Making Technology Transfers a Key Component of Resource Extraction and Construction Contracts in Africa

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Introduction

In this thought piece, I argue that to improve economic growth in Africa requires doing there what China has done over the last several decades at home: structurally transforming from an agrarian to an industrial economy that produces manufactured goods and services. A China has accomplished this transition by embracing foreign investment as a conduit for “learning by doing.” As part of their investments in China foreign enterprises transferred managerial and export marketing technology. China’s increased presence in Africa presents an opportunity for African governments to learn from its science, engineering and technology capabilities.

African countries are missing this opportunity. Well intentioned-efforts with regard to lack of transparency in resource extraction contracts signed by African governments with foreign firms and governments are leaving too little space for more creative initiatives to exploit the opportunities China’s increasing presence in Africa offers. For example, the Democratic Republic of Congo has been involved in an in-depth review of its contracts. Similarly, Latin American countries in particular have focused on the high costs associated with investor-state arbitrations that arise from resource extraction contracts with foreign investors or from Bilateral Investment Treaties. Some Latin American countries have walked away from treaties committing them to investor-state arbitration. Brazil has declined to enter into any bilateral investment treaties.

Investments in Africa’s massive mineral resources have seldom resulted in long-term economic growth. Many African resource rich countries suffer from the resource-curse - stagnant or negative growth and contraction of other sectors of the economy. In this essay, I argue that there are ways of capitalizing on the opportunities created by the presence of foreign investors in resource-rich African to help them diversify and grow their economies. This is critical since an overwhelming amount of FDI flows goes to natural resources extraction rather than to sectors such as manufacturing, processing, transportation or agriculture. In particular, I argue that Africa’s

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relationship to China in the extractive industries sector can be re-characterized to facilitate technology and skills transfers.

How Resource Rich African Countries Can Move Away From Resource Dependency

While China has certainly contributed to some economic growth in countries that have oil and minerals, this contribution will only increase Africa’s dependency on exporting low-cost raw materials. Oil and mineral exports should not take the place of the industrialization of African economies. In addition, resource-induced growth in a number of African countries is hardly shared equitably because of governance problems. This does not augur well for Africa’s long-term growth prospects. Not only is demand for extractive resources such as oil and minerals highly volatile, but these resources are also finite and exports to fulfill China’s huge demand are concentrated in only a handful of African countries. Further, commodity booms will not last into the future, and China well understands this as evidenced by export restrictions on its own natural resources and rare earth minerals. Africa will have to create self-sustaining growth to address poverty in the continent.

To do so, African countries must move away from resource dependency towards exporting high-value products and services. African countries must pursue innovation-seeking investments and not remain content with resource- and market-seeking investments from China and elsewhere. There must also be productivity-enhancing technology transfers in the manufacturing and services sectors with a view to laying a long-term economic and social foundation on which human rights can thrive. As the United Nations Development Program noted in its 2001 Human Development Report, *Making New Technologies Work for Human Development*, policy rather than charity will be more significant in determining whether new technologies become a tool for human development.

There is no evidence that African countries are systematically negotiating joint ventures in infrastructure and other technology-intensive projects being undertaken by Chinese firms in Africa.

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5 Jacob Zuma, the current South African President, has also declared China’s current economic relations with Africa are not sustainable in the long term. See Leslie Hook, *Zuma Warns on Africa’s Ties to China*, Financial Times, Jul. 18, 2012, available at http://www.ft.com/intl/cms/s/0/33686fc4-d171-11e1-bbbc-00144feabde0.html#axzz2AioJONIA


9 The World Intellectual Property Organization (WIPO) defines technology transfers as “a series of processes for sharing ideas, knowledge, technology and skills with another individual or institutions…and of acquisition by the other of such ideas, knowledge, technologies and skills,” WIPO, Standing Committee on the Law of Patents: Transfer of Technology, No. SCP/14/4, (2009)

with the purpose of enhancing human development and in effect reducing poverty and increasing respect for human rights. Instead, some African governments are negotiating resources for infrastructure projects under which African governments exchange resources in return for infrastructure built by the Chinese. These countries are missing out on the significant opportunity that China, and indeed other foreign investors, offer to developing domestic technological and other capacities that African countries do not currently have. China’s involvement gives African countries a significant opportunity to aim systematically for technological change and to support the innovative capacity of African firms by learning from Chinese firms. This will require African governments to take advantage of China’s massive needs for African resources and markets to accumulate domestic technological capabilities through joint ventures that present opportunities for borrowing, learning and imitation. The idea here is that these relationships will help African countries build new production structures that would have high-value addition.

In 2008, a variety of Chinese entities in Africa completed over 3,000 engineering contracts funded by African governments and banks. In essence, African countries have enormous opportunities to develop technical expertise that can produce high-value export products and services through these contractual arrangements. An early empirical study in the manufacturing sector has concluded that Africa’s trade openness with China is unlikely to raise economic growth and living standards. This is not good news for human rights in Africa.

China’s massive involvement in African infrastructural development alone presents important opportunities for developing productive capacity through joint ventures that transfer technology in engineering, construction and related fields. In fact, for Africa to develop productivity-enhancing manufacturing that would compete with enterprises in countries like China, African countries must structure mutually beneficial deals with Chinese firms and firms from developed economies. Such deals could include joint ventures that effectively transfer the technology and skills to African firms. Furthermore, Chinese firms can help African firms add value to African exports and to


13 For a comparative experience, see Mario Cimoli and Jorge Katz, Structural Reforms, Technological Change and Economic Development: A Latin American Perspective available at http://www.druid.dk/conferences/nw/paper1/cimoli-katz.pdf


“position themselves to benefit from world markets, not least the rapidly expanding Chinese market.”

China and Taiwan have vast experience in getting their enterprises to compete in important global value chains. In Lesotho, for example, Taiwanese firms have successfully exploited the opportunities presented by the African Growth and Opportunity Act to gain access to the U.S. textile market. The challenge for governments like Lesotho is to translate the presence of foreign-owned corporations in their economies into the development of large-scale production capabilities, as well as new capabilities “to produce increasingly sophisticated goods and devices” that have higher profit margins and less elastic demand than the commodities that predominate Africa’s exports.

Let us take the road construction industry as an illustration of how heavy outlays of Chinese firms in Africa can help develop new technological and engineering experience and related expertise. In many African countries, in the last several decades, large infrastructural contracts were awarded to locally-owned firms that did not have the technology, experience and expertise to undertake the projects. Locally-owned firms were protected from foreign firm competition through shadowy procurement processes in which government bureaucrats got handsome kickbacks. These locally-owned firms had no incentive to employ qualified engineers or other skilled personnel. These firms rarely invested in high-end road-building technology. As a result, many African countries did not take advantage of the opportunities that experience in road building created in earlier decades. In the meantime, engineering and science education in many African countries has lagged far behind nationally set goals to structurally transform African economies, and has failed to keep up-to-date with engineering education for the twenty-first century. For example, Kenya is estimated to have a shortage of 30,000 engineers and 90,000 electricians. As a side, it is noteworthy that the current discussions relating to the expiry of the Millennium Development Goals are beginning to lay emphasis on investing in science and technology as central tenets of the international development agenda in the next decade or so.

The Chinese presence in Africa therefore offers an excellent opportunity for technology and skills transfers in construction projects. These transfers could go beyond road building to construction of

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18 Id. at 4
20 Global Witness, Transparency Matters: Disclosure of payments to governments by Chinese extractive companies, January 2013 (http://www.globalwitness.org/sites/default/files/library/transparency_matters_lr.pdf) (giving a balanced account of Chinese companies that have been involved in corruption and those that have made extensive disclosures).
dams, ports and buildings. Indeed, they could extend to such fields as agriculture, information and communications technology and biotechnology.\(^{24}\) Africa’s *Mining Vision* envisages using natural resources as a nucleus for strategic infrastructural development in areas such as energy, water and sanitation.\(^{25}\) China in part emerged as a leading economy by developing a manufacturing or value-adding capacity through joint ventures with foreign firms while undertaking the types of initiatives contemplated in Africa’s *Mining Vision*. To date, entry into the Chinese market for foreign firms is highly conditional: foreign corporations in China must comply with strict Chinese restrictions on what particular entity forms may or may not do.\(^{26}\) China’s investment laws require foreign investments to be mutually beneficial for China.\(^{27}\) However, this mutual benefit condition that appears in China’s domestic joint venture law does not apply to Chinese investments overseas.\(^{28}\)

It is therefore paradoxical for China to argue that its investment strategy in Africa is also based on the principal of mutual benefit.\(^{29}\) Apparently what is good for China in China is not good enough for China’s investments in Africa. African governments must be vigilant to make sure China follows through on its mutual benefit promise. One of the best ways for Chinese-African relations to be mutually beneficial is to ensure that Africa receives the technology and skills that build productivity enhancing opportunities. Since China has shown a willingness to disregard promises to ensure mutual benefit, African governments must be vigilant. Enhancing firm-level skills and technology would go a long way towards production for exports. This would in turn help African economies grow on a sustainable basis. Such a strategy would create middle-class jobs and lift many Africans out of poverty. In fact, China has addressed poverty quite effectively through precisely such a strategy.\(^{30}\) When African countries fail to take advantage of paths to acquire technology and skills that China’s relationship presents, they undermine their ability to address their development challenges. African countries should use the leverage of access to their natural resources to structure investment and trade agreements with China and foreign investors. These agreements would help African countries build research and development capacities, acquire new management capabilities for their firms as well as advanced technology and new products with a view to creating competitive advantages and finally increase developing country form reputation from famous brands.

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25. *Africa Mining Charter*, page 57


This two-pronged strategy—conditioning access to natural resources on skills transfer and permitting foreign ownership of business entities in exchange for skills transfer—is one of the paths available to so-called “late industrializers.” In recent decades, late industrializers in Central and South America have allowed foreign investment in manufacturing and other sectors as an opportunity for technological learning and as a conscious mechanism for nurturing productivity and growth. Countries like Mexico, Argentina and Chile developed reciprocity mechanisms to take advantage of such foreign ownership of technology firms to subsidize technology learning and managerial skill formation at firm levels and human capital development. Reciprocity was the link between government support and industrial performance. As interventionist States, these late industrializers restricted this support to firms that achieved quality and performance standards such as deepening local research and development, fostering technology transfers or improving managerial skills. This support was monitored and winners were rewarded with more support, for example, subsidized credit to support technology acquisition. Losers were punished through the withdrawal of such support. A good example to illustrate the success of this strategy is the South Korean High Speed Rail Construction Authority, which entered into a consortium with a Franco-British firm to build high-speed rail. A major purpose of the consortium was to transfer technology skills in aerodynamics, civil and mechanical engineering as well as automation that could subsequently be applied in other sectors of the Korean economy. In addition, the Korean company took advantage of this multi-billion dollar 46 high-speed train project to emerge as the leader in high-speed rail in Asia.

The importance of developing productive capacities is recognized in the Programme of Action for Least Developed Countries (LDCs) for the Decade 2011–2020, from the Fourth United Nations Conference on the Least Developed Countries (referred to as the Istanbul Plan of Action (IPoA)). Since more than three-quarters of the forty-eight LDCs are African countries, this agenda of improving their productive capacity with a view to improving their human and social development is particularly important to them. IPoA acknowledges that LDCs have the primary responsibility for their own development, while calling on their development partners such as China to “renewed and strengthened global partnership.” IPoA further notes the importance of strengthening the private sector in LDCs as well as the building of technological capacity as ways of “overcoming their marginalization.” IPoA identifies the following goals and targets with respect to improving the productive capacity in LDCs:

31 Alice Amsden, The Rise of the Rest, 286 (2001)
32 Alice Amsden, The Rise of the Rest, 292 (2001) Amsden divides late industrializers into two groups – those who industrialized by pursuing an ‘independent’ strategy of technological acquisition such as China, India, Taiwan and South Korea which sought to create a national technological base; and those that pursued an ‘integrationist’ strategy that brought in foreign firms to facilitate technological learning like Chile, Argentina and Mexico. An integrationist strategy was followed in countries that did not have experience with technology. In this sense, it would seem African countries, given their lack of experience with technology, are more likely to develop such capacities through an integrationist approach.
33 See http://www.alstom.com/Global/Group/Resources/Documents/Factsheets/Korea.pdf (describing the variety of projects in addition to the high speed rail that the consortium has undertaken)
35 A/Conf.219/3/Rev.1
36 Id. at Para 10.
37 Id. at Para 28(a) as well as 26(g).
• Increase significantly the value addition in natural resource-based industries payment special attention to employment generation;
• diversify local productive and export capability with a focus on dynamic value added sectors in agriculture, manufacturing and services;
• strive to increase access to telecommunication services and strive to provide 100 per cent internet by 2020;
• strive to increase total primary energy supply per capita to the same level as other developing countries;
• significantly increase the share of electricity generation through renewable energy sources by 2020;
• enhance capacities in energy production, trade and distribution with the aim of ensuring access to energy for all by 2030;
• ensure that the least developed countries have significant increase in combined rail and paved road mileage and sea and air networks by 2020.38

Virtually all African countries, whether they are an LDC or not, have formulated Vision 2020 or 2030 plans that mirror these goals.39 These Vision Plans all aim to structurally transform African economies within the next several decades from agrarian economies or economies dependent on mineral or oil extraction to industrial economies. There is also an African Manifesto for Science, Technology and Innovation, a multi-stakeholder initiative that promotes sustainable development in Africa through the use of science, technology and innovation.40 African leaders must take advantage of China to “strengthen the institutional and managerial capacities and the productivity of small and medium-sized enterprises.”41

These objectives can be met in a variety of ways. For instance, African firms could participate in joint ventures with Chinese firms that use technology at different levels: in the day-to-day planning and management, in the design of projects and in the implementation and management of projects where Chinese technology and knowledge is actually used. African countries can also work with Chinese firms and the Chinese government to finance acquisition of technologies that would enable African firms to become independent and successful competitors, capable of undertaking the large infrastructural and construction projects currently being completed by Chinese and non-African firms.

In addition, China could enhance its support for scientific, technical and vocational education and training in Africa with a variety of programming. Increased and sustained Chinese financial

38 Id. Para 45(a) to (g).
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41 Id. at Para 55(2)(b).
support for these types of initiatives would be critical to ensuring that African countries acquire the technology to industrialize as China did. Africa’s current relations with China are likely to replicate its relations with Western countries and, as such, close off paths to industrialization unless they are re-oriented.

Further, agriculture could also benefit from China’s efforts to develop a productive sector in Africa. China achieved food sufficiency in part by integrating its agricultural sector with other sectors as part of its state-led, market-driven farmer-based model. This model combined China’s “advanced agricultural science and technology knowledge system.”43 Linking system-wide improvements and reforms in agriculture to the creation of productivity-enhancing technology transfers between China and Africa has the potential to inure to the benefit of agriculture, the largest source of employment in Africa. China’s positive experience in “productivity-based staple crop-led agricultural development” could help unlock a huge potential mechanism for sustainably addressing human rights challenges.44 The African agriculture sector provides a labor-intensive area of the economy that, by following the Chinese model, has a large potential for high-value addition through continual technology innovation.45 Just as in the mineral sector, this will require moving towards value-added agricultural production techniques through technological learning, entrepreneurship and innovation which African agricultural research centers and universities can bring to farmers.46 African governments will therefore have to do more than simply reduce the cost of doing business, but also must become active facilitators of technological learning.47

Many African governments may not have the capacity to negotiate the complex and innovative contracts, syndications or project valuations involved in resource extraction and other large projects. This lack of capacity may hinder the governments in becoming active facilitators of technological learning. This is not an insurmountable problem. The World Bank48 has established funds and programs to address this shortcoming. The African Development Bank (AfDB) is doing its part funding projects to support science, technology and innovation.49 In addition, there is a

42 Since China is now a member of the World Trade Organization, it is also bound by the commitments in the Trade Related Intellectual Property Rights Agreement (TRIPS) which in Article 66.2 provides for technology transfers to LDCs. Article 67 calls for technical assistance. On the initiatives to support technology transfer reporting under Article 66 of TRIPS, see Suerie Moon, “Meaningful Technology Transfer to LDCs: A Proposal for a Monitoring Mechanism for TRIPS Article 66.2,” Policy Brief No. 9 of April 2011 of the ICTSD Programme on Innovation, Technology and Intellectual Property.
44 Id.
46 For another excellent proposal to reform African agriculture through innovation, see Calestus Juma, The New Harvest: Agricultural Innovation in Africa, (2011)
49 AfDB (African Development Bank) and Kenya Sign Multi-Million Dollar Loan Agreement to Finance Hydroelectric Power Project and Enhance Higher Education, December 6, 2012. Available at See
large pool of African experts in the private and inter-governmental sectors as well as agencies such as the United Nations Conference on Trade and Development (UNCTAD) that can provide the requisite expertise to negotiate and seal such deals.

So far, I have argued that there are at least two types of governance issues that intersect with Chinese investment in Africa. The resource curse divorces governments from the people they govern and this, in turn, facilitates corruption. This curse inhibits African governments from negotiating deals that would lead to long-term economic growth, and more importantly, to the economic empowerment of Africans citizens. Second, quite frequently, governments lack the technical capacity to negotiate deals that would provide such growth. Where this capacity is available, professionals lack the autonomy to negotiate and structure investment agreements that would help African countries take advantage of the technological skills of foreign investors and turn them into a source of competitive advantage.

To overcome these economic challenges in the long term, China’s engagement in Africa has to be retargeted towards increasing economic growth. This retargeting is the best long-term solution to widespread poverty and human rights challenges. At the moment, the primary orientation of China’s interest in Africa is extracting resources from the continent and sending its enterprises, professionals and products to Africa. This Chinese investment strategy does not satisfy African desires or needs. Growing African economies through joint ventures and productivity-increasing investments is the best guarantee to improve social and economic conditions. This is exactly what China has done at home. It has invested heavily in acquiring technology and knowledge for production and innovation. This helped China move from primary production with unskilled labor to knowledge-intensive production with skilled labor. China is therefore well-placed to help engineer African economies by investing in productivity-enhancing technology transfers in foundational economic industries such as construction. Such investments would help train a high-caliber African workforce and help build a middle class that would otherwise continue living in or near poverty. Thus, in addition to the support China is already giving to help developing African capacity in science and technology by creating educational opportunities in China, much more is possible. African countries must take advantage of China’s technological proficiency in order to develop their own skills. In short, China should not “kick the ladder” it used to climb to its present level of economic wealth just when Africa needs it most.

Conclusion


To address Africa’s development challenges, African countries must capitalize on the trade and investment opportunities China and other countries provide. African countries can do so by taking concerted measures to leave behind their dependency on primary products and to develop a productive base upon which competitive industries could emerge. These actions would promote the kind of growth that inures positively for poverty reduction and economic transformation. In July, 2012, at the last China-Africa forum, Chinese leaders promised that a new chapter in Chinese-African relations was beginning. In this chapter, China would seek to help Africa improve its productive capacity by “scaling up personnel training and technology transfer.” This commitment will be crucial to assuring that China’s contact with Africa goes towards promoting economic growth in the long term. African governments must work closely with the Chinese government as well as Chinese firms to make this happen. China’s human rights policy with respect to Africa must take into account that the same rights China has invoked to defend itself in the global trading system should apply equally in its relations with African countries. Under China’s policy of mutual benefit, African countries should make it clear to China that they, that they have the right to freely dispose of their natural resources as a matter of international law. As I have argued, the negotiation, design, planning, implementation, operation and management of infrastructural or other technology projects undertaken by foreign investors present opportunities for technological learning and transfer from foreign investors to African countries. African countries must capitalize on these opportunities to develop their technological capabilities with a view to establishing long-term growth.

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55 Article 1.2 of the International Covenant on Economic, Social and Cultural Rights (ICESCR) provides that “All peoples may, for their own ends, freely dispose of their natural wealth and resources without prejudice to any obligations arising out of international economic co-operation based on the principle of mutual benefit, and international law,” Article 25 thereof provides that nothing in this Covenant “shall be interpreted as impairing the inherent right of all peoples to enjoy and utilize fully and freely their natural wealth and resources,” 999 U.N.T.S. 171 (16 Dec. 1966). China ratified the ICESCR in February 2001