African governments using significant Chinese financing for infrastructure development (see Figure 2.1 in Section 2.3) in order "to get things done".

In other words, while mainstream development agencies are engaged in many innovative approaches to infrastructure provision and can sometimes join together in large scale programmes, such as in the context of the intergovernmental Mekong River Commission, the support by external actors for infrastructure is seen to be stuck in a duality, juxtaposing the priority for building sound institutions of government that take time to develop with the expedient need for financing and constructing services for the delivery of major infrastructure within a foreseeable future. In this context, **a recent book, *Duality by Design: The Global Race to Build Africa's Infrastructure,* identifies as a fundamental challenge the significant "institutional voids" in African countries in the course of developing infrastructure** (Gil, Stafford and Musonda, 2019[7]).

The book explains that one strategy in infrastructure development is to give priority to strengthening governance institutions and to regulatory reform. This is essentially the stance of traditional development partners, stemming from their conceptual frameworks and their accountability towards their taxpayers and shareholders. Another strategy, taken by Chinese actors, is to work with the current political and institutional environment on the basis that speed and getting infrastructure in place is paramount in moving the development process forward, with institutional development part of a longer-term learning-by-doing process. This is not to say that geopolitical considerations are not a factor in infrastructure investment decisions, but it does posit that the fundamental issue exists even outside that context. Such institutional voids have to be navigated, from one side or the other, in a context where prioritising, accelerating and scaling up quality infrastructure is vital in the Africa of the 21st century.

The everyday realities of the infrastructure gaps around Africa are captured in the following anecdote:

> *"One thing is clear: There is no time to waste. The evidence is in front of us for those who want to see it. As I set off to leave Africa, I left behind a long queue of trucks waiting to cross the river Zambezi at the border between Botswana and Zambia by pontoon ferry. Locals claim that the average waiting time for a truck to cross is around two weeks. A new bridge to open up trade and promote tourism is expected to open by 2019 [now expected by the end of 2020]. But the stubborn fact that the nearest alternative is the Victoria Falls Bridge, completed in 1905, is cause for thought" (Gil, Stafford and Musonda, 2019[7]).*

Africa must progress much faster in developing its core infrastructure. In particular, cross-regional corridors and urban infrastructure projects play a catalytic role in Africa's transformation and regional integration. In this context, the AU's PIDA, which aims to facilitate African integration and connectivity through prioritisation of key infrastructure, will be the overarching framework for countries to establish national infrastructure strategies. Many PIDA meetings among African leaders have focused on the key challenges to infrastructure development: the financing gap, project preparation and the significance of local ownership (see Box 1.1).

A major challenge is to develop compact and replicable projects that can be applied by project developers across Africa at different levels and in a dynamic mode as project opportunities open up. Given these circumstances, complex requirements to access the numerous project preparation facilities (PPFs) are clear bottlenecks. So are single project perspectives with limited scope and scale when rapid and dynamic creation of whole ecosystems for regional connectivity is necessary and possible. Radically different approaches are thus needed.

In this context, business models and contracting services that provide faster response and delivery times have been addressing this fundamental challenge. On the other hand, these various models also have their own limitations. Now, new African-driven project development processes and capacities for accelerating and scaling up quality infrastructure are coming into place, particularly through joint African approaches to Africa's diverse infrastructure partners, using PIDA as an overarching framework.

1.2. Organisation of the report

The report is organised to emphasise the strategic importance of the infrastructure challenge in Africa, develop the context, identify the challenges and explore pathways to scaling up quality infrastructure. It first focuses on infrastructure as the foundation for Africa's transformation, describing the demographic transformation of the continent and how the development of a dynamic infrastructure ecosystem drives economic success, public revenues and vitality in the value chain. It further highlights the benefits of a compact and replicable project cycle.

The core of the report focuses on bottlenecks in the project cycle as an analytical framework based on a Common Framework, beginning with the upstream conceptual, policy and design phases. It first describes obstacles that transcend infrastructure development, then addresses elements more specific to steps in the project cycle, broken down by early stage, pre-development and feasibility, procurement, private sector investment, and construction and operation. Each section blends knowledge gained from the literature review, contributions by experts at the high-level meetings and conclusions drawn from case studies of African bridges relevant to infrastructure more generally in the context of PIDA. **This is followed by a compilation of good practices addressing impediments in the project cycle.** Both the bottlenecks and good practice sections are summaries drawing upon the full body of evidence with supporting data captured in Annex C and Annex D, where full attribution and case study descriptions are provided. **The report concludes with two overarching and actionable recommendations informed by the underlying research as well as discussions and deliberations with the high-level experts and think tank group.** The origins, scope and research method of the report is explained in Box 1.1.

Box 1.1. Origins, scope and research method of the report

This research project responded to the request from President Akufo-Addo of Ghana for a technical investigation into why African governments find themselves turning increasingly to China for large infrastructure projects given their more compact time frames, and how mainstream agencies partnering with the African continent could respond to Africa's need for accelerating and scaling up infrastructure development. The independent research aimed to feed into the PIDA 2021-30 process at a strategic moment.

The research specifically focused on project cycle processes and particularly on upstream processes which policy makers, academics and practitioners interviewed by representatives of the OECD Development Centre and ACET, identified as a problem area. Project development, and the analytical, qualitative appraisals and sectoral-regional policy frameworks in which project development is located, is a vital process. At the same time, it can also be an area of dysfunction, failing to generate pipelines of ready to go projects commensurate with a dynamic development process (ICA, 2019[6]).To respond to the widely-recognised concerns of President Akufo-Addo, the research focused on this key strategic issue, aiming to make a constructive contribution to the ongoing policy dialogue on infrastructure development on the continent.

The OECD Development Centre and ACET defined the empirical field of investigation by creating a common framework comparing case studies of bridge projects undertaken by different partners in various African countries, including one bridge project undertaken by China. This work enabled the research to have a foundation in specific real world examples of project work. Bridges are one type of infrastructure among many – and a component of the larger strategic programming of multisectoral development corridors and urban and rural development in Africa. Thus, relying on case studies was not enough: the research also had to involve in-depth interviews and policy dialogues with policy makers, academics and practitioners, to constitute a robust research agenda discovering meaningful findings.

This report is the result of a three-pronged research approach:

1. **High-level inputs were obtained through a series of policy dialogues** to discuss concrete issues and to translate research-based analysis into policy discussions and recommendations. This included two high-level experts group dialogue meetings and one think tank group meeting of advanced thinkers held in February and June 2020. They gathered academia, research institutions, international organisations and private sector actors (see Acknowledgments).
2. **The second level of research and analysis centred on infrastructure case studies focusing on bottlenecks in the project cycle.** Based on a comprehensive list of about 40 bridges across the continent, we developed a Common Framework for case study analysis. We sent out detailed surveys to targeted infrastructure developers. We garnered complete answers on the following bridges:
    - Henri Konan Bédié Bridge (HKB Bridge or Third Bridge), Côte d'Ivoire
    - Maputo-Catembe Bridge, Mozambique
    - Wouri River Bridge, Douala, Cameroon

Research was also conducted on the Rosso Bridge between Senegal and Mauritania, part of the Trans-Africa corridor between Cairo and Dakar, due for completion in 2023, and on the Senegambia Bridge completed in 2019, carrying the Transgambia Highway. COVID-19 meant that the findings of these case studies could not be completed.

3. **The third research track involved reviewing literature and analysing trends in Africa that underlie the contextual elements of the infrastructure challenges**.

The report is thus based on a multiform analysis, directed to generating findings relevant to cross-border PIDA projects more generally and to the infrastructure challenges across Africa in the historic transformation of its economic structures and geography.

2 Context: A new mind-set for the 21st century

2.1. Matching Africa's demographics and new rural and urban geography

New demographic dynamics are now playing out in Africa, including new patterns of agglomeration, changing the spatial geography of the continent and its degree of urban density (OECD/SWAC, 2020[8]; AfDB/OECD/UNDP, 2016[9]). The United Nations (UN) estimates that the continent's population will nearly double from 1.3 billion in 2019 to 2.4 billion in 2050, when projecting a medium-variant scenario. The vast share of this growth will be in sub-Saharan African countries, which are expected to account for more than half of the world's population growth in this time frame (UNDESA, 2019[1]). Furthermore, Africa has the highest labour force growth rate in the world (AUC/OECD, 2019[2]). Every year between now and 2030, an additional 29 million young people on average will become 16 years old – looking for jobs and educational opportunities (AUC/OECD, 2019[2]) (see Annex B).

In addition, Africa's urban population is projected to increase rapidly from 588 million or 44% of the total in 2020 to 1.5 billion or 59% in 2050, two-thirds of which will reside in intermediary cities or small towns (UN, 2018[10]; Minsat, 2018[11]). Planning will need to urgently address the integration of "informal" districts – where 62% of the urban population lives – within the rest of the cities, as well as anticipate the growth of urban housing demands. Furthermore, the provision of local food for the extra billion urban people would need to be assured. This necessitates the extension of roads, as well as the development of a cost-effective agro-industry in the rural areas that could cater to the significant increase in food demand for urban populations, which today rely heavily on imports. Therefore, the challenge will be to shape these new spatial futures in both urban and rural economic geography so that they create jobs and dynamic economic activities. In particular, regional integration, sustainable cities and connectivity between and within agglomerations will be key priorities (see Annex B).

Together with the construction of the African Continental Free Trade Area (AfCFTA), these demographics will generate radically new opportunities and challenges for Africa. However, in order to realise the transformation of its connectivity and production capabilities, scaling up infrastructure will be vital to match the demands of a billion more Africans to fulfil the promise of the new economic geography and labour force. This is particularly the case since a large share of the African population lacks access to adequate infrastructure. Although North Africa has almost universal provision, in sub-Saharan Africa, only about 45% and 61% of the population have access to electricity and water services, respectively (IEA, 2019[12]; UNICEF/WHO, 2019[13]). Furthermore, while there are 77 mobile subscriptions per 100 inhabitants in Africa, which is growing (ITU, 2020[14]), only 18% of households have Internet access (ITU, 2020[14]).

In addition, the rural-urban divide in access to infrastructure services remains significant. For example, while 75% of the urban population in sub-Saharan Africa have access to electricity, only 25% of the rural population do (IEA, 2019[12]). Access to water is similarly divided: while 84% of the urban population have access to at least a basic source of drinking water, this only applies to only about 45% of the rural population in sub-Saharan Africa (UNICEF/WHO, 2019[13]).

In this context, **with more low-cost broadband services on the near horizon, digitalisation could shape Africa's transformation and integration across all sectors at all levels.** The massive uptake of mobile banking illustrates this development potential, with 500 million mobile accounts and nearly 200 million active users, far exceeding all other developing economies combined (Jeune Afrique, 2020[15]). In fact, digital transformation is already bringing in opportunities to build new industries, expand markets, deliver better services and improve people's daily lives in Africa. Aside from mobile networks, the digital technologies used range from big data, Global Positioning System, Internet of Things, artificial intelligence, blockchains, drones, to 3D printing. At the same time, to leapfrog to the fourth industrial revolution, Africa would not only need ICT infrastructure – both physical as well as software or systems –, it will also require adequate institutional capabilities and regulatory frameworks for its governance. These range from fiscal policies, regional integration, to sandboxing and cybersecurity, in order to prevent major disruptions to the economy and society.

Africa can also seize the opportunity of rapid urbanisation to build new infrastructure that are resilient to climate change. In other words, filling the investment gap is not only a matter of mobilising further resources, but also of moving away from carbon intensive infrastructure projects for the longer term. **In particular, it is critical to align investment decisions with low-carbon and climate resilient infrastructure to avoid locked-in emissions,** as infrastructure assets generally last several decades. **It is therefore vital to address environmental objectives during the design, planning, construction and operational stages,** in line with the nationally-determined commitments (NDCs) of the countries towards the Paris Agreement**.** In particular, since two-thirds of required urban investments in Africa are still to be made between now and 2050, today's technology can contribute to a new service delivery model for sustainable cities. Africa could thereby reap significant benefits by leapfrogging to a green economy (AfDB/OECD/UNDP, 2016[9]).

The spread of COVID-19 has also affected the thinking on the future landscape of Africa's infrastructure. While the impact from the current experience in Africa continues to be measured and analysed, it has already highlighted the importance of accessible ICT, energy and water infrastructure, as well as the need to design transport infrastructure with possible pandemics in mind. In particular, the recognition of the viability of teleworking and on-line education could also alter the choices in urban planning as well as urban-rural linkages. By June 2020, 10 African countries had reformed digital policies to facilitate teleworking and e-education, digital cash transfers, and company loans (OECD, 2020[16]). Furthermore, the sudden realisation of the need to reduce dependence on global supply chains makes the effective implementation and associated infrastructure development of AfCFTA to accelerate intra-continental integration even more compelling.

2.2. Integrated regional corridors: Shaping new economic landscapes and value chains

To develop infrastructure in Africa, a key strategy is to create new economic landscapes that are high value-added by harnessing the potential for public and private entrepreneurship. This means building dynamic export-oriented sectors using the continent's comparative advantage of abundant human and natural resources. In a rapidly changing international context, larger visions and new mind-sets will be required for Africa's development. Scarce infrastructure investment can be concentrated into strategic areas to drive dynamic comparative advantage in large international markets by facilitating local initiatives step by step over several decades (AUC/OECD, 2019[2]).

For example, the Africa Finance Corporation (AFC) financed the successful creation of a furniture export industry in Gabon through the construction of two ports and joining sustainable forestry with manufacturing, creating some 6 000 jobs. As the two ports were subsequently sold on to international operators, AFC re-employed the capital, leveraging the organisational capacities it has

created to act as a fast-moving project development agency. The Gabon model is now being applied in other West African countries (AFC, 2020[17]). This kind of African-led association of financing and entrepreneurship, involving the development of local supply chains and eco-systems of industry and services, with linkages between foreign direct investment and local businesses, is key to realising the potential of African economic integration, especially in the context of the new AfCFTA.

Multiple opportunities are present in Africa for governments and private sector actors to co-ordinate in creating new regional value chains. Functioning regional economic institutions, development banks and financial markets in Africa can supply ideas and finance entrepreneurial activities, bringing new value chains and ecosystems to life. Such potential for innovative business models ranges across fields such as energy, food and agro-processing, forestry, mining, health, transport, construction, water and sanitation, housing, culture and information and communications technology (ICT), all supported by a fast developing African tech industry.

Innovative connections are also emerging, such as the example of a supply chain for high quality tires between Rwanda and Ghana. With the prospect of doubling its population by 2050, more megacities than anywhere else in the world except China and India, along with the densification of its rural economies, Africa can become a dynamic centre in the world economy. Moreover, the impact on land values in African localities will generate a new tax base, a classical source of domestic development finance.

Public investment in infrastructure will remain fundamental, to which public sector capacity and innovation is essential. In addition, whole-of-government approaches and messaging at the level of both political leaders and public officials would be critical. In this context, digital technologies that are opening up new location and connectivity options are generating innovative ways of providing basic services in Africa. These avenues have the potential of enabling Africa to leapfrog and even pioneer in some fields, with high-speed low-cost broadband services available to all (World Bank/China Development Bank, 2017[18]).

At the same time, African countries will need to expand education, improve learning outcomes and upgrade professional skills in order for their human resources to make full use of new digital technologies. In particular, technical and vocational education and training that incorporates ICT skills could be enhanced. That implies investments in African human and institutional capacities to build large communities of African professionals versed in new technologies, as populations double – for example, the population in Malawi, with 17 million people now, is projected to be 34 million by 2035.

2.3. Investments in Africa's infrastructure: Partners and frameworks

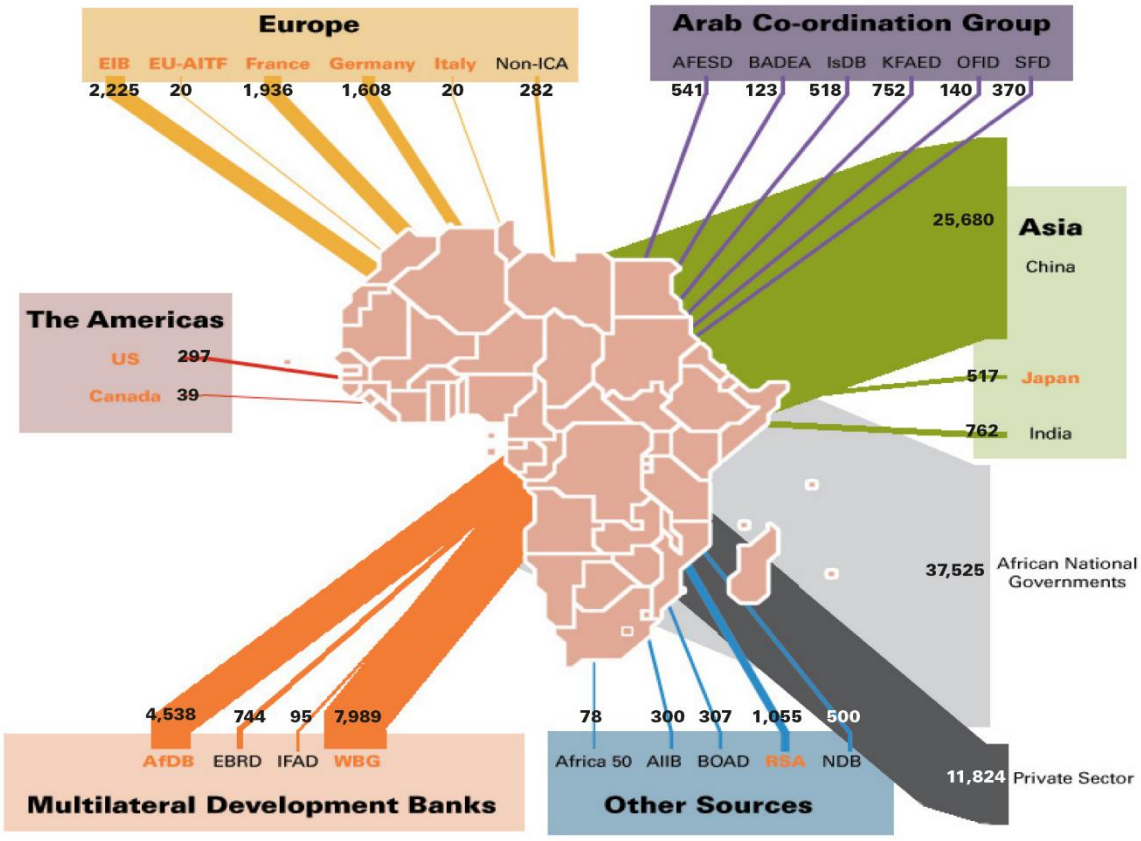
The Infrastructure Consortium for Africa (ICA) recorded that new financial commitments to African infrastructure in 2018 totalled USD 101 billion. The origin of these new commitments was: 37% African governments; 26% China;[5] 22% ICA members; 12% private sector[6] and 2% Arab Co-ordination Group (see Figure 2.1). Compared to 2017, the new commitments in 2018 increased by approximately 12%, mostly from higher financing by African governments and the inclusion of some sub-national financing, along with a major increase in new commitments from Chinese sources, which rose from USD 19 billion in 2017 to USD 26 billion in 2018, including a USD 5.8 billion commitment to a 3.5 GW hydro complex in Nigeria which will take 6 years to complete. The sectoral distribution of total new commitments in 2018 was 44% energy, 33% transport, 13% water, 7% ICT, and 4% multisector (ICA, 2019[6]).

The ICA was founded at the Gleneagles G8 Summit in 2005. Its members include current G7 members, South Africa, the European Commission, and multilateral development banks (MDBs) such as the AfDB and World Bank Group, the European Investment Bank (EIB) and the Development Bank of South Africa. While the data record new commitments made in the year, disbursements will be spread over the years of project implementation. Commitments data are lumpy by nature and can oscillate significantly from one year to another, and not all commitments may eventuate in project implementation (China-Africa Research

Initiative/Johns Hopkins University, 2020[19]). The annual ICA diagram thus indicates the range and nature of current financing sources and their relative size. And importantly, it includes financing by African governments themselves, including some sub-national financing, essential for a proper perspective on African infrastructure finance.

However, given the oscillations from year to year, the diagram needs to be complemented by moving averages. Thus the 2018 data in Figure 2.1 of USD 38 billion from African government sources compare with a USD 28 billion average in 2015-17; the USD 26 billion from Chinese sources in 2018 compare with an average of USD 16 billion in the preceding three years; and the USD 20 billion from ICA members in 2018 compare with average commitments of USD 19 billion in 2015-17. Hence, Chinese financing for African infrastructure has been running at levels comparable to, or higher than, financing from all G7 members and MDBs combined.

Figure 2.1. Sources of infrastructure financing in Africa in 2018, commitments in USD million

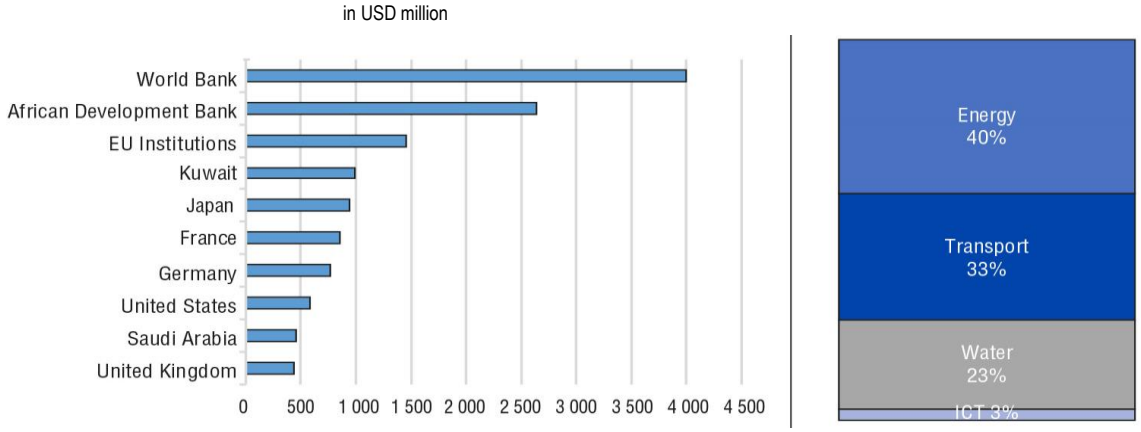


Source: (ICA, 2019[6]), Infrastructure Financing Trends in Africa 2018, https://www.icafrica.org/fileadmin/documents/IFT_2018/ICA_Infrastructure_Financing_Trends_in_Africa_-_2018_Final_En.pdf.

Among the development partners that report their official development finance (ODF) statistics to the OECD, the top contributors to Africa's infrastructure in 2018 were the World Bank, the African Development Bank, European Union (EU) institutions, Kuwait, Japan, France, Germany, the United States (USA), Saudi Arabia and the United Kingdom (UK) (Figure 2.2). The statistics in this figure, drawn from OECD data, are for *disbursements* and thus not comparable to the *commitments* data in the ICA diagram above. Commitments are normally higher than disbursements as project portfolios expand. As for the sectoral breakdown of total ODF disbursements for infrastructure from these partners,

40% went to energy, 33% to transport and storage, 23% to water supply and sanitation, and 4% to ICT (Figure 2.2). These allocations mirror the distribution of total financing of Africa's infrastructure shown in Figure 2.1, including the private sector. However, in general, water supply and sanitation tend to have a higher proportion of financial support from development partners, while ICT tends to have a relatively higher share of private investment (Miyamoto and Chiofalo, 2016[20]).

Figure 2.2. Top 10 ODF development partners for Africa's infrastructure in USD million disbursements and sectoral breakdown in 2018



Source: (OECD, 2020[21]), Creditor Reporting System (database), https://stats.oecd.org/viewhtml.aspx?datasetcode=CRS1&lang=en.

Some of the development partners have special international programmes that concern infrastructure development in Africa. Flagship agreements include the following:

- The **Yokohama Plan of Actions 2019, adopted at the Seventh Tokyo International Conference on African Development (TICAD),** includes construction and facilitation of effective implementation of economic corridors, improvement of the capacity of border logistics and authorities related to border crossing, and expansion of access to affordable renewable energy, which are in line with the G20 Principles for Quality Infrastructure Investment. Support for a number of large urban centres is also prominent (TICAD/MOFA, 2019[22]).
- The **Forum on China-Africa Co-operation Beijing Action Plan (2019-21)** provides for the formulation of an infrastructure and financing plan jointly with the AU in order to enhance continental and sub-regional connectivity. In particular, the contribution by Chinese enterprises is focused on power generation, regional transport and ICTs. The next triennial FOCAC conference will be held in Senegal in 2021.
- The **G20 Compact with Africa,** initiated by Germany in 2017, together with the **Marshall Plan with Africa** and the **Reform Partnerships** led by BMZ, aim to promote private sector investments and job creation while acknowledging good governance (G20, 2017[23]).
- The **EU External Investment Plan** includes infrastructure development in Africa, particularly targeting job creation and mobilising private capital (EU, 2017[24]). The European Investment Bank committed EUR 3 billion in new financing to African countries in 2019 and expects to commit a further EUR 4 billion in 2020. The EU is exploring the option of consolidating existing development finance activities into a single entity that would have additional financial resources to particularly focus on Africa and address climate change. Infrastructure development would be a priority sector for this entity (Council of the EU, 2019[25]).

- The **USA** established the Millennium Challenge Corporation in 2001, targeted to countries that met certain governance standards, including a number in Africa. It has now begun to consider cross-border projects in Africa. The government introduced the Power Africa programme in 2007 and passed the Better Utilisation of Investment Leading to Development Act (BUILD) 2019, which includes the establishment of a new US International Development Finance Corporation, charged with developing a "Blue Dot" certification system for global infrastructure (CSIS, 2020[26]).

Public investment, funded by domestic budget, official development finance (ODF) and international bond markets, will continue to be the primary source of finance for infrastructure development. Given its nature, private finance will not suffice to fund basic infrastructure with widely spread social returns and spill-overs, as shown in other world regions that relied on public investment to develop infrastructure. Roughly, only 6% of infrastructure projects were financed by private investors between 2015-17 (ICA, 2019[6]).

For financing infrastructure that generates dedicated revenue streams, Africa is joining the intensified global effort to attract funding from large global institutional investment vehicles via structured project information systems, blended finance instruments and more integrated policy making. Therefore, in addition to external resources, an entrepreneurial African development finance industry has a vital role to play. Much of the financial need can be mobilised from local resources, such as domestic capital markets and the private sector (AfDB, 2018[27]), provided new financial tools are developed, existing practices scaled up, regulations adapted, and management advisory services become ubiquitous.

2.4. New mind-sets and PIDA 2021-30

New mind-sets are emerging for better quality and faster infrastructure development in Africa to meet the demographic and economic megatrends as well as to address the ubiquitous bottlenecks in the project cycle. The focus of the second phase of PIDA is precisely this – with larger visions and actions towards the creation of ecosystems beyond single projects that include integrated economic corridors, global, regional or local value chains, and linkages of urban and rural economies. The PIDA 2021-30 aims to also better prioritise projects by selecting 50 projects (10 per region) that can strategically enhance the regional integration of the continent. This prioritisation aims to ensure that the projects are implemented by the end of the plan, since less than half the projects had reached the construction or operation stage at the end of the first phase of PIDA. This requires capacities for rapid opportunity-based investment with entrepreneurial agents who are able to co-ordinate public and private actors to get things done, including consultation processes at the community level.

The AU aims to enhance its vision, strategy and programme for the development of priority regional and continental infrastructure through the second phase of the PIDA 2021-30. The idea is to merge infrastructure sectors increasingly under this overarching African strategy to achieve economies of scale and socio-economic agglomeration through an integrated corridor approach. This could enhance co-ordination in achieving continental integration, particularly by enhancing the creation of regional value chains. In this context, it is of paramount importance to address the bottlenecks to Africa's infrastructure development, identified at the Dakar Financing Summit, notably regarding the lack of capacity and funding for project preparation, financing, and involvement of the private sector. Furthermore, the process needs to fully integrate ESG dimensions.

3 Accelerating and scaling up quality infrastructure pipelines and implementation: Key frontiers

The project cycle for major infrastructure projects takes a significant amount of time world-wide as they are large, complex, and expensive to construct. Nevertheless, the speed by which core infrastructure is being developed in Africa is far too slow to meet the economic and social needs of its growing population. It is lagging compared to other developing regions,[7] which is magnified by a lack of finance raised internally and provided by development partners and commercial investors. In fact, in many cases, the projects never even make it past the project preparation or feasibility phase due to capacity inadequacies and limited dedicated funding (McKinsey, 2020[28]). This is stunting the ability of the continent to meet its development challenges of the 21st century and deliver on its promise as the new growth pole of the globe.

This research effort leverages publicly available literature and pairs it with new knowledge derived from case study analysis of bridge projects in Africa as well as discussions at high-level expert meetings. As described in Box 1.1, this section blends three research streams. Direct attribution and supporting evidence in the long-form text can be found in Annex C along with case study descriptions in Annex D and in the contributions from the Sustainable Infrastructure Foundation and the Global Clearinghouse for Development Finance in Annex A.

The resulting body of evidence indicates the bottlenecks and obstacles that are impeding Africa's rapid infrastructure development. These include overarching issues such as: the political nature of all large projects; structure and co-ordination of government ministries and agencies; institutional capacity constraints of governments; varying regulatory and technical standards; constrained access to finance; and the requirements of individual development partners. They also are found more uniquely within steps in the project cycle, such as project development inadequacies, delays and hurdles in resettlement, inefficiencies in the procurement process, complications in negotiations, unfavourable conditions for private finance and sub-optimal prioritisation by financing source. This section elaborates on these findings organised by steps in the project cycle.

While the research methodology was crafted to uncover impediments, **the inquiry found an abundance of good practices including many that arise from learning by doing in Africa**. A clear focus on governance emerged through enhancing training and professional development, optimising intragovernmental continuity and collaboration, increasing standardisation and harmonisation within countries and across boundaries, and implementing digital platforms that are transparent. Transcending good practices go on to include reforms that insulate regulators from outside influence, improve project prioritisation aligned with the optimal financing sources, and embrace negotiation strategies that achieve value for money, local content and knowledge transfer. Within project cycle steps, some key takeaways include establishing a peer learning mechanism early on, approaching infrastructure as a programme beyond individual projects, continuously involving key stakeholders, enforcing internal controls in procurement, selecting a strong project sponsor and competent general contractor, and improving the enabling environment for private investment, especially from local sources.

3.1. Political economy and project preparation are keys to project development

As in other parts of the world, political economy issues can impede infrastructure development in Africa. In particular, disputes arising from the political process as well as the expression of vested interests by politicians or businesses take time to resolve. Moreover, changes in political leadership can overturn previous commitments to infrastructure projects. The risk that political instability may arise also remains a significant drag on infrastructure development, which becomes an impediment to attracting private investment. On the other hand, strong political commitment and accelerated infrastructure development may also have drawbacks if the infrastructure is built at the expense of transparency, accountability and inclusiveness.

As governance capacity required for securing the laws, regulations, institutions and finances are pre-requisites for quality infrastructure, the lack of human capital and organisational experience can be a challenge. In addition, poor co-ordination among ministries can lead to an incoherent government approach towards infrastructure projects. In particular, the capacity to manage sustainable debt levels in order to borrow more to finance infrastructure is crucial. Regardless, bottlenecks can also be caused by development partners that at times pull out of initial agreements to provide funding due to changes in their financial and budgetary situations.

As African governments grapple with constrained public resources, their ability to commence early project preparation – including carrying out pre-feasibility studies – is limited without external support. However, it is often difficult for African governments to obtain funding for project preparation because of the low likelihood of realising the plans. Furthermore, while large amounts of PPFs are available for project preparation, **the conditions to access are complex and time-consuming to start the infrastructure development**.

3.2. Continuous engagement with stakeholders is requisite for pre-development

Successful delivery of infrastructure projects requires effective early-stage screening, feasibility assessments and rigorous evaluation for implementation, which includes design evaluation, compliance with legal regulations, financial viability, cost-benefit analysis, socio-economic impact assessments and social and environmental impact assessments. Robust feasibility assessments identify expected service outcomes in line with overall development priorities, project concepts, access benefits, project boundaries and scope, technical options and demand projections.

Building capacity to conduct rigorous social and environmental impact assessments (SEIA) is crucial to mitigate potential risks associated with infrastructure developments. Although infrastructure projects that are carefully planned create various benefits such as employment opportunities, social inclusion and local empowerment, if risks are not adequately managed, the local environment and people's well-being could deteriorate, causing social discontent, delays and cost overruns. Indeed, considerations on environment – such as climate change, water use, pollution and biological diversity – and social elements – such as gender equality, social inclusion, labour conditions, health and safety – should not be compromised for the sake of accelerating the development process. While speeding up the development process is vital to meet the growing demand of infrastructure in Africa, ensuring that infrastructure is of a sufficient quality is equally essential for sustainable and inclusive growth. Depending on the requirements of multilateral organisations and development banks involved in projects, the length of SEIA process can vary, which impacts the length of the project cycle.

Land acquisition and resettlement affect people's livelihoods such as the loss of assets, job security, food security and economic conditions. **Negotiations for land acquisition, resettlement and compensation generally take a long time,** involving translation into local languages, clarifying land ownerships and agreeing on arrangements, which often affects the overall project timeframe. During this phase, projects may experience delays largely due to weak legal framework in land ownerships, disagreements for resettlement and compensation with local populations as well as political crisis.

Requirements and conditions for compensation can vary depending on standards set by funding organisations. The lack of pragmatism and flexibility in requirements and insufficient consideration for local contexts could result in delays, for instance due to duplicated compensation processes towards the same residents without land titles during or after a political or security crisis to satisfy compliance standards by the development partner. This poses a question regarding the extent to which globally applied standards by traditional development partners that do not allow for the flexibility in responding to local contexts become bottlenecks in accelerating infrastructure development. Throughout the above-mentioned pre-development phase, identifying affected stakeholders and keeping them continuously engaged are critical for building trust, credibility, partnerships and consensus for effective and efficient implementation of projects, while mitigating potential risks of disputes throughout the infrastructure life cycle that could cause delays. Systematic stakeholder consultation may require strengthening domestic regulations and processes for public sector consultation, as well as improving legal frameworks for managing social and environmental impacts. This could help mainstream quality standards in project development.

3.3. Value for money, transparency and competitiveness are pivotal in procurement

Good procurement practice is a crucial aspect in building cost-effective quality infrastructure on time, through a transparent and fair process. However, projects in Africa often show procurement to be the weakest link in project cycles. Bottlenecks such as lack of value for money, efficiency of administration and lack of transparency impede Africa's GDP growth by nearly 2.2% per year.

Procurement procedures require a strong administrative capacity, particularly in inter- and intra-ministerial co-ordination. However, skilled administrative personnel can be scarce; hence co-ordination in implementing the procurement processes often takes longer time, which results in significant time delays of the projects cycle. In addition, time delays are experienced as a result of difficulties in processing different documentation and tender evaluation requirements, as bidding procedures are not harmonised across development partners.

African governments often prefer non-competitive methods such as direct contracting or sole sourcing to avoid the time-consuming process of supplier selection. This has the benefit of expediency given the need to scale infrastructure quickly. However, in order to attain the best value for money and quality of infrastructure, maintaining a competitive bidding procedure is fundamental for large-scale infrastructure projects. Absence of these features can lead to a downward spiral of bribes, collusion, bid rigging and fraud. These practices can result in low quality infrastructure as well as re-bidding that may require twice the time initially planned for a project.

Furthermore, **projects are often selected based on low financial bidding costs, rather than lowest life cycle costs with better quality.** As such, these projects can be more expensive in the long run due to high maintenance and operation costs, as well as the shorter useful life of the project. Moreover, while some African governments and traditional development partners include the degree of local content in the evaluation criteria of the procurement, in order to create engineering and management capacities in the domestic construction sector, others do not necessary take this into consideration.

3.4. Private investment and ownership must grow

Africa is underperforming in its share of private sector investment in infrastructure when compared to other developing regions. **Given the scale of needs, the amount of private sector investment must grow for African countries** to continue to progress. Private finance faces obstacles and bottlenecks that are unique, which can delay, stunt or abort infrastructure projects (see Samuels in Annex A for ways to confront these problems).

Negotiating, devising and implementing concessions, financial packages and legal agreements associated with private finance are costly, complex and time-consuming, which leave sophisticated arrangements for governments to manage for years to come. These involve public-private partnerships (PPPs) in a context where countries often lack the capacity and legal framework to negotiate and execute, which can result in poorly structured agreements and elaborate workarounds of existing laws and regulations. The time required, uncertainty and significant upfront costs are not conducive to private investment. This necessitates a dedicated and financially capable project sponsor willing to see the project through the difficult process, which are in short supply on the continent.

Time to financial close is too slow. This can result from the lack of expertise, resources and human capital of government actors, which can be complicated by overlapping agencies and ministries working in poor co-ordination with unnecessarily complex processes across the project cycle. It can also be magnified by development partners and DFIs that layer in additional requirements and work in timeframes unsuitable for many private investors. Further, private investors worry that regulators and the judicial system are not adequately independent and insulated from the government or the political process, leaving them exposed to risks associated with contractual integrity.

The risk protections that counter uncertainty are woefully inadequate. This is the case for host governments to some extent, but mostly due to insufficient availability of insurance and guarantees provided by donor-funded development institutions. The lack of standardisation adds to the challenge requiring investors to tailor solutions to each situation, which demands additional due diligence, legal advice and expert opinions leading to delays, higher costs and risk. This is magnified by the absence of harmonisation of engineering standards, regulations and specifications across sub-Saharan Africa.

There are also not enough projects that meet private investment requirements. Infrastructure is too often not prioritised to optimise private finance. Political figures and government officials exhibit a tendency to fund flagship high-profile projects with public funds and as a tool for geopolitical strategic interests, even when these projects may be the type most viable for private finance. This leaves the remaining vital projects lacking public funds and unable to attract private investment. Regardless, the projects made available for private finance suffer from the combination of high discount rates due to an amalgamation of unmitigated risk factors, high upfront costs and long waits for positive cash flows, which steer away investors who employ a discounted cash flow approach for investment decisions.

The private sector is more likely to invest in existing assets with a track-record of financial viability rather than new projects laden with upfront costs and risks. This complicates efforts when governments have a clear need for greenfield projects and few existing projects are made available for private finance. Furthermore, projects in search of private finance require more robust project preparation, complex feasibility studies and significant transaction advice to hit investment hurdles, which entails more upfront time and cost. This is further stymied when the capacity to undertake the kind of project preparation is limited and must seek external expertise. The result is an inadequate pipeline of bankable projects.

3.5. Institutions, procedures, standards and contracts are crucial for construction

Political events, such as changes in government, general strikes, deteriorations of public security or economic crises, can stall construction for many years. Furthermore, due to the multisectoral nature of infrastructure development, unclear division of roles and the overlapping nature of regulatory bodies and executing agencies may require extra time to co-ordinate before construction. The lack of human resource capacity and skills in ministries poses further challenges in getting resources and equipment in place to build the infrastructure.

Institutional procedures related to sequencing and adequate environmental and social impact assessments (ESIA) can also affect the construction stage. Furthermore, land acquisition and resettlement need to be completed before the commencement of civil works. While gaps in technical capacity result in poor quality construction, unified engineering and other technical standards, regulations and specification across sub-Saharan Africa also need to be addressed. Harmonising standards is particularly crucial among different countries in regional cross-border transport infrastructure projects.

Moreover, **poor performance by or disagreements with local contractors can cause major delays**. In particular, if incidents escalate to contract disputes, resolution will require active co-operation by the sponsoring authority, contractor and several government departments. Other major technical causes of delay involve design change in construction, which can be due to imperfect estimation or natural factors, but sometimes results in quality reduction.

The operations and maintenance (O&M) stage can also face delays due to slippage of different types of logistical procedures. In some cases, where local consultations or compensation have not been carried out properly, surrounding residents can hinder operations. Furthermore, **if resources to carry out necessary maintenance of infrastructure are not secured, it could lead to operational malfunctioning as well as expensive rehabilitation**. Ensuring the availability of funds for optimal maintenance throughout the whole operation period can raise economic efficiency of infrastructure expenditures and free up valuable resources to be used for other investments.

3.6. Good practices insights: Modernising governance and institutions

Despite the challenges, a body of good practices is being developed across the continent. The research suggests several good practices that transcend the project cycle. Bottlenecks, capacity and scale can be addressed by improving and modernising government. **Better training, professional development and advisory support in areas such as regulatory reform, concessional arrangements, procurement and negotiation would enhance capabilities**. Organisational reform could streamline processes, enhance intergovernmental co-ordination and make it easier for external parties to move through the process. Standardisation, paired with transparent digital platforms, would help improve scale and efficiency, as well as prevent corruption. Further, harmonisation of standards, specifications and regulations across borders could be aligned through bilateral or multilateral treaties.

Transcending good practices also include the insulation of regulatory bodies from political pressure that could improve their accountability to perform their mandate in a timely and predictable manner. Governments could also benefit from a project prioritisation process that targets the most pressing needs first and optimises the various sources of finance. Regardless, governments should look to improve access to external resources, while simultaneously addressing governance and institutional development. This includes a negotiation approach with traditional development partners and China alike, focusing on advancing national development priorities, optimising financing costs, and ensuring local employment and content, as well as knowledge transfer. Infrastructure development could further benefit from a systematic upstream approach for programme development, whereby development partners proactively work with project sponsors and host governments starting early on in the project cycle.

Good practices emerge within project cycle stages as well. **Early on, a system to incentivise host governments to maintain a commitment to infrastructure projects could be developed. Peer learning mechanisms could facilitate the enhancement of administrative capacity for the speedy completion of infrastructure project preparation**. Moreover, traditional donors could engage in these dialogues to discuss ways to make project preparation more effective. The pre-development phase would be enhanced by continuous involvement of affected stakeholders and transparent two-way communication to address local demands and concerns. SEIAs and plans for land acquisition and resettlement should employ an effective dispute resolution system, which clearly defines procedures and policies that compress the timeframe required.

The procurement stage could benefit from incorporating a sound managerial system and including an inter- and intra-ministerial focus on prioritising quality of infrastructure in terms of value for money, transparency and competitiveness through fair processes. **Improving integrity standards, enforcing internal controls for corruption and enacting monitoring schemes could improve efficiency of projects and avoid unnecessarily slowing down the process**. Procurement can be further enhanced by training workshops and seminars for staff, as well as by the implementation of e-procurement systems.

Construction risk can be mitigated by a competent general contractor overseeing and implementing a management structure that enables co-ordination among sub-contractors with appropriate risk-sharing measures. Delays can further be avoided with suitable penalty clauses. In addition, performance records of local contractors should be kept to reference for future projects. The adoption of digital technology and innovative practices can help build better, cheaper, faster and safer infrastructure. In the long term, temporary facilities could be established to assemble parts close to construction sites, which could dramatically reduce construction time and labour costs. In addition, innovation-friendly regulations and policies, as well as technological solutions, can reduce life cycle costs.

Private finance can be attracted to transparent, accountable and independent institutions employing effective leaders and capable staff. **Strong project sponsors and project champions can be pivotal in driving projects from concept to completion**. The establishment of a “one-stop-shop” for infrastructure projects can also be an attractive feature for private investors. Further, a legal framework for private investment can help avoid costly and time-consuming workarounds. Governments could also find it beneficial to sell brownfield projects to private investors to fund new greenfield projects. Additionally, expanded risk mitigation resources and co-investment programmes by development institutions could enhance private investment. This would help address the deterrent of high discount rates that have placed infrastructure investments at a disadvantage; lower discount rates improve valuations and should result in more private investment.

The ecosystem for private investment is enhanced when there is a focus on environmental, social and governance (ESG) standards, which are becoming a critical requirement for the participation of institutional investors. Regulatory, operational and fiduciary reforms related to the management of pension assets could also play a significant role in unlocking capital managed by African pension funds that have been called on to reach the goal of allocating 5% of their investments in infrastructure. Lastly, expert negotiation support can be crucial for sound concessional and financial agreements with private actors.

With this background, new African business models for managing project cycles are emerging, particularly by fast-tracking project development processes, while building in quality, sustainability and integrity factors. These approaches make project cycles – particularly at the project preparation stage – more compact and replicable, as well as amenable to changing circumstances and opportunities. For example, efficient early-stage screening and advisory of project proposals can improve chances to receive construction finance quicker and guarantee successful operations. **Early-stage project preparation is especially important as it is estimated that 80% of infrastructure projects fail at feasibility** (McKinsey, 2020[28]).

The key to infrastructure development is to have a project sponsor with the political backing and professional capabilities to orchestrate and drive projects through the whole cycle from concept to completion. **This entails streamlining project developing processes, managing complex partnerships and responding rapidly to unexpected challenges and opportunities**. Such project sponsors may be in the public or private sectors or in DFIs (see attached note from the Sustainable Development Foundation on its SOURCE platform for tracking project cycle progress and co-ordination issues).

In addition, **upfront financial modelling is essential in determining which projects should be regarded as public goods and which can generate enough revenue to attract private investment**. In this respect, feasibility study departments in ministries and development partner agencies can also be better connected with departments responsible for putting together the financing. For public procurement projects, lead agencies in the public sector would need to take up strong co-ordination roles by qualified and dedicated civil service staff. For PPP projects, while consortiums in the private sector have demonstrated operational capacities and assume interactive roles in specific projects, a clear driving agency is essential. In this respect, new African DFIs and investment funds that have emerged are finding ways to work on a fast-moving entrepreneurial basis.

4 Pathways ahead

4.1. Conclusions

Africa needs to urgently develop infrastructure to meet its demographic challenge and exploit new economic opportunities. The study therefore tried to identify bottlenecks as well as good practices in the different phases of infrastructure development in order to examine the factors that impede this pressing mission and to come up with some mechanisms to address them (see Table 4.1 for summary).

Table 4.1. Key takeaways from the research

Project cycle	Bottlenecks	Good practices
Overarching or transcending factors	Political economy, structure and co-ordination within government, institutional capacity constraints, capabilities within government, varying standards, constrained access to finance and development partner requirements	Professional development, intra-governmental continuity, standardisation, digital platforms, transparent systems, insulation of regulators, project prioritisation, financial source optimisation and negotiations with development partners
Early stage	Changing political priorities and project development inadequacies	Peer learning mechanism and incentives to ensure commitments to projects
Pre-development	Unsatisfactory feasibility studies, delays in ESIAs and complications in land acquisition and resettlement	Support for feasibility studies, continuously involving key stakeholders and effective dispute resolution systems
Procurement	Inefficient procurement process, complex regulatory framework and negotiation complications	Sound managerial system, focus on value for money and internal controls to improve transparency and fairness
Construction and operation	Institutional procedures, logistical processes, technical capacity, sub-contractor performance, design changes and inadequate maintenance resources	Competent general contractor, sub-contractor co-ordination, adoption of digital technology, logistical focus and innovation-friendly environment
Private sector investment	Unfavourable conditions for private finance, institutional framework, lack of risk protections, complex negotiations and sub-optimal prioritisation by financing source	Strong project sponsor, streamlined interface with government, institutional reforms that facilitate private finance, risk protections by development partners and ESG standards
Construction and operation	Institutional procedures, logistical processes, technical capacity, sub-contractor performance, design changes and inadequate maintenance resources	Competent general contractor, sub-contractor co-ordination, adoption of digital technology, logistical focus and innovation-friendly environment

The review has acknowledged that there is indeed a duality in Africa's infrastructure development. On the one hand, **the traditional model of financing from MDBs and OECD members is based on the principle of good governance – transparency, accountability, inclusiveness, equity and the rule of law**. These conditions are required by traditional development organisations from all their partner countries – not just in Africa –, since they need to be accountable to their taxpayers and shareholders. However, **this requires institutional capability, which is taking time to build in Africa, delaying processes in each step of the infrastructure project cycle**. Recognising that major infrastructure projects are inherently time-consuming and subject to unforeseen events and complications, **current project development processes are being reconsidered to meet Africa's needs in the coming decades.**

On the other hand, the support by China, which adopts a non-interventionist approach by taking the local environment as a given, does not make demands or conditionalities in governance issues. Through this pragmatic stance, **infrastructure supported by China can be built quickly, which could generate economic growth and social development. At the same time, by riding on institutional voids or weaknesses, this model could undermine long-term development of partner countries** via facilitating corruption, harming the environment, violating human rights or generating unsustainable debt. The issues connected with Chinese development finance are widely discussed (China-Africa Research Initiative/Johns Hopkins University, 2020[19]).

Chinese development actors, who are conscious of these systemic problems – lack of transparency, use of tied aid, few local employment opportunities, and weak labour and environmental standards –, are providing training via learning by doing processes, as well as moving to inject stronger ESG standards into their project work (Gil, Stafford and Musonda, 2019[7]). Further, historical evidence of countries that are wealthy today suggests that economic development leads to improved institutions, not necessarily the other way around, and that economic governance and social justice are ongoing historical and current issues in many developed countries today (Chang, 2011[29]).

4.2. Recommendations: Developing an infrastructure business model 2.0

Based on the review, **this section proposes ideas to explore how the above two contrasting approaches can be combined through an African owned and led model of building institutions and capabilities, where the infrastructure project cycles can become SMART, compact and replicable, while simultaneously meeting the quality and institutional challenge**. The ideas, which are interlinked, have been generated by the review and inputs from a high-level experts group; they include expanding two mechanisms:

- promote the wider application of AUDA-NEPAD's PIDA Quality Label, along with other existing manuals, toolkits and initiatives
- create a confederating platform for regular real-time peer learning on project development practices by an African community of infrastructure professionals.

These could be done within the PIDA framework, which has already established agreements among African Heads of States on issues that are key to infrastructure development, such as filling the financing gap, addressing challenges in project preparation, and promoting local ownership. This is particularly pertinent since the AU and AUDA-NEPAD have the mandate to represent the “African Voice” for infrastructure development and advise AU Member States. The following elaborates on these two concrete actions.

a) African brand for excellence in infrastructure development processes

Among the numerous PIDA instruments developed, the AUDA-NEPAD designed a project screening and advisory tool called the PIDA Quality Label (PQL) as part of the Service Delivery Model (SDM), with support by Germany through GIZ (see Box 4.1). The objective is to shorten the time needed to get from project proposals through to financial closure, with initial quick checks and the use of scoring and technical advisory systems. More specifically, it is intended for DFIs and other financing partners to use PQL as a screening and appraisal tool to fast track early-stage advisory. This African model is currently planned to be applied to projects emerging from the PIDA 2021-30 selection process. The aim is to build in regional and sectorial linkages, with a rigorous analysis in terms of markets, movements and investments, so that projects selected for PIDA are implementable rather than remaining aspirational.

However, **the quality could be developed into a business model for wider use beyond projects for private investments and the early-stage preparation**. First, as PPPs usually take up a small share of total infrastructure projects in many developing countries – in particular, PPPs in PIDA's first phase are estimated to be only 7-11% of the total number of PIDA projects[8] –, the quality label could also be applied to the majority of infrastructure projects that are carried out through public procurement. Second, although project preparation is a key stage that delays infrastructure development particularly in PPPs, there are major bottlenecks in other stages of procurement, resettlement, construction and O&M that need to be removed and accelerated. Third, the mechanism could also include facilitating the necessary decentralisation of project cycle management to sub-national levels in Africa. This could possibly be accommodated especially if the 50 projects to be selected for PIDA's second phase are considered as programmes for corridors and regional connectivity with multi-sectoral sub-projects subsumed – as was the case for the first phase of PIDA –, leading to a prioritised holistic approach to infrastructure development.

Box 4.1. The PIDA Quality Label

As part of the PIDASDM, the PIDA Quality Label (PQL) is a recognition by the AUDA-NEPAD awarded to projects that excel in the preparation of PIDA projects at an early stage. Its overall goal it to unlock critical bottlenecks in project development. The objectives are:

- to shorten the period to reach feasibility and bankability stage
- to identify project preparation gaps and help access project preparation facilities (PPFs)
- to certify excellence in project preparation with a label recognised by stakeholders.

The mechanism will help Regional Economic Communities (RECs) and Member States structure project information, particularly in submitting applications to PPFs. This is important in order to obtain funding to carry out technical studies. It will then help the project owner to establish bankable projects and reach financial close.

Sources: (AU-PIDA, 2019[30]; AU-PIDA, 2019[31]).

The idea of expanding the PIDA Quality Label concept is to develop an African solution to the duality dilemma of building institutions and capabilities by bringing in traditional partners, Chinese actors and all other infrastructure stakeholders under a common framework. It could also be used to align government agencies and enhance co-ordination among them by expanding the concept of a quality label to many stages of the project cycle. Here, key components are: standardisation of procedures, such as procurement and sector guidelines, **enhanced use of digital technology**, increased transparency, assistance in removing bottlenecks and providing incentives.

On standardisation, clearer institutional and procedural guidelines and guidance – or at least the minimum requirements – could help reduce time loss in each step of the project cycle from project conception, project development – which includes feasibility studies, SEIAs, community consultations, resettlement, procurement, value for money calculations and contracting –, construction, to O&M. In other words, **a common handbook on infrastructure development could reduce uncertainties and confusion regarding who needs to do what in a time-bound manner**. This idea is already envisaged in PIDA 2021-30, as standardisation of these processes becomes increasingly important for private capital providers and public finance agencies alike.

This would be particularly pertinent to transboundary regional projects in the second phase of PIDA that emphasises an integrated corridor approach. It implies that neighbouring countries would have a shared basis that spells out the respective responsibilities for harmonised regulatory frameworks, policies, financing arrangements, and technical standards with clear milestones to make joint programming work. **This calls for further thinking on how sovereign States could be subsidiary to the RECs or supra-national entities in order to drive the common objective of Africa's integration in a systematic and practical manner**. This could be explored at the sector level in each corridor or at the sub-regional level, for example, like the West Africa Power Pool.

Guidance that is African driven already exists such as the AU and AUDA-NEPAD Procurement Manual, which can be applied to infrastructure projects. Other instruments such as the PIDA Job Creation Toolkit also help planning infrastructure projects by estimating the number and types of jobs that can be created from planning, construction and O&M phases of infrastructure projects. Per the Job Maximisation Guide in the Toolkit, the terms of reference for procurement can be designed to require local sourcing, training and employees without sacrificing quality infrastructure. In fact, creating benefits at the local level reduces risks and costs over the longer term (see Samuels in Annex A).

At a more comprehensive level, the online project management platform, SOURCE, which has all the major MDBs as board members including the AfDB and Development Bank of Southern Africa, is designed to provide real-time information for pipeline of infrastructure projects. While it is mostly intended for institutional investors who are looking for opportunities to invest in PPPs, the checklist provides *de facto* a holistic framework for managing infrastructure from the policy environment to the project level (see Sustainable Infrastructure Foundation in Annex A).

The main feature of an online project platform such as SOURCE is that it combines standardised formats with ICT. The exploitation of digital technologies and innovative approaches in accelerating and scaling up the infrastructure project cycle cannot be over-emphasised. Aside from efficiency gains, sharing standardised information through digital means also enhances transparency, which is necessary for gaining understanding and support by various stakeholders, including government departments, financiers and the general public.

In particular, greater use of e-procurement procedures is expected to increase transparency, thereby possibly reducing incidences of misprocurement and other delays. In this respect, the AUDA-NEPAD's Procurement Manual encourages the establishment of a dedicated portal and giving bidders the opportunity to submit their offers electronically. It states that this is an effective way to increase efficiency and reduce the environmental impact of traditional paper-based tendering (AUDA-NEPAD, 2017[32]). The OECD's procurement guidelines also suggest that e-procurement increases efficiency by facilitating access to public tenders, while improving transparency by holding public authorities more accountable (OECD, 2020[33]).

The system could also build on the PIDA's SDM to identify weaknesses and critical project development bottlenecks, provide tailored solutions, and thereby enhance institution building (AUDA-NEPAD PIDA, 2020[34])**. This could be carried out by facilitating capacity building and training through real-time peer learning (see item b below), and by identifying project preparation gaps, encouraging continued political commitment and helping RECs and countries to structure projects**. It could provide assistance for qualitied projects in seeking funding from different sources: multilateral and bilateral development partners, DFIs, PPFs, long-term investors and so on. Particularly in the case of PPPs, it could support the negotiation stage by linking up with resources, such as the CONNEX Initiative, a contract negotiation support provider which was initiated in the G7 context (CONNEX, 2020[35]).

The enlarged project quality label concept could thus consider incorporating the above key aspects of standardising project cycle – particularly using common digital platforms and technologies – and transparent information sharing. **In other words, the mechanism could require, assess, assist and recognise projects that fulfil these conditions**. This is particularly important since the infrastructure development process needs to be managed with a robust dynamic performance metrics, which is currently lacking. While this is particularly the case for PPPs, it applies to public infrastructure as well. A performance-based system, which could include rewarding staff, thus needs to be developed and championed by Africa's political leaders who would be empowered through technical metrics that deliver candid reporting on impediments in infrastructure project development and menus of possible solutions (see Samuels in Annex A). **On this basis, the project quality label could then be designed so that it provides enough incentives for governments, development partners, and other stakeholders to build quality infrastructure in a SMART, compact and replicable manner**.

To realise this, it would require the status of the quality label to be elevated to, and recognised as, an African brand – by countries, development partners, the private sector and the public –, as something similar to the International Standard Organisation (ISO) or certifications such as the Michelin Star or World Heritage Site that recognise excellence. This could build on the experience of PICI, which facilitated in maintaining political commitment to key infrastructure projects. In particular, the label could be linked to infrastructure that contributes to the aspirations of the AfCFTA and commitment by countries towards the Paris Agreement on Climate Change, in addition to the corridor and regional connectivity approach envisaged for PIDA. **The aspiration is for the label to have a signalling effect beyond infrastructure development management, namely to become a symbol or gold standard that would give confidence to the private sector to invest in the country**.

b) Confederating platform for peer learning and capabilities

To address the challenges in scaling up the provision of infrastructure and speeding up project cycles, **a technical platform that federates the fragmented capacity-building initiatives could thus play a role in the enhancement of these African human and institutional capabilities. In the end, these capabilities will drive infrastructure provision in a dynamically transforming continent.**

While the G20 is working on important issues such as principles for quality infrastructure investment, reflections to reform the global financial governance system, and actions to improve project development and the investment environment (G20, 2019[36]), actual implementation requires further collective efforts building on the continuous G20 work on quality infrastructure (G20, 2017[23]; G20, 2018[37]; G20, 2019[36]). As infrastructure project development in Africa today is human capital intensive**, to accelerate and scale up infrastructure development requires a new "transformation" mind-set by leveraging an expanding multidisciplinary community of African infrastructure professionals.** These professionals are educated, trained and experienced in operating in a landscape that demands more entrepreneurial co-ordination across disciplines, actors and financial agents. It entails numerous phases of co-ordination at different levels of governance, across borders and locally, with community-level engagements.

Forming such a broad multidisciplinary community of African infrastructure professionals is an essential priority. Such an endeavour needs to be pursued at different levels – e.g., public and business administration programmes at undergraduate and post-graduate universities; training courses and internships; online sharing of case studies via video materials; and the formation of professional associations. In particular, it is important to work together with the private sector, technical and vocational education and training institutes, policy makers, engineers, lawyers, environmental specialists, as well as international organisations including the International Labour Organisation and the OECD. Topics can include upstream regulatory issues, project preparation, designing procurement systems that require local sourcing, and O&M – all without sacrificing the quality dimension of infrastructure. Given the rich accounts

of new kinds of project experience, the demand for sharing experience and case studies in an ongoing programme of real-time learning across public and private sectors is growing.

Particularly in terms of promoting PPPs for quality infrastructure, there is a need to train African professionals to use specialised finance techniques, such as blended finance and managing contracts. **Not only does Africa need a larger pipeline of investable infrastructure projects, it also needs the pipeline of human capital to develop PPPs.** Instead of the "business as usual" workshops to train Africans, it could pursue the modality that is carried out worldwide among infrastructure specialists, i.e. training combined with on-the-job internships (see Samuels in Annex A). In this context, the Continental Business Network launched by AUDA-NEPAD in 2015 to crowd-in financing for infrastructure project will be a key platform for collaboration and sharing lessons-learned between the public and private sectors (AU-PIDA, 2015[38]).

Another area that merits exchange of experience is on how to enhance co-operation among African governments and traditional and non-traditional development partners. This includes sharing good practices on upstream reforms, negotiating financing arrangements, procurement, requiring conditions for local content, risk assessment, or adapting ESG standards more flexibly. In particular, expropriation and resettlement issues, which can delay infrastructure development and be costly, should be adapted in locations where residents do not have land titles (see Sub-section 3.2).

With this background, many African academic institutions and DFIs are already organising professional groups or running training programmes for civil servants and other infrastructure experts (see Box 4.2). In fact, there is a plethora of capacity building events and networks on Africa's infrastructure challenges, mostly working in silos. **Therefore, the idea is not to reinvent the wheel, but to overcome fragmentation by pooling resources, linking up pockets of excellence, and improving the coherence of the AU.** In this respect, aside from AUDA-NEPAD, the AU's African Capacity Building Foundation, which also has several relevant knowledge products, can play an important role.

To connect up silos, developing a repository of relevant events, courses, and successful institutional models could be useful. In addition, a database of experts in the different infrastructure fields that could serve as a marketplace platform to demand and supply African expertise could also be explored. **While peer learning should look at experiences in Africa, it could also extend to other regions, including countries of the Association of Southeast Asian Nations**, where infrastructure has played a key role in the developmental transformation over several decades and where a regional approach is now being actively pursued. Lessons from the EU's Trans-European Transport Network in enhancing regional cohesion through cross-border infrastructure could also be explored on a case-by-case basis.

Box 4.2. Development and Investment in Infrastructure Conference Series (DIIS)

The Development and Investment in Infrastructure Conference Series (DII) is an annual process of conferences on infrastructure development and investment in Africa, as well as more broadly in the developing world. It is organised annually by the University of Zambia, the University of Johannesburg, the Copperbelt University (Zambia) and the National Council of Construction of Zambia. The three-day event aims to provide a forum for leaders, researchers, practitioners and other stakeholders in infrastructure development to discuss, evaluate and devise ways of maximising benefits from infrastructure development in Africa. The goal is to achieve outputs that will inform policy makers and the wider public of challenges and best practices in development. Participants include:

- academics in Africa and other regions working on research projects for Africa's infrastructure
- economic associations and professional bodies such as the Chartered Institute of building and the Engineering Institute of Zambia
- DFIs, and contracting, consulting and manufacturing organisations
- presidents and former presidents of Zambia, Tanzania and South Africa
- development partners, such as the EU
- the Network of Energy Excellency for Development, supported by the EU
- Engineering Education for Sustainable Cities in Africa, supported by the University of Toronto.

From the first conference in 2015 until the most recent one in 2019, themes have highlighted the importance of integrated infrastructure management, investment, procurement and finance, ICT in infrastructure development, sustainability and renewable energy, as well as legislative and institutional frameworks for infrastructure. The DII publishes a proceedings report, consolidating papers produced by participant experts in the field from numerous African countries. The last proceedings report, *The Construction Industry in the Fourth Industrial Revolution,* provides insights into effective and efficient delivery and operation of physical-to-digital asset transformation and infrastructure management.

Source: (DII Conference, 2020[39]).

Annex A. Contributions by participants

Potential for use of SOURCE as a project management platform in Africa (Contribution from the Sustainable Infrastructure Foundation, Geneva)

Discussion items for the Phase II Action Agenda

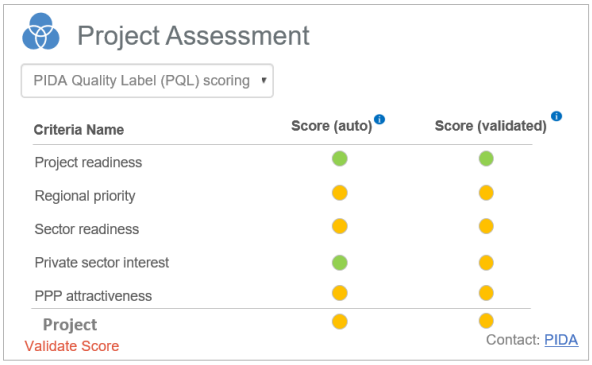
Component I: Use of SOURCE to assess and benchmark projects against international guidance and standards

SOURCE is the online multilateral platform for quality infrastructure led and funded by multilateral development banks (MDBs). It brings a systemic change in the way governments define, develop, and manage their infrastructure projects for both traditional procurement and public-private partnerships (PPPs). SOURCE embeds a set of sector-specific templates covering governance, economic, technical, legal, as well as environmental and social, aspects across the entire lifecycle of infrastructure projects.

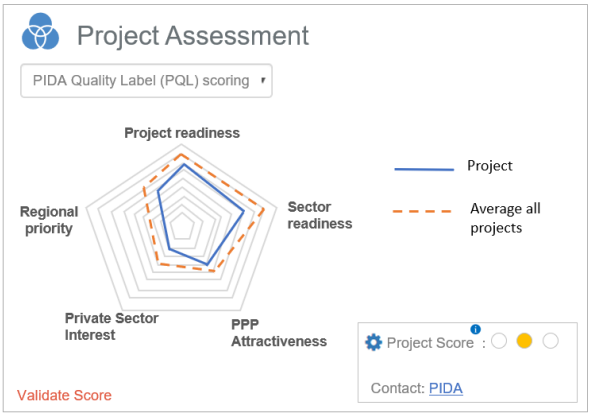
These templates provide project developers: i) a comprehensive map of all issues to be considered when preparing a project, and make informed decisions throughout the project cycle; and ii) a standardised approach to collect and structure key project information across all sectors, procurement modes and regulatory frameworks. Projects may therefore be assessed against international guidance and standards, with the development of a specific module. The SOURCE platform could thus be used not only as a project management system, but also as a learning vehicle for African countries at national and sub-national levels.

Figure A A.1. Examples of a project assessment module on SOURCE, with PIDA Quality Label

Potential Design #1



Potential Design #2



Component II: Piloting of SOURCE in Africa

As part of the second component, it is suggested to identify case studies that can be piloted on SOURCE and thus help share best practices and lessons learned between key stakeholders. This will actively foster a real-time online exchange to a broad multidisciplinary community of African infrastructure professionals, and in such a way strengthen the capacity of African institutions for the preparation and knowledge of investment requirements from financiers and investors. This initial exercise could serve as a basis for a wider roll out in more African countries.

Developing a professional project finance community in Africa (Contribution by Dr. Barbara Samuels, Executive Director, Global Clearinghouse for Development Finance, New York)

Action steps for effective development of Africa's infrastructure

As underlined in this compelling report, ***"traditional project development processes will not […] meet Africa's needs in the coming decades"***, the report sets forth the urgent need for African governments and development partners to restructure the project development processes currently used for infrastructure development across the continent.

In fact, if the project development processes are reengineered – even in the current economic crisis –, Africa can access more finance for its infrastructure, including from African pension funds. The core building blocks for more effective project development processes cut across core principles of investability, related finance techniques, engagement of expert professionals, and the development of an African-based project development ecosystem. *Co-ordinated accelerated actions* across African governments with the support of AUDA-NEPAD and development partners include the following:

1. **Use project finance techniques, such as special purpose vehicles and ring-fenced revenues:** The best practice for the design and risk mitigation of infrastructure projects is non-recourse project finance techniques. The annual assessment of project finance loans by Moody's Investors Service documents the superior performance of African project finance loans, with defaults of African infrastructure projects from 1983 to 2017 averaging 5.5%, a lower default rate than Latin America (12.9%), Asia (8.8%), Eastern Europe (8.6%), North America (7.6%), and Western Europe (5.9%) (Moody's Investor Service, 2019[40]).
2. **Provide infrastructure project sponsors with highly-specialised technical support needed to develop investable infrastructure projects**: African pension funds have indicated a strong interest in investing in Africa's infrastructure, provided the projects meet their investment criteria. The most effective way to meet investor criteria is to engage experienced professional project developers. In fact, surveys of professional project developers have demonstrated their willingness to provide their services to African governments and other project sponsors, provided the project is developed in alignment with investor criteria and a market-based model is used to compensate them for their services.
3. **Train African professionals to use specialised project finance techniques:** Not only does Africa lack pipelines of investable infrastructure projects, but also the *pipelines of human capital needed to develop investable projects*. "Business as usual" is the use of workshops to train Africans, while worldwide infrastructure specialists are able to obtain graduate school training combined with on-the-job internships and positions. African governments and their development partners need to immediately and urgently employ *"blended learning" models* that combine first-rate free on-line lectures with in-country university courses, combined with internships and job training.
4. **Manage development processes with robust dynamic performance metrics:** Despite the mantra of "moving from billions to trillions", there is no performance system to define and measure the metrics of project development processes that result in investable projects that can mobilise finance. A technical performance-based system needs to be championed by Africa's political leaders, who would be empowered through technical metrics that deliver candid reporting on impediments in infrastructure project development and menus of possible solutions.

In short, Africa and its partners can embrace achievable actions moving from "business as usual" to new effective processes that can accelerate the development and finance of infrastructure projects.

Annex B. Issues note for the high-level think tank and senior technical experts meetings

Introduction: Infrastructure as a driver of Africa's transformation

With the world's most rapid population growth in terms of regions and a newly established continental free trade agreement becoming operational, infrastructure can act as a driver of Africa's transformation. Accelerated and scaled-up quality infrastructure development can become a catalyst for growth (IEA, 2019[12]) by driving local construction industries and attracting investments, thereby building dynamic ecosystems of associated economic activities. To assume this role, infrastructure may support strategic industrial clusters, facilitate regional production networks and enhance the abilities of firms to thrive in new markets (AUC/OECD, 2019[2]). Infrastructure is crucial in providing the services needed for raising the well-being of an African population that will almost double (UNDESA, 2020[41]).

To meet the United Nations' Sustainable Development Goals (SDGs) by 2030 and achieve the African Union's Agenda 2063, Africa needs a major scaling-up of its infrastructure. As projects supported by many development partners require long time periods, President Nana Akufo-Addo of Ghana called upon the Development Centre of the Organisation for Economic Co-operation and Development (OECD) and the African Center for Economic Transformation (ACET) to establish a technical platform that would facilitate policy dialogue and create insights into how to accelerate and scale up quality infrastructure in Africa. In the following sections, issues for this policy dialogue will be outlined, notably in the context of the Programme for Infrastructure Development in Africa (PIDA), which aims to facilitate African integration.

Africa's labour force and economic potential: Creating a new mind-set around opportunity

The continent's rapid demographic development demands a new mind-set around opportunity. Currently, the African population is the youngest of all regions, with a median age of less than 20 years (UNDESA, 2019[1]) and under-15 children accounting for about two-fifths of the total (UNECA, 2016[42]). Africa's population is projected to grow from a current 17% of the global population in 2018 to 26% in 2050 (UNDESA, 2019[1]). The continent is thus projected to experience a 40% increase in its working age population from 2018 to 2030 (AfDB, 2019[43]).

Africa's growing working age population provides major opportunities to achieve productive transformation (AUC/OECD, 2019[2]). However, demographic growth can also turn into a threat if job growth does not keep pace, thereby exacerbating the existing challenge of youth unemployment. By 2030, up to 100 million young Africans who will enter the job market in the coming decade may not find jobs if this challenge is not met (AfDB, 2019[43]).

The continent is experiencing rapid urbanisation. Its urban population is projected to increase from 472 million or 40% of the total in 2015 to 1.3 billion or 56% in 2050 (UNECA, 2016[42]). Urbanisation is an opportunity for Africa's economic development because it generates economies of agglomeration, stemming from a reduction in transport costs, thereby allowing for a cheaper exchange of goods, services,

people and knowledge (Ellison, Glaeser and William, 2010[44]). However, if cities do not provide the necessary public goods, including infrastructure, their rapid growth can also lead to congestion and poor sanitary conditions (AfDB/OECD/UNDP, 2016[9]). To accommodate their rising numbers of inhabitants, African cities and growing megacities would therefore need to boost their housing construction and enhance the provision of public services, such as clean water, electricity and public transport (ICA, 2019[6]).

Moreover, stronger urban-rural linkages are required to provide better access to jobs and social infrastructure that can improve labour productivity and well-being, as well as reduce poverty and income inequality. In other words, for urbanisation in Africa to be functional and sustainable, the rural sector also needs to develop its productive capacity and create good quality jobs. This will ease the pressure on cities stemming from rural-urban migration, and foster territorial development across the continent. However, rural supply chains require connectivity to towns and cities, particularly through local transport infrastructure.

The African Continental Free Trade Area (AfCFTA) will constitute the world's largest free trade area in terms of number of participating countries (Tralac, 2019[45]). The objective of AfCFTA is to foster intra-continental trade, which accounted for only 17% of African exports in 2017, compared to 59% in Asia (UNCTAD, 2019[46]). To date, 30 of the 54 countries have ratified the instruments, which were supposed to enable trading under AfCFTA from 1 July 2020; however due to COVID-19, the starting date has been postponed. The trade liberalisation is expected to result in productivity gains through scale production and enlarged domestic consumer markets for African firms. It can enhance regional production networks and value chains, reducing dependency on the global economy, and thereby fostering self-sustained development (AUC/OECD, 2019[2]).

The key element of AfCFTA is the elimination of tariff and non-tariff barriers, which currently pose a significant obstacle to intra-continental trade. The average tariffs levied on goods traded within Africa are significantly higher than those within other regions (AfDB, 2019[43]; UNCTAD, 2019[46]). As a response to removing 90% of existing tariffs under AfCFTA, estimates indicate a possible 14-16% increase in intra-regional trade (AfDB, 2019[43]; Abrego and al., 2019[47]). Additionally, the agreement aims to advance the removal of non-tariff barriers such as diverging technical standards and sanitary and phytosanitary rules, cumbersome administrative procedures or arbitrary enforcement of country-specific trade regulations. The African Development Bank (AfDB) estimates that such measures, combined with the removal of tariffs, could result in an increase in intra-regional trade of up to 107% (AfDB, 2019[43]). This implies major investment in facilities and processes for trade facilitation. At the same time, the successful integration of African economies will also require overcoming the lack of infrastructure, which presently acts as a major impediment to intra-African trade (UNCTAD, 2019[46]).

In particular, transport infrastructure that facilitates local, national and regional linkages will be crucial for fostering trade across the continent. It is also critical for enhancing the connectivity of the many landlocked African countries to the sea. As such, transport infrastructure can increase productivity, reducing Africa's prohibitively high transport, logistics and materials costs, and can thereby improve the competitiveness of African firms (AUC/OECD, 2019[2]). This, in turn, will be essential for their integration into global value chains, which could also play an important role in the continent's economic transformation.

In this context, PIDA aims to develop a vision, strategy and programme for the development of priority regional and continental infrastructure (AfDB, 2019[43])**. Bringing infrastructure programmes increasingly under an overarching African strategy such as PIDA would enhance co-ordination in achieving continental integration**. Simultaneously, this should leave room for local, decentralised initiatives, which will play an increasingly important role for scaling up infrastructure development, requiring replicable project cycle management tools that can serve all tiers of government.

Accelerated and scaled-up quality infrastructure builds dynamic ecosystems

To accelerate and scale up quality infrastructure, it will be important to adopt a new mind-set which captures the dynamics of ecosystems. A key aspect of infrastructure is that its wider economic impact goes beyond the direct value created for the users of a facility (Collier and Cust, 2015[48]). Empirical evidence spanning the period from 2000 to 2011 suggests that infrastructure investments had a significant positive impact on economic growth in sub-Saharan Africa (Kodongo and Ojah, 2016[49]).

People in developing and emerging economies are often more vulnerable to environmental and climate risks, social and gender inequality, and poor labour conditions. As infrastructure assets generally last several decades, long-term quality and sustainability considerations need to be embedded into decision-making processes at all phases of infrastructure planning and project development to ensure wider social and economic benefits. **Quality Infrastructure thus requires planning, decision and implementation processes that build in, from the very beginning, inclusive and sustainable growth and development factors**. These are set out under SDG 9 and other goals, as well as the G20 Principles for Quality Infrastructure Development (G20, 2018[37]).

Infrastructure governance processes must therefore be multi-dimensional, multi-actor and territorially-based, reinforcing the State by reinforcing local actors. This means regular systematic oversight at a high level to ensure that the key policy and implementation connections are happening at all levels of governance, while also facilitating the acceleration and scaling up of quality infrastructure. **With strengthened governance, quality infrastructure raises economic efficiency, integrates environmental and social considerations, and builds resilience against natural disasters**. It improves people's well-being by providing better access to jobs, raises labour productivity through on-the-job training and capacity building, and thereby reduces poverty, gender inequality, and social exclusion. In addition, quality infrastructure builds better business environments and market access. Life-cycle costs and spill-overs become part of the decision and management equations, integrating maintenance and safety costs which are vital components of lifetime returns on investment.

In the African context, scaling up infrastructure development could lead to a booming local construction industry that helps provide new jobs for the growing working age population. Recent empirical evidence indicates that the construction industry is closely linked to economic growth in Nigeria (Abubakar, Abdullahi and Bala, 2018[50]). Furthermore, enhanced infrastructure creates the conditions to attract private investments, generating additional jobs and economic activities. Research suggests a positive impact on infrastructure development and foreign direct investment (FDI) inflows in North and East Africa (Anyanwu and Yameogo, 2020[51]). The increase in demand for labour will be met by abundant supply, giving workers on-the-job experience that will upgrade their skills (Romero, 2015[52]). This will result in rising household income and consumer spending, thereby expanding local, national and regional economies.

Africa can seize this opportunity of rapid urbanisation to build new infrastructure resilient to climate change, since two-thirds of the investments in urban infrastructure are still to be made between now and 2050 due to rapid urban growth (AfDB/OECD/UNDP, 2016[9]). Today's technological advancements provide additional momentum for a transition to a green economy and sustainable cities in Africa. According to the International Energy Agency (IEA), a major shift towards renewable energy sources and increases in efficiency would allow for an economy four times larger than today with only 50% more energy consumption (IEA, 2019[12]).

A major scaling up of infrastructure activity will build dynamic ecosystems of associated activities – networks in which participants create economic value by collaborating, exchanging knowledge and co-developing capacities (Pulkka and et.al., 2016[53]). Due to the high level of interdependence among all actors, the dynamic development of the ecosystem as a whole is likely to be intensified through the increase in local consumer spending and further investments.

The imperative to build quality into infrastructure will in itself generate ecosystems of consultation processes as well as sharing of relevant knowledge and good practices that will increasingly emerge among African actors. Professional policy communities and civil society movements providing local, regional and pan-African capacities already exist as the foundation for underpinning the quality dimension of a scaled-up infrastructure industry. These capacities also allow for the essential expansion of evaluation, research and communications services to ensure quality infrastructure.

Scaled-up infrastructure will connect African regions, sub-regions, cities, towns and villages, enhancing the flow of goods, services and capital. This would not only contribute to realising the economic benefits expected from AfCFTA, but also expedite broad-based growth at all levels all over Africa (OECD/SWAC, 2020[8]). In particular, transport infrastructure can also facilitate networks for the flow of people and goods, knowledge, and information. Although such networks are increasingly shaped by ICT, empirical research confirms that geographical proximity remains an important factor for knowledge spill-overs. In other words, transport infrastructure that enables face-to-face contact can positively impact the development of human capital as well as public and private sector capacities, which are important drivers of productive transformation (OECD, 2015[54]).

Taking a broad transformative approach to infrastructure development can promote a continental network perspective (ECDPM, 2019[55]; Gu and Carey, 2019[56]). This includes bringing projects under an overarching strategy situating the continent and its ecosystems in a global context. African companies need integration in value chains that are increasingly global, which have become an important feature of world commerce (AfDB/OECD/UNDP, 2016[9]). For achieving productive transformation, it is also important to generate added value in the form of intellectual property. This includes products of cultural industries (e.g. Nollywood), African brands and mobile applications supported by ICT infrastructure.

Dynamic infrastructure ecosystems drive employment, savings, and public revenues

Financial commitments to African infrastructure projects amounted to about USD 101 billion in 2018 (ICA, 2019[6]), of which 37% came from African governments. Doubling the total volume of annual investment over the PIDA 2021-30 period would require a 7% increase per year, a significant challenge, but not out of reach. In this respect, as outlined in the previous section, rising public revenues and national savings, resources generated from economic growth as a consequence of accelerated and scaled-up quality infrastructure would be central to financing additional infrastructure investments.

The key locus of financial sustainability is thus not external debt, but domestic savings and public revenues that are put to good use via local and regional financial markets, and effective fiscal systems. The increase in domestic savings is a natural consequence of rising income levels stemming from enhanced labour market opportunities (AfDB, 2019[43]). While public revenue also rises with economic growth, governments can leverage additional resources by increasing tax rates and improving tax collection (AUC/OECD, 2019[2]). Furthermore, the rising land-values resulting from enhanced infrastructure constitute an additional tax base, which could then provide more funding for infrastructure. This is particularly pertinent for sub-national governments, since rapid urbanisation will require a larger share of infrastructure to be built in cities (Allain-Dupre, Hulbert and Vincents, 2017[57]; Paulais, 2012[58]).

Enabling sub-national governments to finance and manage infrastructure development will become increasingly important. Enhancing and creating new domestic funding channels, particularly capital markets that can be accessed by all tiers of government, will be key for self-sustained financing (ICA, 2019[6]). Furthermore, successfully strengthening the involvement of sub-national governments will require extensive capacity building at this level (ICA, 2019[6]). In this context, decentralisation that can increase efficiency by improving accountability and better utilising localised knowledge will be essential for quality infrastructure development (ICA, 2019[6]).

It is also essential to secure resources to carry out necessary maintenance of infrastructure, which can be equally important as new investments. In fact, failure to perform routine maintenance leads to disproportionally high rehabilitation expenditures (ICA, 2019[6]). Applying the Principles of Quality Infrastructure means project development should always account for the full life-cycle cost, which also implies ensuring the availability of funds for optimal maintenance throughout the whole operation period. As this can raise economic efficiency of infrastructure expenditures, it would ultimately free valuable resources to be used for new investments rather than expensive rehabilitation. An infrastructure maintenance industry in itself would be an integral part of the ecosystem, generating employment, domestic demand, formal sector enterprise and fiscal revenues.

Harnessing digital technologies can make infrastructure more efficient and cost-effective, as in the transport and logistic sectors, where digital technologies are used for mapping, communication and management processes. In particular, technologies that provide information on location – including taxi-hailing and ride-sharing platforms – or mobile applications that allow customers to book package delivery services instantaneously via their smartphones, have brought innovation and efficient service delivery across Africa. Digitally related smart grids can generate significant energy savings too. Thus, the increasing cost-effectiveness of infrastructure due to advances in digital technologies means that the number of attractive opportunities to invest in the infrastructure sector is rising.

As significant increases in the financing of infrastructure will be necessary for Africa to achieve the SDGs, private resources must complement public funding from host governments and international development partners (ICA, 2019[6]). Where revenue streams generate a permanent income for private investors, public-private partnerships (PPPs) can help catalyse capital. However, while PPPs constitute an opportunity for African infrastructure development, they have to balance the interest between profit-seeking private stakeholders and welfare-maximising public actors. Moreover, many African countries lack the required regulatory frameworks and administrative capacity to design effective PPPs (World Bank, 2018[59]). Therefore, governance related to PPPs needs significant improvement in order to use this modality more widely to leverage private capital in Africa (ICA, 2019[6]).

Blended finance, which is the use of development resources to mobilise private funds, can serve as a flexible and practical tool, although the process requirements and financial analysis are complex and require much time for implementation. The rationale is that sufficient capital is out there in the world economy, but too little of it is going to developing countries due to high risks and lack of transparency. Mobilising even a small fraction of the global stock of financial assets would enable a significant expansion of infrastructure development in Africa. Blended finance mechanisms can mitigate risks for the private sector to invest in infrastructure, as well as provide major equity stakes to the investors for the provision of a limited contribution to the overall project funding.

In addition, other financial instruments, such as low-interest credit and guarantees backed by development partners with their expertise, can also help develop local financial institutions and capital markets to allow for a transition towards self-sustained financing (ECDPM, 2019[55]). However, data show that very little of the private capital catalysed by blended financing mechanisms goes to least-developed countries. Therefore, developing the instruments to supplement the public funding necessary for scaled-up infrastructure development in these countries remains a frontier challenge for development finance institutions.

In sum, under favourable conditions, scaled-up infrastructure investment will result in dynamic ecosystems of economic activity that lead to increased public revenues and domestic savings. This increase in financial resources could ensure the financial sustainability of infrastructure expansion in Africa. Furthermore, private finance, including PPPs, can serve as an additional source of capital. The allocation of resources for routine maintenance, as well as digital technologies, can also increase the cost-effectiveness of investments.

SMART, compact and replicable project cycles foster decentralisation and accelerate scaling up

Developing SMART, compact and replicable project cycles is necessary to accelerate the planning, design and implementation of scaled-up quality projects. SMART project cycles mean infrastructure development processes that set Specific, Measurable, Attainable, Relevant and Time-bound goals. Compact project cycles are organised systematically to minimise the effort and time needed for completion. This includes efficient step-by-step mapping of interfacing procedures, avoiding predictable bottlenecks, and harnessing local and regional problem-solving processes. Replicable project cycles require standardised SMART and compact procedures that can be applied to projects across infrastructure sectors and geographical locations, while still being flexible enough to allow for locally-tailored solutions. They should also optimise the use of skills and resources that public administrations at various government levels need for their infrastructure project development and operations. This could include the use of new technologies such as e-procurement and possibly blockchain. SMART, compact and replicable project cycles should furthermore be compatible with the PIDA Quality Label, which certifies excellence in the early-stage project preparation of PIDA projects.

For scaling up, it is important to incentivise infrastructure project planning by African governments and development partners with a future impact perspective, as opposed to a backward view (IFC, 2019[60]). In other words, good practices for SMART, compact and replicable project cycles should relate project impact on market and service outcomes with development objectives (Fay, Martimort and Straub, 2018[61]; Foster and Briceño-Garmendia, 2012[62]). The International Finance Corporation's Anticipated Impact Measurement and Monitoring (AIMM) system allows for estimating the expected development impact of projects, including on the wider economy. It is underpinned by a set of frameworks for the analysis of up to 25 individual sectors. Availability and replication of such project development methodologies would remove a key bottleneck in African infrastructure development.

Case studies will be used to provide real-world project cycle experiences that help inform the development of project cycles that are SMART, compact and replicable. The case studies will be conducted as part of a joint ACET/OECD Development Centre/GIZ programme analysing a set of bridge projects in Africa that are supported by different international development partners. To ensure comparability, a Common Framework will be used that captures the key processes in the project development phase (project definition, investigation, local consultations, appraisal, procurement, financing) and in the construction and operation phases. The findings will feed into a final synthesis report.

Annex C. Evidence of impediments and good practice

Evidence of impediments

a) Early stage

The political economy, governance capacity and project preparation are important aspects in accelerating and scaling up quality infrastructure throughout the project cycle. However, they are particularly critical during the early stage of project development.

Political economy

Political economy issues impede infrastructure development in Africa in multiple ways. Firstly, project selection is often based on considerations for gaining and maintaining power. For example, politicians tend to favour highly visible projects, often large-scale mega-projects, which are notorious for cost overruns and delays. In addition, special interest groups, such as business elites, frequently try to influence project selection with the aim of rent extraction (KPMG, 2019[63]). As a result, disputes arising from personal gains take time to resolve before project preparation can be started.

A case can be made that all the bridges studied were affected by political factors in some way, including the Wouri River Bridge in Cameroon, that involved both a project that delivered a domestic political victory and factored into geopolitical considerations in relation to France and their support of the project via the *Agence française de développement* (AFD). This political process significantly slowed down the process as the country oscillated between partnering with France or China (AFD Cameroon, 2020[64]). A similar situation played out in Mozambique. Once the prospect of Portuguese support faded due to the global financial crisis, the country turned to China with a high-level dialogue outside of a traditional procurement process (Zhou, 2020[65]). Further, this project was pursued despite arguably more pressing transportation infrastructure needs in the country (Pilling, 2017[66]).

Moreover, changes in political leadership can overturn previous commitments to infrastructure projects which generally require longer than one election cycle for completion (McKinsey, 2020[28]). This can lead to a large number of projects that are pursued at an early stage but never gain momentum because of changes in political priorities. In the worst cases, projects are started but remain unfinished (AfDB, 2018[27]). For multi-country projects, these challenges are exacerbated, since continuous political support is required from the governments of all host countries.

Secondly, political instability and violent conflicts remain a significant threat for infrastructure development in many African countries: 11 States are ranked in the lowest decile globally in terms of political stability and absence of violence (World Bank, 2020[67]). In addition to electoral changes in leadership, coups d'état add to the risk of overturning previous commitment to infrastructure. The uncertainty stemming from political instability acts as an impediment to external investments, particularly in immovable assets such as infrastructure (ICA, 2019[6]).

The example of the Maputo-Catembe Bridge in Mozambique illustrates the challenge of political instability: the idea to build a bridge over the Maputo Bay was already pursued by the administration of former President Samora Machel in the 1980s (Daniel, 2018[68]). In 1989, the World Bank endorsed plans for an improved transportation network, which included the proposal of a bridge, as part of Maputo's urbanisation policy. However, the civil war and unrest in the following years prevented advancement of the project development, which only gained momentum after confidence in the country's economic prospects was restored in 2008 (Daniel, 2018[68]). With a more stable security situation, the construction finally started in 2014 with financing from the China Exim Bank. Hence, political instability and violent conflicts prevent projects from even being started, thereby constituting a major barrier to scaling up infrastructure in African countries. This case is also not alone in this study. The Henri Konan Bédié (HKB) Bridge was delayed more than a decade due to political instability and civil war (Wadda, 2020[69]).

On the other hand, strong political commitment and accelerated infrastructure development may also have some drawbacks. For example, Kenya developed a 475 km long railway linking Mombasa Port to Nairobi with Chinese assistance in a record time of four years. The process was centrally controlled by the President of Kenya, who was able to unilaterally resolve disputes, adapt to uncertainty, mobilise State resources quickly and circumvent problems caused by ill-defined property rights. In other words, the infrastructure was built at high speed, but at the expense of transparency, accountability and inclusiveness (Gil, Stafford and Musonda, 2019[7]).

Governance capacity

An additional factor to consider is the governance capacity required for securing the laws, regulations, institutions and finances that are pre-requisites for quality infrastructure development. Creating the enabling environment for infrastructure can be challenging for many African governments due to the lack of human capital and organisational experience (AfDB, 2018[27]). In particular, the capacity to manage sustainable debt levels in order to borrow more to finance infrastructure is crucial. For example, the development of the Second Bridge over Wouri was delayed since Cameroon, as a heavily indebted poor country, had to wait until the debt levels declined enough for the International Monetary Fund (IMF) to allow borrowing again.

In addition, lack of co-ordination among ministries can lead to an incoherent government approach towards individual infrastructure projects, which can discourage private investors and development partners from engaging in project preparation (AfDB, 2018[27]). In fact, infrastructure projects require strong governmental support at all levels. For example, the Henri Konan Bedé Bridge in Côte d'Ivoire was realised because of significant participation and co-ordination by the Ministry of Finance, the Ministry of Economic Infrastructure, the cabinet, and other local authorities (Wadda, 2020[69]).

Project preparation

Within total finance of an infrastructure project in Africa, preparation costs are estimated to amount to 7% to 12% (CSIS, 2020[26]; ICA, 2019[6]). As African governments grapple with constrained public resources, their ability to even commence early project preparation without external support is limited. This means that starting serious project investigation, such as pre-feasibility studies, typically requires negotiations with a development partner beforehand.

At the same time, it is often difficult for African governments to obtain funding from development partners or private investors for project preparation because of the low likelihood of realising the plans. Reviews show that the required applications for technical and/or financial assistance for project preparation can also be time-consuming. On the other hand, bottlenecks could also be on the side of the development partner. Before the China Exim Bank stepped in to finance the Maputo Bridge in Mozambique, Portugal had committed to its financing in 2010. However, due to the country's financial and budgetary crisis, the plan had to be abandoned (Loureiro, 2018[70]).

This dilemma applies to sub-national governments as their budget constraints are even tighter than for national governments and as external financiers are reluctant to provide financing to them (ICA, 2014[71]; Paulais, 2012[58]). This challenge takes place in the context of rapid urbanisation in Africa, requiring substantial investments in urban infrastructure to provide much needed services (OECD/SWAC, 2020[8]). Since a large part of the land is not yet occupied, infrastructure can be developed beforehand by avoiding time-consuming and costly resettlement (Collier, 2014[72]). However, strategic planning and enforcing the underlying regulations to make this work also requires a high level of governance capacity, which sub-national governments currently lack (Collier, 2014[72]; AfDB, 2018[27]).

b) Pre-development

Successful delivery of infrastructure projects requires well-planned infrastructure investment with transparent selection criteria, robust policies and regulatory frameworks with accountable public institutions. Effective early-stage screening, feasibility assessments and stakeholder engagements are necessary to realise the positive economic, environmental, social and development objectives of infrastructure for sustainable and inclusive growth (Global Infrastructure Hub, 2020[73]). In Africa, however, 80% of infrastructure projects fail to reach financial close, mainly due to the lack of capabilities and budget in governments and developers for project design and implementation with commercial viability (McKinsey, 2020[28]). In developing countries, approximately 5-10% of total project investments is spent on project preparation costs that involve streamlining policies and institutional settings, infrastructure planning and project development (Global Infrastructure Hub, 2020[73]; OECD, forthcoming[3]).

Feasibility studies

The clarity of the role of infrastructure in the overall development strategies is critical in order to align infrastructure plans with national and sub-national development strategies (G20 Development Working Group, 2019[74]). This ensures maximising positive spill-over effects of infrastructure by assessing needs for achieving development objectives. Disconnects between socio-economic development plans and infrastructure planning hinder the effectiveness of infrastructure projects (OECD, 2018[75]). Therefore, the prioritisation of infrastructure plans needs transparent criteria with consistent national mandates and priorities across various ministries. Prioritised projects then require rigorous evaluation and feasibility assessments for implementation, including design evaluation, compliance with legal regulations, financial viability, cost-benefit analysis, socio-economic impact assessments, and social and environmental impact assessments (Global Infrastructure Hub, 2020[73]).

Robust feasibility assessments identify expected service outcomes in line with overall development priorities, project concepts, access benefits, project boundaries and scope, technical options and demand projections (Global Infrastructure Hub, 2020[73]). Insufficient consideration is often paid to the economic interactions between individual projects, leading to situations where an infrastructure project does not contribute to enhancing connectivity due to a lack of consistency and relevance between infrastructure plans and development strategies (OECD, 2018[75]). The lack of connectivity consideration in feasibility studies also results in delays of project delivery (Chatham House, 2016[76]).

Achieving expected service delivery requires rigorous feasibility assessments including future demand projections for ensuring long-term sustainability of infrastructure projects. For instance, the Maputo-Catembe Bridge in southern Mozambique, financed by the China Exim Bank, opened in November 2018. The bridge has significantly reduced the time taken to cross the Maputo Bay, linking the centre of Maputo city to the outlying district of Catembe. Before the opening of the bridge, an average of 2 705 passengers a day travelled between Maputo and Catembe.

However, in the first year after the opening, actual traffic over the bridge has been considerably lower than expected, only reaching 73% or 75% of what had been planned. During the first year, 1.1 million vehicles had crossed, whereas the target was 1.5 million. This impacted on the amount raised by the tolls. Ensuring sufficient maintenance of the bridge requires yearly revenue of MZN (Metical) 240 million, while the first year raised only MZN 217 million (Club of Mozambique, 2019[77]). This indicates that the financial viability of the feasibility process may have been lacking. The fact that the project was largely scoped out prior to the participation by the Chinese construction firm and the China Exim Bank could have affected their feasibility analysis (Zhou, 2020[65]). This could also be due to the financing itself, which was borrowed by the government and not tied to the financial performance of the bridge.

Social and environmental impact assessments

Building capacity to conduct rigorous social and environmental impact assessments is crucial to mitigate potential risks associated with infrastructure developments. Infrastructure development often poses high risks on natural habitats and biological diversity. In addition, energy, transport, buildings and water infrastructure are currently responsible for more than 60% of total greenhouse gas (GHG) emissions (OECD/UN Environment/World Bank Group, 2018[78]). Although infrastructure projects that are carefully designed and planned create various benefits such as employment opportunities, social inclusion and local empowerment, if risks are not adequately managed, then local environment and people's well-being would deteriorate, causing social conflicts, delays and cost overruns.

In Ghana, for instance, the lack of stakeholder participation in the environmental and social impact assessments (ESIA) for the Tema port expansion project led to the loss of valuable cultural resources of the local communities and a court action that caused delays in the project development. The port authority did not fully involve affected stakeholders in the decision-making process of the project; instead, they used stakeholder participation and ESIA to "inform" and to fulfil requirements (Lawer, 1999[79]).

The length of this process can vary, which impacts the length of the project cycle. Some bilateral financiers, such as the China Exim Bank, may largely rely on the domestic process for assessment in the partner countries, which is often quicker and more relaxed (Zhou, 2020[65]). This is contrasted by the requirements of multilateral organisations and development banks involved in the other three bridges' studies, which took much longer to complete. For example, the Rosso Bridge between Senegal and Mauritania, financed by the AfDB, the European Union (EU) and the European Investment Bank (EIB), conducted the environmental and social impact assessment (ESIA) in accordance with the requirements of the AfDB and both countries. The ESIA was prepared in 2014 and includes the legal and institutional frameworks of Senegal and Mauritania, social and environmental impacts, main environmental conditions, and a comparison of four alternatives for technical, economic, environmental and social feasibility. The ESIA also identifies enhancement and mitigation measures to reduce negative impacts, as well as the monitoring programmes (AfDB, 2016[80]).

The ESIA also presents details of public consultations (AfDB, 2016[80]). For the ESIA, the public consultation process employed the participatory approach with State services, local authorities, beneficiary communities, civil society organisations, the youth and women, in order to record their needs and concerns about the project. Meetings with affected stakeholders helped to identify key environmental and social issues, and to provide them with an opportunity to raise concerns and expectations of the project that are presented in the ESIA. The project plans to continue public consultations during project implementation at all stages. The ESIA states that the information of host communities is a decisive factor and their involvement will contribute to better ownership of the project (AfDB, 2016[80]) land acquisition and resettlement.

Land acquisition and resettlement affect people's livelihoods such as the loss of assets, job security, food security and economic conditions (Han and Webber, 2020[81]). Negotiations for land acquisition, resettlement and compensation generally take a long time involving translation into local languages, clarifying land ownerships and agreeing on arrangements, and often affect the overall project timeframe (IFC, 2019[60]). During this phase, projects may experience delays largely due to weak legal frameworks in land ownerships, disagreements for resettlement and compensation with local populations, as well as political crises. For instance, the Maputo-Catembe Bridge in southern Mozambique, financed by the China Exim Bank, experienced a six-month delay largely due to the relocation of around 900 families and disagreements between the municipalities of Maputo and small market owners (China-Lusophone Brief, 2018[82]). A group of small market owners from the Nwankakakana market refused to leave the site until they received compensation.

However, the Maputo city council had already offered new replacement stalls in an organised municipal market (The Economist Intelligence Unit, 2017[83]; BBC, 2018[84]). The Maputo municipal council eventually undertook negotiations with the market owners that led to the municipality providing compensation. However, some market owners protested that they had not received sufficient compensation (BBC, 2018[84]).The Chinese approach on this matter is to let the local authorities handle the process (Zhou, 2020[65]).

The Maputo-Catembe Bridge was not alone in experiencing challenges and delays related to this stage. The Henri Konan Bédié Bridge repeated the process on three separate occasions due to the interruptions from a political crisis and a civil war, coupled with the need to comply with standards set by development actors when interruptions occur (Wadda, 2020[69]). The Wouri River Bridge suffered significant delays in resettlement not due to meeting the needs of people being resettled, but to the cases of buildings owned by two politically exposed persons in the affected area. Reluctance of the authorities to cause any political trouble extended the resettlement process, resulting in an estimated delay of 6 to 8 months (AFD Cameroon, 2020[64]).

Requirements and conditions for compensation can vary depending on standards set by funding organisations. The lack of pragmatism and flexibility in requirements, as well as insufficient consideration for local contexts, could result in delays, for instance due to duplicated compensation processes towards the same residents without land titles during or after a political crisis and conflict to satisfy compliance standards by the development partner. This poses a question regarding the extent to which globally applied standards by traditional development partners that do not allow for flexibility in responding to locally-specific contexts become bottlenecks in accelerating infrastructure development.

The proactive management of land acquisition and resettlement issues in the early project stage can in fact provide significant development opportunities for affected populations and create better outcomes for displaced and host communities. Adequate planning for land acquisition can lead to more efficient securing of land with reduced costs (EBRD, 2017[85]). The early stage of project preparation requires the identification of stakeholders, especially adversely affected populations, such as people displaced by land acquisition for the project. Transparent two-way communication channels with a project grievance mechanism could build trust, credibility and partnerships, and identify stakeholder concerns and expectations (EBRD, 2017[85]). Keeping various stakeholders continuously engaged during the infrastructure development is therefore critical for building awareness and consensus for the effective and efficient implementation of projects, while mitigating potential risks of conflict throughout the infrastructure life cycle that could cause delays (Global Infrastructure Hub, 2020[73]).

For instance, a road project in the Balkans initially lacked the consideration on local livelihoods that would be impacted through significantly reduced access to agriculture land and pastures, as local communities were not fully consulted. The project required design changes (construction of underpasses, overpasses and access road) that resulted in increased costs with delays. The involvement of communities in the earlier planning stage could have avoided these design changes (EBRD, 2017[85]).

The AfDB, Senegal and Mauritania established the Full Resettlement Action Plan (FRAP) for the Rosso Bridge linking the two countries. The FRAP aims at limiting involuntary displacement and reducing property loss to the extent possible, and at compensating project-affected persons (PAPs) for the loss of homes, farms, building structures and facilities, and lost income (AfDB, 2016[80]). It includes the detailed negative impacts associated with resettlement and details of impacted populations and their assets, including residents and workers in the affected areas.

The FRAP also outlines organisational responsibilities and details of public consultation as well as dispute settlement procedures and mechanisms. It presents detailed complaint procedures with several steps in case of dissatisfaction of PAPs. The procedures stipulate that responsible authorities need to respond to the PAPs within ten days following receipt of the complaint and the PAPs shall be exempt from paying all administrative or legal costs related to filing their complaints. The FRAP also discloses the detailed timetable for the implementation of resettlement (AfDB, 2016[80]).

Corruption

Globally, corruption is another cause for ineffective and inefficient infrastructure development. Actors involved in infrastructure development are in a position to be highly exposed to corruption risks, mainly due to poor governance and a lack of transparency and accountability (Chatham House, 2016[76]). Corruption also leads to unnecessary projects, increased public spending, weak competitiveness, reduced funds on the maintenance of existing infrastructure and poor quality (Chatham House, 2016[76]). It also weakens institutional capacity and effectiveness, leading to loss of public trust in governments. This creates disincentives for taxpayers to pay taxes and for governments to collect them. It could also result in lowering capacity to mobilise domestic revenues, in particular for infrastructure development (OECD/CAF/ECLAC, 2018[86]).

In general, highly-corrupted economies discourage private investment (IMF, 2016[87]). Corruption also weakens the enforcement of environmental regulations, resulting in more pollution, as bribes are often used to acquire licences to control natural resources. Anti-corruption strategies need to have more transparency, rule of law and economic reform policies with effective institutions (IMF, 2016[87]). Improving government institutions by reducing the regulatory burden and improving transparency is essential, as an overly-regulated economy often provides more incentives for corruption (IMF, 2016[87]).

c) Procurement

In projects worldwide, the procurement stage is considered problematic as corruptive and clientelistic practices can often take place in the bidding procedures. Therefore, assuring a transparent and a fair process is essential for building good procurement practices (Arrosmith, Sue and Geo-Quinot, 2013[88]). In this context, the first African Public Procurement Conference, organised by the International Trade Centre, the African Development Bank, the World Bank and the United Nations Development Programme in 1998, highlighted that political commitment and reforms in legal frameworks were needed in making procurement a priority (ITC, 1999[89]; Arrosmith, Sue and Geo-Quinot, 2013[88]). It also emphasised that securing sufficient resources and building local capacities and skills for procurement were essential (ITC, 1999[89]). Following this, in 2010, the African Union Commission issued a Procurement Manual for the continent, which provides five procurement governance principles: (1) value for money; (2) fairness, integrity and transparency; (3) effective competition; (4) efficiency and economy; and (5) the interest of the African Union (AUDA-NEPAD, 2017[32]). The manual was revised, and its latest version was composed in 2016.

Most African countries have made efforts at reforming their public procurement regulations and practices. Some countries like Ghana, South Africa and Kenya have reformed their procurement processes, methods, organisational structures, institutional capacity and work force, while other countries reformed public procurement regulations, but did not ensure enforcement and institutional proficiency to follow the policy formulation. This results in inconsistencies and gaps in implementation, which significantly slow

down the procurement process and impede the overall quality of projects (Foster and Briceño-Garmendia, 2012[62]; BCG, 2016[90]; Chatham House, 2016[76]). Estimates show that Africa forgoes gross domestic product (GDP) growth of 2.2% per year as a result of inadequate procurement practices such as lack of value for money, efficiency of administration and transparency, in addition to corruption (Foster and Briceño-Garmendia, 2012[62]). These challenges constitute the main bottlenecks in procurement, leading to cost overruns and time delays in Africa's infrastructure development, further discussed below.

Delays and difficulties in the procurement process were exhibited in half the examined bridge projects. The Wouri River Bridge involved a process resulting in many claims from unsuccessful bidders, which then reached above the civil service with appeals to the President of the country, resulting in delays in the process. This was further slowed by the mismatch of the turn-key contract and the long-standing technical procurement processes of the government and its engineers (AFD Cameroon, 2020[64]). The creation of a dedicated project implementation unit including both Senegalese and Mauritanian staff took longer than expected. Procurement was subsequently accelerated by the contributions of the international financial institutions, and notably by the AfDB that took the lead in all procurement matters on behalf of all financiers (AfDB, 2020[91]).

Quality and value for money

The purpose of public procurement is to obtain the best value for money by balancing the optimum combination of the cost of a purchase by considering quality and ability to fulfil the purpose (AUDA-NEPAD, 2017[32]). Particularly, besides being cost-effective, tenders for large infrastructure projects need to plan in detail social, economic and environmental objectives in order to assure maximum quality of the project. To evaluate these objectives, bidding committees can use the merit-point system where 70- 80% of the weight is allocated to technical scores and 20-30% to financial scores (AUDA-NEPAD, 2017[32]).

However, studies point out that projects are selected based on low financial bidding costs, rather than lowest life cycle costs with better quality (Foster and Briceño-Garmendia, 2012[62]; EY, 2015[92]; Chatham House, 2016[76]). This is evident in the case of the Second Bridge over the Wouri River in Cameroon, where the tender was technically qualified, but was above budget. Value for money is further complicated by the nature of large bridge projects. For example, the HKB Bridge and Maputo-Catembe Bridge were expensive projects, but have been recognised for their high-quality construction (Zhou, 2020[65]) (Wadda, 2020[69]). Yet, they have both been subject to criticism regarding value for money. This is especially the case in Mozambique, with the bridge costing in excess of USD 700 million (Pilling, 2017[66]).

Effectiveness of administration

Sufficiently skilled workforce as well as co-ordination among ministries is key in carrying out adequate procurement procedures. However, the lack of highly skilled individuals in many African States (Foster and Briceño-Garmendia, 2012[62]; AfDB, 2018[27])results in significant time delays as well as cost overruns, frequently requiring external expertise. For example, in the Northern Main Road Construction project of Eswatini by the Japan International Co-operation Agency (JICA), the preparation of civil works for bidding documents was 14 months over the time frame because staff at the Ministry of Public Works and Transport were unfamiliar with international competitive bidding procedures (JICA, 2009[93]).

Moreover, to be up to par with international standards, African countries have adopted complex regulatory frameworks demanding high numbers of certifications and other documentation related to selection criteria (Foster and Briceño-Garmendia, 2012[62]). This poses an administrative burden since strong intra- and inter-ministerial co-ordination is required to process these documents. However, high skilled officials equipped to follow these procedures are often scarce in the ministries, making co-ordination significantly harder and causing time delays (Foster and Briceño-Garmendia, 2012[62]; ICA, 2016[94]).

In addition, regulatory frameworks, which vary for every country as they have different procurement criteria, add to the administrative burden in cross-border projects. This can also impede participation of private companies in international competitive biddings, since they find variable procedures complicated, difficult and even discouraging (Foster and Briceño-Garmendia, 2012[62]; AfDB, 2014[95]; OECD, 2018[75]). Hence, maintaining a standardised administrative procurement procedure, such as using the AU Manual, in every country could minimise delays in the development of African infrastructure.

Transparency and competitiveness

Open competition methods are based on bidding among firms that are technically and financially capable of executing the procurement contract. The key features of bidding – wide advertisement and open public access – ensure that the process is fair and competitive, and would result in an outcome that is the best value for money (Foster and Briceño-Garmendia, 2012[62]; AfDB, 2014[96]; OECD, 2015[54]). However, in many African infrastructure projects, bidding procedures are entirely absent or frequent amendments are made to favour a certain bidder (BCG, 2016[90]; Mafini, 2017[97]; Mohan and Tan-Mullins, 2019[98]).

Furthermore, bidding in Africa is sometimes done hastily in times of political or socio-economic crisis, resulting in projects being pursued in private-gain interests, rather than for their socio-economic rationale (Foster and Briceño-Garmendia, 2012[62]; Sobjak, 2018[99]). Absence of transparency and accountability leads to a downward spiral of bribes, collusion, bid rigging and frauds (Sobjak, 2018[99]). These practices subsequently result in low quality infrastructure or the creation of "white elephants", if not causing significant time delays as well as re-bidding that may require twice the time initially planned for a project (BCG, 2016[90]; Mohan and Tan-Mullins, 2019[98]; Sobjak, 2018[99]).

Inclusiveness of local contractors in the competitive process is also an important aspect in the procurement process. It creates capacity of engineering in the domestic construction sector and provides labour opportunities for local workers (AfDB, 2014[96]). Traditional development partners typically encourage procurement through international competitive bidding that often sub-contracts to local companies in order to stimulate the local economy. At the same time, many sources point out that African governments often prefer non-competitive methods such as direct contracting or sole-sourcing to avoid the time-consuming process of supplier selection (Foster and Briceño-Garmendia, 2012[62]; Mohan and Tan-Mullins, 2019[98]).

The procurement procedure in projects financed by the Chinese Export Import Bank (CEXIM) is different from traditional development partners, as it can be tied or procured without bidding. For example, in the Maputo-Catembe Bridge project, the construction was undertaken by the Chinese Road and Bridge Corporation (CRBC) without international competitive bidding (ICB). In addition, a similar practice was observed in the case of the Ghanaian gas processing plant financed by the China Exim Bank, where the loan was tied to the employment of a Chinese state-owned enterprise for the construction (Mohan and Tan-Mullins, 2019[98]). At the same time, Chinese companies hire local labourers and carry out "learning by doing", providing on-the-job training for them.

d) Private investment and ownership

Private sector investment in infrastructure is small relative to other sources on the African continent. Private finance accounted for just USD 11.8 billion, compared to total infrastructure finance of USD 100.8 billion in 2018. A smaller share can be expected since the type of projects better suited for private investment are limited to projects in sectors that can generate sufficient revenue through user fees or other funding mechanisms to be directed to debt payments and returns to equity investors. Regardless, Africa is underperforming in this regard: the private sector provides a lower share of total financing for African infrastructure when compared to other developing regions (ICA, 2019[6]). Given the scale of needs and the size of the infrastructure financing gap in Africa – estimated to range from USD 68 to 108 billion per year (AfDB, 2018[27]) –, the amount of private financing must grow for African countries to continue to progress forward.

Privately financed projects in many regards are not different from their purely publicly financed brethren and suffer from most of the same bottlenecks in the project cycle. Nevertheless, private finance faces unique obstacles and bottlenecks – such as negotiating and implementing PPPs, and meeting the requirements of private investors for financial viability – which either delay, stunt or prevent infrastructure projects all together, as detailed in a myriad of recent publications on the subject. These are organised by issue areas that often overlap different steps in the project cycle, reach into more overarching institutional and capacity challenges or highlight preferences by private investors. These conclusions are augmented by the HKB Bridge case findings.

Legal and regulatory matters

Negotiating and devising concessions, financial arrangements and legal agreements uniquely associated with private finance can be costly and time consuming. These elements are complex and create bottlenecks for privately financed infrastructure. Furthermore, it limits the use of private finance to only larger projects that have the scale to economise these additional upfront costs. This presents an especially difficult predicament in Africa, where the majority of infrastructure needs are small and hard to value (Collier, 2014[72]). When looking more generally, infrastructure projects financed through PPPs tend to be more expensive than traditionally financed projects, complex to negotiate and implement, and laden with additional financial risk for the public sector (Romero, 2015[52]). The European Investment Bank concluded from their experience financing African seaports that the majority of PPPs suffered from implementation delays and cost overruns (Alfaro and Vouche, 2010[100]). Additionally, PPPs require governments to manage sophisticated arrangements for years to come (Bayliss and Van Waeyenberge, 2017[101]).

Local institutions and governing frameworks are often not well designed or adequately equipped for private finance. Most low-income countries lack the capacity to negotiate and execute PPPs (Bhattacharya, Oppenheim and Stern, 2015[102]). The more complex the PPP, the more extensive the advisory services required to support governments (AfDB, 2018[27]). This can cause private investors to feel like “guinea pigs” trying to co-develop agreements and implement projects (BCG and AFC, 2017[103]). The subsequent agreements risk being poorly structured due to the lack of know-how in governments. This can be compounded by the lack of PPP laws; in this case, each project involves a workaround of existing laws and procurement regulations (AfDB, 2018[27]). The result of these institutional and capacity constraints are delays and cost overruns ranging from 20% to 50%. This causes increased risks for project developers and higher financing costs (Bhattacharya, Oppenheim and Stern, 2015[102]).

The challenge is even greater at the sub-national level, where local entities are highly dependent on financial transfers from the national government. This inhibits local governments from raising their own revenue and broadening their ability to develop PPPs and issue bonds (Gutman, Sy and Chattopadhyay, 2015[104]). Furthermore, it will continue to be difficult to attract private finance so long as a sound and predicable policy environment is not in place (Bhattacharya and Jeong, 2018[105]). Observations by the United States government confirm this obstacle as it ramps up technical assistance in West Africa for its Power Africa initiative (USAID, 2020[106]).

Private investors do not have the patience for unnecessary processes and overlapping agencies. Time is money. They grow wary of the time-consuming nature of financing new infrastructure projects in Africa. This can result from the lack of expertise, resources and human capital to implement infrastructure projects (Saghir, 2017[107]). It can be further complicated by the number of government actors involved in infrastructure. Multiple agencies and ministries can be sprawled across government, resulting in poor co-ordination, complex processes and significant delays that discourage private investors (AfDB, 2018[27]).

This type of obstacle is not found in just one area, but across the process related to preparation, procurement and approval, causing delays (Chua, 2016[108]). In this context, private investors often do not see regulators as independent from the government and subject to international professional norms (Collier and Cust, 2015[48]). This keeps many investors on the side-lines even when presented with financially sound projects for investment. Further, regulatory, operational, capacity and fiduciary obstacles make it difficult to unlock assets held in African based pension funds to invest in infrastructure to achieve the ”5% Agenda", the campaign to increase the allocation made by African asset owners from 1.5% of assets under management (AUM) to 5% (Sy, 2017[109]; AUDA-NEPAD, 2018[110]).

Preferences and requirements

Private finance favours brownfield over greenfield projects. In other words, the private sector is more likely to invest in existing assets rather than in new projects (Chua, 2016[108]). This presents a difficult predicament for a continent that has substantial needs for new infrastructure. This preference is expressed by many institutional investors that seek stable income streams over the long term from existing projects with operational success. Add this to the high upfront costs of preparing a new large-scale infrastructure project, the risk-adjusted returns become incompatible to what is feasible for the project (Saghir, 2017[107]).

Risk protections and guarantees are often inadequate for private investors. There are simply not enough private sponsors that can tackle large infrastructure projects in Africa due to balance sheet and risk constraints (Saghir, 2017[107]). The success of attracting private finance for infrastructure depends on reducing perceived risks. This can be addressed in part through donor-provided risk capital and insurance (Collier and Cust, 2015[48])**.** Evidence suggests that private infrastructure finance does not flow to Africa without guarantees from the multilaterals for the host government (ICA, 2019[6]). Further, development actors are not adapting their operational models to address the clear need. For example, multilaterals and their bilateral counterparts have traditionally been too passive, when they could be proactively looking to catalyse new proposals (Collier and Cust, 2015[48]).

The lack of standardisation frustrates the ability to scale private finance for infrastructure. This requires investors to tailor solutions to each context. It necessitates additional due diligence, legal advice and expert opinions leading to delays, higher costs and enhanced perceived risk. Disruptions are also created through the lack of harmonisation of technical standards, regulations and specifications. Technical standards and specifications include variations in areas such as rail gauge, maximum axle load for roads, voltage loads on transmission lines and interfaces for ICT systems. Procedures for tendering and procurement, as well as concession frameworks, can also differ, magnifying the challenge of cross-border private investments by leaving concessionaires to comply with differing requirements (WEF, 2014[111]). This carries over into other areas, such as the lack of unified engineering standards across sub-Saharan Africa (Shehu, 2016[112]).

Availability of investable projects

Projects seeking private finance require more rigorous and time-consuming project preparation. Developing projects that hit investment hurdles creates a common roadblock to private finance. Establishing bankability (a project that meets investment requirements) entails more upfront time and cost. These are long gestation periods requiring complex feasibility studies in addition to significant transaction advice by experts (Saghir, 2017[107]). This leads to an inadequate pipeline of bankable projects that is desperately sought to make private finance more viable in Africa (McKinsey, 2016[113]). Bankability can be an especially large constraint for some countries that lack the capacity to undertake the kind of project preparation necessary and must seek external expertise (AfDB, 2018[27]).

Infrastructure is often not being prioritised to optimise private finance. Not all infrastructure is well suited for private investment. These projects require predictable and stable revenues, heightened speed for investors to earn a return and an ability to ring-fence revenues (McKinsey, 2020[28]). National officials can often have a preference for public funds and do not have the capacity to leverage it to attract private capital (WEF, 2019[114]). The outcome is too few projects capable of being privately financed and many projects that can only be publicly financed lacking funds. Private sector investment is being crowded out leading to calls to reallocate public funding to projects that cannot attract private finance (McKinsey, 2020[28]). This requires more rigor throughout the process from prioritisation to procurement (KPMG, 2019[63]). Regardless, the practice by investors who apply discount rates as a valuation tool for investment decisions puts infrastructure in a poor position due to early negative cash flows for several years before positive cash flows arrive; this disadvantage is further magnified when a project has inherent unmitigated risk factors that convince investors to employ a high discount rate (Cifuentes and Espinoza, 2016[115]).

Case study insights

The HKB Bridge provides direct insights into accelerating and scaling up quality infrastructure involving private investment and PPPs. It has been a success on many measures, earning several awards. It was completed on time and on budget with high quality construction, local knowledge transfer, employment gains and an excellent safety record. It further delivered on development impact and created a balanced arrangement whereby financial benefits are shared with the government if returns for investors exceed certain benchmarks. Further, the unwavering commitment of the Bouygues Group, the main project sponsor, was vital in seeing the project through after a long interruption due to political unrest and civil war (Wadda, 2020[69]).

Nevertheless, the pre-construction activities of the HKB Bridge exhibited costs and delays related to many of the elements unique to private finance. The financing was complex and new to Côte d'Ivoire. It was multi-layered with equity, debt and sub-debt provided by both private investors and development finance institutions (DFIs), layered with a political risk guarantee provided by the Multilateral Investment Guarantee Agency (MIGA). This requires significant negotiation time and added cost given the needs of the different investors. Each actor has their own processes and time constraints.

In this case, DFIs moved noticeably slower than private investors. Fees, tenors and currency all became issues to be worked out. Disputes were negotiated on how the cost of premium for the guarantee would be shared. Even the language of the documents themselves needed negotiation and added time to the process. The concession itself involved a long and complicated negotiation as well, which included difficult elements of tolling and the government providing the access roads to the bridge. While Côte d'Ivoire had the laws in place for private finance, this type of concession was new, which required added time and cost to educate government actors and develop a process to provide advisors. Lastly, the bridge turned out to be an expensive infrastructure project, which required government subsidies on tolls to generate sufficient income to compensate investors (Wadda, 2020[69]).

e) Construction and operations and maintenance

Construction is a time-consuming endeavour with many variables that could impede and interrupt progress. Further, concerns go beyond the project cycle to the life cycle itself, looking at the quality of the project and the need to effectively operate and maintain the critical investment. This section describes issues around significant delays and poor quality at the construction stage as well as in operations and maintenance (O&M), followed by some good practices to address them. In general, the bottlenecks at the construction stage are related to political events, institutional co-ordination and procedures, technical capacity and standards, local contracts, and design change. Many of the challenges in O&M concern procedural and resource issues. Good practices to address some of these challenges involve ways to improve local contracts and the use of digital solutions.

Construction stage

Political events

Political events that affect the construction stage include crises or disruptions, such as coups d'état and general strikes, or deteriorations of public security (JICA, 2012[116]). In particular, sudden political changes such as coups d'état can stall construction for many years. For example, after some early work had begun, construction for the Henri Konan Bedié Bridge in Abidjan, Côte d'Ivoire, had to halt all activities due to a military coup in 1999 (AfDB, 2014[96]). Only after public security was fully restored over a decade later, and with strong political support, construction could resume in 2011 and was completed in 2014.

The bridge became a successful PPP, with financing from various development partners including the AfDB, the MIGA, FMO, the West African Development Bank and the Africa Finance Corporation (AFC), a political risk guarantee by MIGA, and sponsorship by the Bouygues Group (AFC, 2020[17]). In addition to security issues, other major events, often driven by politics or economics, can threaten the timely implementation of African infrastructure projects. For example, oil shortages can lead to rapid escalation of fuel prices and construction materials, which would require readjustment of the original project scope (JICA, 2015[117]). Unexpected changes in regulations can also cause delays.

Institutional co-ordination and procedures

Institutional bottlenecks arise due to the multisectoral nature of infrastructure development. The unclear division of roles and the overlapping nature of regulatory bodies and executing agencies cause confusion, which requires extra time to co-ordinate among the stakeholders before construction (WEF, 2014[111]; JICA, 2017[118]; AfDB, 2018[27]). The lack of capacity of ministries in terms of human resources and skills poses challenges in logistic processes of getting resources and equipment in place to build the infrastructure (Chatham House, 2016[76]). In some cases, it leads to delays for counterparts in obtaining permits, licenses and approvals to carry out the construction (BCG, 2016[90]; Chatham House, 2016[76]; McKinsey, 2016[113]). Furthermore, custom procedures in many countries remain slow and poorly integrated, which results in hold-ups in importing materials and equipment for the construction (Chatham House, 2016[76]).

Institutional procedures related to sequencing and adequate environmental and social impact assessments can also affect the construction stage. While not in Africa, there have been cases, such as the Kamchay Dam in Cambodia, where there was a delay in obtaining an environmental permit because the environmental impact assessment (EIA) was approved only after the construction started, instead of before the loan agreement (Siciliano and Urban, 2017[119]). The quality of EIAs also matters. In the case of the Senegambia Bridge, the original design of an infrastructure had to be changed, which caused a 10-month delay, because it was not fully suitable for the location of mangroves that were growing (IMF, 2019[120]). Land acquisition and resettlement also need to be completed before the commencement of civil works, though in many cases, they can go smoothly, as in the case of road projects in Kenya, Madagascar, Malawi and Eswatini funded by JICA (JICA, 2009[93]; JICA, 2010[121]; JICA, 2012[116]; JICA, 2015[117]).

Technical capacity and standards

Gaps in technical capacity result in poor quality construction. Thus, enhanced local involvement in building technical knowledge, such as engineering, is necessary (Chatham House, 2016[76]). This can be done through, for example, the training and development of managers and employees in the construction industry (Mafini, 2017[97]). Furthermore, the lack of unified engineering and other technical standards, regulations and specifications across sub-Saharan Africa needs to be addressed through better harmonisation (Chatham House, 2016[76]). In the case of the Maputo-Catembe Bridge, financed by the China Exim Bank, Chinese standards for construction, that were different from those of the German

supervision company selected through international competitive bidding, created additional workload to the construction process (Zhou, 2020[65]). Harmonising standards is particularly crucial among different countries in regional cross-border transport infrastructure projects (OECD, 2018[75]), such as the case with the Rosso Bridge between Senegal and Mauritania. The Wouri River Bridge in Cameroon also highlighted the need to make sure the type of contract arranged with the project developer matches the technical culture of the local authorities (AFD Cameroon, 2020[64]).

Local contractors and sponsors

Poor performance by, or disagreements with, local contractors can also cause delays. In an energy project in Lesotho, construction was held up because the local contractor ordered wrong materials and did not submit the construction procedural specifications (JICA, 2018[122]). As a result, the development partner proceeded to change the local contractor. Moreover, if incidents escalate to contract disputes, resolution will require active co-operation by the sponsoring authority, the contractor, and several government departments, which takes time (Singh, 2010[123]).

Having a strong sponsor that can manage local contractors well can make a difference. In the case of the Henri Konan Bédié Bridge in Abidjan (Côte d'Ivoire), since the sponsor Bouygues was an experienced company with an established local subsidiary, the construction was completed on time, even generating 700 construction jobs. Local human capital was used significantly, with only one or two top positions in operations filled by expatriates. International health and safety standards were applied and monitored daily by consultants, which required workers to wear helmets, reflective jackets, and so on. Frequent sensitisation and trainings were organised, as well as presentations of the bridge construction for ministers, parliamentarians and university students (Wadda, 2020[69]).

Challenges with local contracts are minimised in Chinese funded infrastructure by often using its own state-owned enterprises (SOEs) for the construction stage (Singh, 2010[123]). In the case of the Maputo-Catembe Bridge, the Chinese construction company followed the laws set by the Mozambique government in terms of employing local labourers. It further formed teams to help local labourers "learn by doing" with Chinese workers. However, as there was an incentive for the Chinese company to deliver punctually to move on to other projects, the labourers were required to work beyond regular work hours (Zhou, 2020[65]). This resulted in the local workers protesting against the poor working conditions and late payments of salaries (TIM, 2014[124]). In more recent years, large Chinese companies have not brought Chinese workers as their labour cost is becoming too high (Zhou, 2020[65]).

Design change

Other major technical causes of delay involve design change in construction, which can be due to imperfect estimation or natural factors (Singh, 2010[123]). Aside from the necessary modification for engineering reasons or to expand scope, e.g installation of additional photovoltaic generation systems, there are cases where cost considerations enter, sometimes resulting in quality reduction (JICA, 2012[116]; JICA, 2017[125]). In the case of the Second Bridge over Wouri, an additional design for an overpass to reroute the traffic led to the *Agence française de développement* (AFD) providing an additional loan for part of the cost and the matter being brought to international arbitration by the contractor along with other claims (AFD Cameroon, 2020[64]). However, design change does not necessarily entail delays if the stakeholders take appropriate action. For example, it was carried out within the planned timeframe in the case of a bridge project in Tanzania and Rwanda financed by JICA, thanks to speedy drawing up of detailed design and smooth procurement, proper monitoring, and prompt attention by executing agencies and the construction consultant (JICA, 2017[125]).

Operations and maintenance

Operations

The operations and maintenance (O&M) stage can also face delays due to slippage of different types of logistical procedures, such as suspended supply of electricity, procurement of operational equipment or furniture, securing of staff accommodation facilities, and so on (JICA, 2017[125]; USAID, 2020[106]). In some cases, where local consultations or compensation have not been carried out properly, surrounding residents could cause bottlenecks that hinder operations as was the case with the One Stop Border Post facility between Tanzania and Rwanda, where the water distribution was sabotaged (JICA, 2017[125]). Regarding ways to improve operations, digital technologies can be used. In the case of the Henri Konan Bedié Bridge in Abidjan (Côte d'Ivoire), mobile operators are enabling users of the bridge to pay toll fees through their mobile phones, which significantly eases the traffic (Wadda, 2020[69]).

Maintenance

Securing resources to carry out necessary maintenance of infrastructure can be equally important as new investments. In fact, failure to perform routine maintenance leads to poor service delivery due to operational malfunctioning as well as disproportionally high rehabilitation expenditures (ICA, 2019[6]). At the initial stage, corruption or lack of financial and technical capacity in estimating expenses can divert funds away from maintenance (Singh, 2010[123]; Chatham House, 2016[76]).

As a more macro-level and long-term issue, policy and regulatory changes can substantially impact the quality of O&M. This was the case in South Africa after the privatisation and the enforcement of affirmative action in the energy sector. It reduced operation-related competence, causing malfunctioning in power plants, which resulted in costly damage to the economy (Gil, Stafford and Musonda, 2019[7]). Alternatively, some critics point out that the tendency of development partners to finance rehabilitation and reconstruction of infrastructure has created perverse incentives for the host governments to neglect maintenance that is necessary to sustain existing infrastructure (Foster and Briceño-Garmendia, 2012[62]). On the other hand, in some cases where maintenance expenses were supported by development partners, during political crisis when assistance was frozen, the host government had to mobilise domestic resources to pay for operating costs, such as by raising fuel tax (JICA, 2012[116]). Ensuring the availability of funds for optimal maintenance throughout the whole operation period can raise the economic efficiency of infrastructure expenditures by freeing valuable resources to be used for other investments rather than expensive rehabilitation.

Evidence of good practice

While the study was designed to identify obstacles and bottlenecks in the project cycle, the inquiry also resulted in uncovering a myriad of good practices that address scaling up quality infrastructure in Africa. On one level, insights are transcending in nature, affecting multiple steps, providers of development assistance or general aspects of governance. Many others can be siloed within some of the steps in the project cycle. Hence, overarching good practices are described first, followed by insights categorised by each step within the project cycle.

a) Overarching insights

The book *Duality by Design: The Global Race to Build Africa's Infrastructure* (2019[7]) posits that Africa cannot afford to wait until the time-consuming generational effort of sound institutional development is complete before accessing external capital to finance infrastructure. The lack of infrastructure is impeding the continent from sufficiently growing their economies and generating capital locally, which is the basis for sustainable infrastructure finance. As a result, this does not mean African countries cannot work on

increasing the amount of external capital, while also improving institutions in parallel. This starts with multilateral development banks and countries providing development assistance embracing and recognising the imperative for infrastructure now, while prudently balancing the need for improved governance, tender and procurement standards over time. Further, these same players could accelerate infrastructure development by identifying and acting upon bottlenecks and instrument limitations within their own organisations.

The research goes on to suggest that bottlenecks will be reduced as government institutions and organisations are improved and modernised. In particular, professional staff in government ministries and agencies would benefit from better training, skills development and advisory support in areas such as regulatory reforms, concessional arrangements, procurement processes and negotiating with external actors, whether they are sovereigns, construction firms or investors. For example, Ethiopia has demonstrated how effective negotiations with a development partner can lead to better value for money (Soule, 2019[126]) and more substantial local benefits with regards to content, labour and knowledge transfer.

The research supports that standardisation helps as well as moving systems to digital, transparent platforms. Harmonisation of standards, specifications and regulations across borders could be addressed by bilateral or multilateral treaties to create alignment (WEF, 2014[111]). Decreasing the redundancy and number of overlapping agencies involved in infrastructure speeds up the process, as does the creation of a co-ordinating body that can offer a single point to contact for external actors involved in infrastructure. Further, these organisations need to become more independent from political pressure, accountable to performing their mandate in a timely manner, and transparent to stymie corruption. Lastly, governments could benefit from a project prioritisation process that targets the most pressing needs first and optimises their own publicly derived funds, sources provided through development assistance and investment by the private sector.

b) Early stage

Several good practices emerge early in the project cycle. A highly visible system to incentivise host governments to maintain commitment to infrastructure projects could be developed. In this context, the Presidential Infrastructure Champion Initiative (PICI) and the PIDA Quality Label (PQL) could serve as references for future action. Peer-learning mechanisms could also facilitate the enhancement of administrative capacity necessary for the speedy completion of front-end infrastructure project preparation. Traditional donors could further engage in these dialogues with African governments to discuss ways to make project preparation funding more easily and quickly accessible.

c) Pre-development

Additional good practices can be found in the pre-development phase, which examines the role of proposed project for achieving wider development goals, and determines how a project contributes to sustainable and inclusive growth while ensuring people's well-being. This phase requires rigorous assessments and effective engagements with affected stakeholders; however, the process needs high levels of efficiency to minimise the time taken. Firstly, throughout all stages of the pre-development phase, involvement of affected stakeholder and continuous engagements are crucial to mitigate potential risks of conflicts that could cause delays. Identification of affected stakeholders and transparent two-way communication channels with a grievance mechanism could address local demands and concerns from the early stage of infrastructure development. Secondly, social and environmental impact assessments (SEIAs) and land acquisition and resettlement plans should identify effective dispute resolution systems with clearly defined procedures and policies that could help compress the timeframe required for settlement. These plans should illustrate a clear timetable for implementation.

d) Procurement

Good practices in the procurement stage involve establishing a sound managerial system, which monitors and ensures whether and how the five main principles of the African Union's Procurement Manual are applied. This includes an inter- and intra-ministerial focus on prioritising quality of infrastructure in terms of value for money, and ensuring transparency and competitiveness through fair bidding processes. This can be done through requiring high standards of integrity for all stakeholders in the procurement process, enforcing internal controls and compliance measures for corruption and collusion of suppliers, as well as including appropriate monitoring schemes (OECD, 2015[54]).

In addition, good practices that can strengthen inter- and intra-ministerial co-ordination involve systemising administrative procedures in accordance to the AU Manual, so that procurement practices can be compared between ministries and among different countries. In addition, to ensure the application of the AU Manual and the timely execution of procurement procedures, governments should provide staff with training workshops and seminars. Lastly, to foster innovation and also stimulate more transparency and accountability, authorities could encourage the use of e-filing though e-procurement systems.

e) Private sector investment

There are also several items the research identified to reduce obstacles, improve scale, lower costs and speed up the process when private sector investment is involved. First, private investors are attracted to government institutions that have highly trained professional staff and effective leadership who are efficient, transparent and accountable at carrying out their duties (ICA, 2019[6]). A legal framework is critical for private sector investment in order to avoid costly and time-consuming one-off government deals negotiated individually (BCG and AFC, 2017[103]). Further, regulators must maintain independence from governments. Private investors require a level of confidence that continuity will be maintained and contracts will be honoured even when political leadership changes. This takes time to achieve a proven track record. Moreover, strong project sponsors and effective project champions within the government are critical to driving projects from concept to completion when private finance is involved. The establishment of a "one-stop-shop" government organisation dedicated to co-ordinating and accelerating infrastructure projects is an attractive feature for private investors, so long as the new organisation does not become a bottleneck itself (BCG and AFC, 2017[103]).

The ability to attract private investment also involves recognising their preferences and requirements. Governments might find it beneficial to explore selling brownfield projects to private investors to generate funds for publicly funded greenfield projects in order to optimise private sector investment in infrastructure (Chua, 2016[108]). A process to categorise and prioritise projects by the optimal funding method could enhance private sector investment. Additionally, expanded risk mitigation and co-investment programmes by multilateral development banks and development finance institutions would enhance private investment infrastructure (Chua, 2016[108]). Further, greater standardisation across the project cycle improves access to private finance (Collier and Cust, 2015[48])). Not to mention, conditions for private investment are improved when there is a focus on environmental, social and governance (ESG) standards, which are becoming a critical requirement for the private sector, highlighted by the commitment to responsible investment made by nearly 2 400 funds managing assets totalling USD 86 trillion (Bain, 2020[127]). Finally, the target of negotiations should be a balanced deal that stands the test of time. Pre-negotiation and actual negotiation expert support is critical for governments to achieve an optimal agreement (CONNEX, n.d.[128]).

f) Construction and operation

The ability to avoid delays and cost overruns in the construction are vital to this effort. Good practices to minimise difficulties with local contracts include organising a competent General Contractor to oversee and co-ordinate all construction work. This includes establishing a management structure that enables adequate co-ordination among sub-contractors, with appropriate risk-sharing to minimise delays (ICA, 2016[94]). Furthermore, delays on the part of the contractor can be avoided with suitable penalty clauses (Singh, 2010[123]). In addition, lessons learned suggest that performance records of local contractors should be kept, in order to check before concluding contracts for future projects (JICA, 2018[122]).

Other good practices include using digital technology solutions to redefine what is possible in construction. Innovative materials, smart equipment, automated processes, 3D printing and big data can help build better, cheaper, faster and safer infrastructure. While not in Africa, establishing temporary and low cost "flying factories" to assemble parts close to construction sites has reduced construction time by 65% and cut labour costs by 50% (BCG, 2016[90]). To foster such innovation, African governments and development partners need to promote innovation-friendly regulations and policies, as well as reward technological solutions that reduce life cycle costs (BCG, 2016[90]).

Annex D. Background briefs on bridge projects

Henri Konan Bedié Bridge in Côte d'Ivoire

Location:	Abidjan, connecting the districts of Riviera and Marcory
Construction period:	2011 to 2014
Development partner:	Africa Finance Corporation (AFC)
Budget:	EUR 270 million
Length:	1 500 metres

Political and economic context

Côte d'Ivoire is situated in West Africa, neighbouring Liberia, Guinea, Mali, Burkina Faso and Ghana. The country experienced political stability and economic development in the years that followed its independence from France in 1960. This changed at the close of the millennium following a military coup and the ensuing political instability and civil war from 2002 to 2007. Stability returned in 2010 following elections that led to the sitting president being removed by force after refusing to accept the electoral results (BBC, 2019[129]). Côte d'Ivoire is governed as a constitutional republic. The president is elected by an absolute majority in two rounds and the legislative branch functions as a bicameral parliament. The country operates a legal system reflecting the French civil code (CIA, 2020[130]). Its current population stands at 25 million (World Bank, 2019[131]).

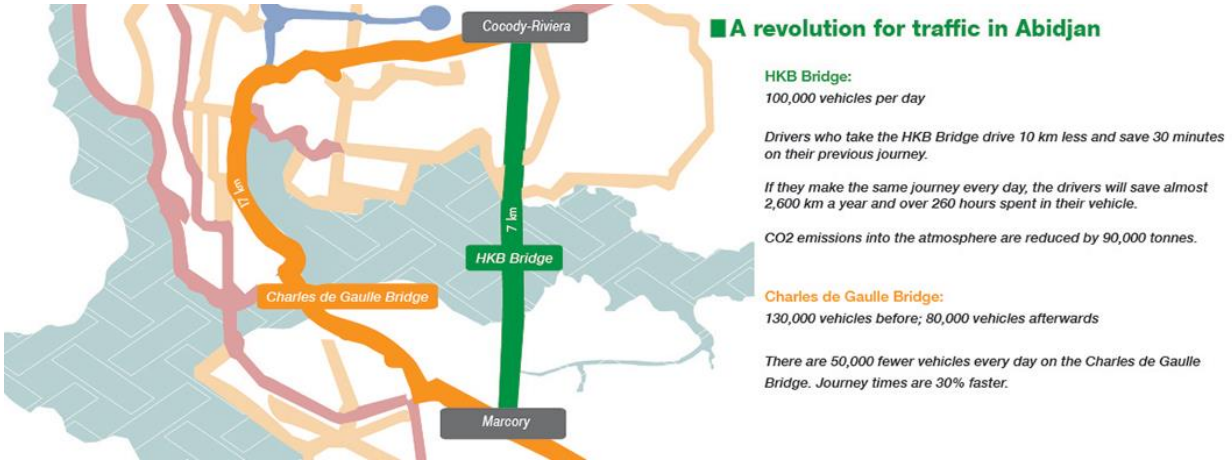
Côte d'Ivoire has experienced strong economic growth since 2011, averaging 8% per year, and improvements on many development measures including life expectancy, school enrolment and gross domestic product (GDP) per capita (World Bank, 2019[131]). This has been reinforced by structural reforms, an improved business environment, macro-economic stability, increases in private investment, infrastructure development and trade surpluses (Republic of Côte d'Ivoire, 2018[132]). Its economy exhibits elements of diversification in services, industry, agriculture, mining and hydrocarbons. Nevertheless, significant dependence on cocoa farming is a constant feature as the world's leading producer, representing 15% of GDP and 38% of exports (AfDB, 2020[91]). Despite these gains, development outcomes in Côte d'Ivoire continue to lag. The country ranks 170 out of 189 countries on the United Nations (UN)'s Human Development Index, scores poorly on the World Bank's Human Capital Index, and has high rates of gender inequality. Further, secondary education completion rates are low, youth unemployment rates stand at 36% and the poverty rate remains high at 46% (World Bank, 2019[131]).

Project history

The Henri Konan Bédié Bridge (also known as the HKB Bridge or Third Bridge) was first featured in Abidjan's development plans in 1952. As time went on, the city continued to expand, creating increased congestion and significant stress on the two existing bridges – the Félix Houphouët-Boigny and Charles de Gaulle bridges, connecting the northern and southern parts of Abidjan. The government originally launched the tender for the Third Bridge in 1996, and created in 1997 the legal and regulatory changes necessary for a private concession. The preferred bidder was selected in April 1997 and the agreement was signed on November 1997 to construct and operate the bridge with Socoprim, a subsidiary of the Bouygues Group. Work on the bridge had only just begun in 1999 when a military coup occurred, quickly halting the project. Due to political unrest and a civil war, the project remained shelved for a decade. Due diligence was restarted in 2009, with the resumption of new negotiations. An addendum to the concession was established, the resettlement process was repeated and a financing package was structured including several investors. The updated agreement involved a 30-year operating period, which would transfer ownership back to the government thereafter. Construction began in October 2011 and was completed in December 2014 (MIGA, 2012[133]; AfDB, 2014[95]; AfDB, 2015[134]; World Bank, 2015[135]; Wadda, 2020[69]).

The HKB Bridge is part of a larger infrastructure transport project spanning 7 kilometres, connecting two major districts over the Ebrié lagoon that previously required a lengthy and time-consuming journey through the centre of city via the aging Charles de Gaulle bridge. The figure below illustrates the project's impact on the road network. The bridge itself was completed on time and on budget by a subsidiary of the Bouygues Group. It was financed and now operates as a public-private partnership (PPP) requiring tolls. The tolling rates are subsidised by the government and a minimum revenue guarantee was provided by the government to mitigate risks for private investors. The financing structure involved equity, senior debt and sub-debt (Wadda, 2020[69]). In addition to the government, the core financiers of the project were the Bouygues Group, the Africa Finance Corporation (AFC), the African Development Bank (AfDB), FMO, the Pan African Infrastructure Development Fund, the *Banque ouest-africaine de développement*, the *Banque d'investissement et de développement de la CEDEAO* and the *Banque marocaine du commerce extérieur*. The MIGA provided a total of USD 145 million in insurance coverage (AFC, 2020[17]).

Figure A D.1. HKB Bridge traffic benefits



Source: (AfDB, 2014[136]).

Second Bridge over Wouri in Cameroon

Location:	Douala (economic capital of Cameroon)
Construction period:	2013 to 2017
Development partner:	French Agency for Development (*Agence française de développement* [AFD])
Budget:	EUR 178 million
Length:	760 metres

Economic and political context

Cameroon is located in Central Africa, bordering Nigeria, Chad, the Central African Republic, Equatorial Guinea and Gabon. With a population of 25 million and a per capita income of USD 1 500 in 2018, it is a lower middle-income country. Cameroon is endowed with rich natural resources, including oil, gas, minerals, timber, coffee, cotton, cocoa, maize, and cassava. In 2019, while the country was experiencing an economic crisis triggered by the steep fall in oil prices, there were projections for sustained momentum in the construction, industry, housing and services sectors.

Cameroon's ruling party, the Cameroon People's Democratic Movement, has long dominated the country's political landscape, with President Paul Biya serving his seventh term since 1982. Having enjoyed several decades of stability, however, Cameroon has recently been grappling with attacks by Boko Haram in the north and secessionist insurgency in the Anglophone regions, which resulted in a large number of internally displaced people. Furthermore, the poverty rate has increased by 12% between 2007 and 2014, with more than half the poor living in the northern regions.

The Second Bridge over Wouri links the highly industrial city of Douala, where 60% of the country's GDP is generated, with the agriculturally important region in the west. Along with roads that cross Douala from east to west, the bridge provides the only access route to the port – where more than 90% of Cameroon's goods transit – and the airport. The bridge and roads are essential links to the major national and regional corridors in the north, east and west (AFD, 2011[137]).

Project history

The first bridge over the Wouri River was commissioned in 1955. Subsequently in the 1980s, the idea to build a second bridge emerged. However, it did not materialise until the 21st century, when the first bridge no longer met the requirements of traffic after 60 years. There was frequent congestion by heavy goods vehicles, cars and two wheels that did not co-exist well. Frequent accidents completely interrupted traffic sometimes for several hours. Furthermore, as the first bridge was presumed to last only another 10-20 years, the Cameroonian government saw the need to construct a second bridge. It then became a highly political project, as part of the "Programme des grandes réalisations" by President Paul Biya (AFD, 2011[137]; AFD, 2019[138]; AFD Cameroon, 2020[64]).

To receive assistance in financing this second bridge, the government explored approaching development partners such as China and the *Agence française de développement* (AFD). This reflected the fact that China was already financing highway, hydro-electric power and deep seaport projects, while the AFD funded the rehabilitation of the first bridge, as well as roads that linked to the area of the second bridge. In the end, the government approached the AFD, particularly since its loans would be untied and would allow

a better competition between contractors (AFD Cameroon, 2020[64]). In 2011, the AFD agreed to finance a EUR 100 million loan plus a EUR 33 million grant from the Debt Reduction Development Contract (C2D)[9] mechanism, out of an initial estimated cost of EUR 150 million. The expectation was for the project to be completed in three years (AFD, 2011[137]). While initial studies were made for the second bridge, the Cameroonian government had to wait for its debt sustainability to improve after the heavily indebted poor country debt relief process (AFD Cameroon, 2020[64]).

The government decided to make this a turnkey project. The first procurement process faced challenges as the tenders were qualified, but above the estimated cost of the bridge. Therefore, the government negotiated a direct contracting with the Vinci Group, which had the best technical offer, partially to gain time. This decision caused some delay, as it required resolving claims by other bidders. Resettlement also had challenges as there were buildings close to the bridge with high land values which took time to be evaluated, compensated for, and demolished. In particular, co-ordinating the process among multiple offices in the Ministry of Land, Ministry of Public Works, Ministry of Finance, Presidents' Office, and so on, was time-consuming. However, the AFD was able to facilitate in expediting the process by reminding the government of the expected project timelines (AFD Cameroon, 2020[64]). While the resettlement was duly completed, as of 2019, 14 persons affected by the project had not been compensated, despite the existence of a legal process in Cameroon since 2012 (AFD, 2019[138]).

Prior to the construction stage, a cement plant was installed close to the bridge, which generated traffic. Consequently, the government decided to develop an overpass to reroute the traffic towards the bridge. This incurred an additional cost of EUR 60 million, which has been partially covered by an additional loan from the AFD. During the execution of the works, the contractor also claimed compensation for various reasons, including geo-technical hazards and loss of performance due to delays in the resettlement process. As the government is disputing the amount being claimed by the company, the case has been submitted to international arbitration (AFD, 2019[138]; AFD Cameroon, 2020[64]). Nevertheless, the bridge was commissioned in 2018, serving an estimated 80 000 users per day, free of charge (AFD, 2019[138]; AFD Cameroon, 2020[64]).

Maputo-Catembe Bridge in Mozambique

Location:	Linking Maputo to the nearby town of Catembe
Construction period:	2014 to 2018
Development partner:	China Exim Bank
Budget:	USD 726 million
Bridge length:	3 041 metres
Suspension length:	680 metres

Economic and political context

Mozambique is located in Southern Africa, bordering Tanzania, Malawi, Zambia, Zimbabwe, South Africa, and Eswatini, as well as the Indian Ocean. As a low-income country with per capita gross domestic product (GDP) of USD 1 500 in 2018, about two-thirds of its population of 31 million live in rural areas (World Bank, 2019[131]; UNDESA, 2019[1]). The country is furthermore endowed with ample arable land, water, energy, as well as mineral resources (World Bank, 2019[131]). Additionally, with three deep seaports,

it serves its four landlocked neighbouring countries as a conduit to the sea. Mozambique's strong links to the region's economic powerhouse, South Africa, underline the country's importance to the development and integration of Southern Africa as a whole (World Bank, 2020[139]).

Since the introduction of multiparty voting in 1994, the ruling party (Frelimo) has been continuously in power. Following two decades of relative peace, Mozambique experienced a resurgence of violence in 2013, with political groups fighting a low-level conflict against government forces that persisted until a peace agreement was reached in 2016 (World Bank, 2019[131]). In addition, the country's administration struggles with overall poor governance (Freedom House, 2019[140]; World Bank, 2020[141]).

A major challenge for the economy is to diversify from the current focus on capital-intensive and low-productivity subsistence agriculture towards a more diverse production structure. This also requires overcoming the lack of infrastructure, which currently contributes to the region's low competiveness (AUC/OECD, 2019[2]). Additionally, Mozambique remains in debt distress: while progress was achieved in debt restructuring, the outlook remains unknown, with the government yet to conclude renegotiation on its defaulted debt (IMF, 2019[120]).

Project history

The idea to build a bridge over the Maputo Bay was pursued by the administration of former Mozambican President Samora Machel in the 1980s. In 1989, the World Bank endorsed plans for an improved transportation network, which included the proposal of a bridge, as part of Maputo's urbanisation policy. However, the civil war and unrest in the following years prevented advancement of the project development, which only gained momentum after investor confidence increased again in 2008 (Daniel, 2018[68]). Two years later, Portuguese Prime Minister José Sócrates proposed funding for the construction of the bridge (Daniel, 2018[68]). However, as the country was subsequently unable to provide the required financing, in 2011, the China Exim Bank stepped in (Daniel, 2018[68]). The bank provided a total of USD 700 million, which was 95% of the total cost, of which 85% was concessional and 10% on commercial terms. The Mozambican government financed the remaining 5% (The Economist Intelligence Unit, 2017[83]).

The Maputo-Catembe Bridge was commissioned to the Maputo Development Corporation (Maputo Sul) and a Chinese construction company "China Road and Bridge Corporation" (CRBC) for building and construction. As with many Chinese projects, an international competitive bidding (ICB) process was not carried out. However, for the construction supervision and quality assurance, an ICB was implemented, resulting in the contracting of the German GAUFF Engineering Company as an international consultant (Daniel, 2018[68]). Aside from the suspension bridge connecting the capital Maputo to Catembe, the project includes 200 kilometres of roads and five smaller bridges between Maputo and Ponta do Ouro, in the south of the country. It constitutes an important element of the Maputo Development Corridor, which connects South Africa's Gauteng region to the deep-water port in Maputo, thereby providing regional connectivity (AUC/OECD, 2019[2]).

During the construction phase, Maputo Sul and CRBC employed more than 3 800 local and 500 Chinese workers. The Chinese workers trained around 5 500 local workers, including welders, operators and drivers (China-Lusophone Brief, 2018[82]). However, in 2014, local workers started protesting due to poor working conditions and late payments of salaries (TIM, 2014[124]). The construction of the bridge required the resettlement of 900 families and stallholders from the Nwankakakana market (The Economist Intelligence Unit, 2017[83]). Initially, sufficient compensation was not negotiated with the parties concerned; however, later in the project, extra funds were allocated for building houses for the families and remunerating stallholders (China-Lusophone Brief, 2018[82]). The Maputo-Catembe Bridge was inaugurated in June 2018 as officially the longest suspension bridge in Africa (Daniel, 2018[68]). The bridge received the Fulton Award 2017 and 2019 – the highest distinction for concrete structures in the Southern States of Africa – and the "Award of Merit" from the Engineering News-Record (ENR) in 2019 (GAUFF Engineering, 2019[142]; Yingqun, 2019[143]).

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Notes

[1] In the 25 years between 1990 and 2015, 28 African countries doubled their population; in the next 25 years between 2015 and 2040, 14 countries will double their population; and between 2017 and 2050, that number will rise to 26 countries.

[2] Despite the impressive growth in venture capital (VC) investments over recent years, financing for Africa's start-ups and small and medium-sized enterprises (SMEs) remains below needs. The International Finance Corporation (IFC, 2017[144]) estimated the potential demand for finance by the 44 million micro, small and medium-sized enterprises (MSMEs) in Africa, excluding North Africa, at USD 404 billion in 2017, with a financing gap of approximately USD 331 billion, representing a finance gap as a proportion of gross domestic product (GDP) of 16% (AUC/OECD, 2019[2]; OECD, forthcoming[3]).

[3] As part of the Programme for Infrastructure Development in Africa (PIDA), a list of 51 infrastructure programmes, decomposed into 433 projects across the four sectors of transport, energy, water and ICT, was developed, to be implemented from 2012 to 2020 under the Priority Action Plan (PAP 1). As of October 2019, 175 (40%) have reached the construction or operation stage.

[4] Some 80% of infrastructure projects fail to reach financial close mainly due to the lack of capabilities and budgets for project design and implementation with financial viability (McKinsey, 2020[28]).

[5] ICA data on China come from the American Enterprise Institute's China Global Investment Tracker.

[6] This includes public-private partnerships (PPPs) as well as self-standing private financing.

[7] (McKinsey, 2020[28]) found that India connected five times more people to electricity than Africa in 2018 – 100 million vs. 20 million.

[8] Authors' estimates out of 155 PIDA 2009-20 projects that are under construction or in operation.

[9] The Debt Reduction-Development Contract (C2D) is a tool to restructure the debt of certain countries. In practical terms, once a heavily indebted poor country has signed a C2D with the AFD, the country continues to service its debt until repayment. At each payment on the due date, the AFD transfers the equivalent amount to the country in the form of a grant. This amount is used to finance poverty reduction programmes.

Quality Infrastructure in 21st Century Africa

Africa is facing a monumental task to prioritise, accelerate and scale up quality infrastructure development. The status quo will clearly not suffice to meet the needs of 21st Century Africa. New models are necessary to provide for the needs of a population set to double by 2050, realise the African Union's Agenda 2063, and harness the economic opportunities opened up by the African Continental Free Trade Area (AfCFTA) and digital transformation.

This report comes at a critical time. It responds to the request of President Nana Akufo-Addo of Ghana to investigate the issues underlying African governments' increasing turn to China for infrastructure projects. It also aims to feed into the African Union's preparation of the 2021-30 Programme for Infrastructure Development in Africa (PIDA). The research focussed on areas in upstream and downstream project development where policy makers, academics and practitioners identified fundamental challenges.

Findings acknowledge the duality of Africa's infrastructure development between a mainstream model integrating infrastructure development with the creation of enabling environments up front, versus an entrepreneurial model of building infrastructure quickly. The report proposes expanding an African owned and led model, which builds institutions and capabilities where infrastructure project cycles become SMART, compact and replicable, while meeting the quality challenge.

Two key proposals emerged. One is to elevate the PIDA Quality Label as an African brand to certify quality infrastructure investments that use standardised and transparent procedures, including through digital technology, with compact time frames. The second proposal is to create a confederating platform for real-time peer learning on project cycle practices for the expanding African community of infrastructure professionals, stakeholders and policy makers. The pathways described in this report are already emerging, mapping the way ahead on these two frontiers.

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