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## Creating a market for skills transfer: A case study of AVIC International's skills transfer programs in Kenya

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# ABSTRACT

**SAIS-CARI WORKING PAPER  
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“Creating a Market for Skills Transfer: A Case Study of AVIC International’s Skills Transfer Programs in Kenya”  
*by Irene Yuan Sun and Qi Lin*

THIS PAPER PROVIDES AN IN-DEPTH CASE STUDY of a set of AVIC International’s local workforce development programs in Kenya, which challenges the stereotype that Chinese firms in Africa care little about local development. Examining the motivation and implementation of AVIC International’s programs reveals two striking characteristics. First, they are true investments, driven by clear profit motivations as well as a desire to create social value. Second, AVIC’s relationship with the Kenyan government follows a flexible approach centered on social learning and cooperation--so-called “bootstrapping development.” This approach was enthusiastically praised by Kenyan government partners, who appreciated the company’s flexibility compared to Western approaches. Although it is difficult to generalize from one example, AVIC’s case has the potential to change our understanding of Chinese companies’ contribution to skills development in Africa. At the very least, it shows that a Chinese company can see investment in local skills development to be in its self-interest. Beyond this, AVIC may be a bellwether for what is ahead. Chinese and African governments have expressed the desire for Chinese companies to do more in the area of skills transfer, and AVIC’s program, as one of the earliest and one of the most prominent, may well offer a model for the future.

# INTRODUCTION

DESPITE THE RAPID EXPANSION OF CHINESE investment in Africa in the past two decades, Chinese companies operating in Africa have often been accused of not doing enough to encourage local skills development and technology transfer. This critique is frequently aimed at the manufacturing sector; critics charge Chinese companies for leaving Africa further and further behind the global technology frontier. As Lamido Sanusi, the former governor of the Nigerian Central Bank, put it, “So China takes our primary goods and sells us manufactured ones. This was also the essence of colonialism...Africa is now willingly opening itself up to a new form of imperialism.”<sup>1</sup>

But what is it like to be on the receiving end of this accusation? Despite vast public concern and extensive media coverage, there is scant existing literature on how Chinese companies view the issue of local skills development in Africa. Even basic questions remain unanswered. Do Chinese companies perceive local skills development to be a salient issue? Has this issue caused them to change their strategies or operations? How has this influenced how they interact with local stakeholders, and how have these interactions changed their relationship and programming?

This study offers a first glimpse into this set of issues through an in-depth case study of one Chinese company operating in the industrial sector in Kenya, AVIC International. A Chinese state-owned company and member of the Global Fortune 500, AVIC International is one of the major construction contractors and heavy machinery providers in Kenya, and as part of its core business there, it has made major investments in the area of local skills development.<sup>2</sup> These programs originated early in the company’s tenure in Kenya when it became concerned that one of its major customers lacked the technical ability to utilize and maintain the heavy machinery that it bought from AVIC. This was a business concern as much as a social concern: the company worried that if the machines were poorly utilized and maintained, the company’s reputation would suffer. As a result, over the past decade, AVIC International has invested in four skills-building initiatives in Kenya. Two of them are for-profit, one is not-for-profit, and the last is a mixed model. This case study of AVIC International’s skills development programs offers insight into the dynamics of how a Chinese company perceives and responds to the issue of local skills development, and how it interacts with local stakeholders to address this issue. As Chinese investment continues to grow in Africa, it will become increasingly important that policymakers understand how Chinese firms view and react to socially relevant issues in Africa.

The contribution of this study lies at the intersection of economics and business. On one hand, development economists have studied the patterns of transitioning economies as they move from being dependent on low-skilled economic activities toward relying on activities closer to the global technology frontier. On the other hand, business case studies offer in-depth analyses of the dynamics of a single company, allowing us to understand their perception of the changing external environment and decision-making logic. By applying the methodology of a business case study to the development economics topic of technology transfer in developing countries, we hope to make a useful contribution to the topic of how individual firms respond dynamically

to change the technological context in which they operate. This deeper understanding will allow policymakers to craft more effective public policy to incentivize firms to invest in skills development and other social goods in developing countries.

## BACKGROUND

RAPID GROWTH IN TRADE, INVESTMENT, and infrastructure financing has characterized the China-Africa relationship over the past two decades. Despite the paucity and inconsistency of data quantifying the scale and impact of Chinese engagement in the continent, China is indisputably one of Africa's biggest and most important economic partners. With great power comes great responsibility: facing high unemployment rates, fast population growth, and skills shortage in many African countries, local and international stakeholders expect Chinese actors to transfer skills to and create jobs in Africa. It is in this context that AVIC International, a major Chinese infrastructure firm, has been working to create multiple skills transfer programs in Kenya. This section reviews the background of Chinese investment and infrastructure engagement in Africa, the evidence to date on the local development impact of Chinese firms in Africa, particularly on labor and skills transfer, and the context around AVIC International's business activities.

### CHINESE INVESTMENT IN AFRICA

THE ECONOMIC TIES BETWEEN CHINA and Africa have expanded rapidly during the past two decades. Trade between China and Africa has increased twenty-fold during this period, from approximately US\$10 billion in 2000 to US\$199 billion in 2012.<sup>3</sup> Within the trade relationship, Africa mainly exports raw materials to China, while China exports investment and manufactured goods to Africa. In 2011, petroleum comprised 64 percent of Chinese imports from Africa, followed by iron and other metal ores (16 percent). Only 8 percent of African exports to China were manufactured goods.<sup>4</sup> In contrast, the two top categories of African imports from China are machinery and transport equipment (38 percent) and manufactured goods (30 percent). In this context, AVIC International's heavy machinery business in Kenya is indicative of the current paradigm of the China-Africa economic relationship whereby Chinese firms sell finished goods to Africa, while at the same time AVIC's investments in skills transfer represents a bet—or at least a hedge—that African exports of finished goods to China will grow in the future.

As for Chinese investment in Africa, estimates range widely. The official Chinese Ministry of Commerce figure for Chinese FDI stock into Africa in 2012 was US\$21.7 billion.<sup>5</sup> The Chinese Ambassador to South Africa, Tian Xuejun, cited a much larger figure of US\$40 billion for 2011 Chinese FDI stock in July 2012.<sup>6</sup> One explanation is that the smaller figure covers investments directly from China, whereas the larger figure also includes estimates of Chinese investments flowing through overseas tax shelters.<sup>7</sup> Whatever the real figure is, Chinese investment in Africa has undoubtedly increased in

the past two decades.<sup>8</sup> According to official Chinese National Bureau of Statistics figures, the stock of Chinese investment in Africa increased from US\$0.62 billion in 2003 to US\$26.19 billion in 2013.<sup>9</sup> (It is important to note that the Chinese government's definition of investment includes both private and public/SOE flows, whereas the OECD definition only includes private flows.<sup>10</sup>) The Chinese Ministry of Commerce (MOFCOM) registry of firms operating in Africa shows a similarly upward trajectory: from only 888 investments before 2010 to 2,161 Chinese firms registered with MOFCOM as investors in Africa by January 2015.<sup>11</sup>

## CHINESE INFRASTRUCTURE ENGAGEMENT IN AFRICA

AFRICA HAS A LARGE INFRASTRUCTURE DEFICIT, with acute needs to increase power provision, road density, transport linkages, and other physical infrastructure.<sup>12</sup> A 2010 World Bank study found that Africa's road density was less than 30% of the next-lowest region, South Asia.<sup>13</sup> In power provision, the 48 countries in Sub-Saharan Africa, which have a combined population of 1 billion, generate approximately the same amount of power as Spain, with a population of 45 million.<sup>14</sup> The World Bank estimated in 2009 that Africa needed more than US\$90 billion per year in investments to fill its infrastructure gap.<sup>15</sup>

In this context, infrastructure has emerged as a major area of engagement by Chinese firms in Africa. However, estimates for the scale of Chinese infrastructure financing vary widely due to (1) a lack of a centralized database, (2) the difference between amounts announced and those actually committed and disbursed, and (3) varying definitions of "infrastructure."<sup>16</sup> The OECD reports that "China is now Africa's biggest partner for its infrastructure sectors."<sup>17</sup> According to the Brookings Institute, Chinese infrastructure commitments rose from US\$313 million in 2000 to US\$4.4 billion in 2012, representing about 20% of total external financing.<sup>18</sup> Between 2007 and 2012, the average annual flow from China to Africa of approximately US\$5 billion was well beyond any other single bilateral or multilateral source.<sup>19</sup> Based on data from the China Africa Research Initiative at the Johns Hopkins University School of Advanced International Studies (SAIS-CARI), Chinese loans for transport and power infrastructure in Africa totaled US\$41.8 billion between 2000 and 2014.<sup>20</sup> This is in contrast to other types of investors in infrastructure sectors: private investors focus predominantly on the telecoms sector, whereas Western donors tend to focus on water, sanitation, and roads.<sup>21</sup>

This infrastructure investment is financed in several ways that are tied to the Chinese state. The China Exim Bank provides export credits, preferential loans, and guarantees. The China Development Bank provides non-concessional debt financing, while its wholly owned China-Africa Development Fund (CADFund) provides equity financing to Chinese ventures in Africa. The so-called "Angola model" entails loans for African governments to build infrastructure using Chinese contractors that are backed by future resource streams.<sup>22</sup> The World Bank has termed this infrastructure financing model resource-financed infrastructure (RFI) and provides a rough estimate of US\$30

billion in signed RFI contracts in Africa.<sup>23</sup> In Kenya, AVIC International is a major participant in Chinese state bank-financed projects, participating as a contractor for several projects financed by the China Exim Bank.

Kenya has been a major site for Chinese infrastructure engagement. In recent years, the Kenyan government has actively courted Chinese finance. In August 2013, Kenyan President Uhuru Kenyatta visited Beijing and inked US\$5 billion worth of deals in the energy and transport sectors.<sup>24</sup> In 2014, Chinese Premier Li Keqiang visited Africa for the first time, and concluded his visit in Kenya by signing multiple infrastructure mega-deals.<sup>25</sup> The flagship project is the US\$13.8 billion standard gauge railway, which will eventually link the landlocked countries of Burundi, Rwanda, South Sudan, and Uganda to the seaport of Mombasa. The first phase connecting Mombasa with Nairobi was completed in May 2017. Although only a small portion of the financing came from Chinese policy banks, the main contractor was China Road and Bridge Corporation (CRBC).<sup>26</sup> Another Chinese-Kenyan mega-project currently under discussion is the US\$24 billion Lamu Port, which is expected to create a new economic corridor connecting Kenya with Ethiopia and Sudan.<sup>27</sup> In anticipation of East Africa's entry into the global energy market, there are also plans to include oil and gas export facilities in this project.<sup>28</sup> Recently, however, work on the Lamu Port project has stalled, with questions swirling about the Kenyatta Administration's commitment to the project, which was initiated by his predecessor Mwai Kibaki.<sup>29</sup>

## LOCAL ECONOMIC DEVELOPMENT IMPACTS

ONE MAJOR AREA OF DEBATE IS THE EXTENT to which Africa benefits from its economic relationship with China. According to macroeconomic theory and evidence, foreign investment should benefit local economies. Justin Yifu Lin has written extensively about the ability of foreign investment to catalyze structural transformation from agriculture towards industries.<sup>30</sup> Adopting Japanese economist Kaname Akamatsu's "flying geese theory," Lin anticipates that 85 million manufacturing jobs in China will soon be exported overseas, potentially to Africa.<sup>31</sup> World Bank researchers have also found that in African countries such as Tanzania, Chinese private firms have become major sources of employment and have "productivity-enhancing spillovers."<sup>32</sup> In addition, a recent McKinsey & Company report based on a large-scale dataset in eight Sub-Saharan African countries found that one-third of Chinese firms operating in Africa have introduced a new technology or production method into their market, suggesting a high level of technology transfer accompanying Chinese investment in Africa.<sup>33</sup> These studies suggest that Chinese industrial investment in Africa has the potential to jump-start productivity and GDP growth in receiving countries. However, a World Bank country study of Kenya's overall economic relationship with China shows a mixed impact to date: generally, producers have suffered, although some have benefited from cheaper intermediate goods imported from China, while consumers have benefited from lower prices.<sup>34</sup>

In practice, there is little conclusive evidence on the effect of Chinese investment on the local economy. One possible mechanism by which Chinese investment could spur African economic growth would be through the formation of linkages between the foreign investor and local firms. However, so far, it appears that African firms have not been able to significantly participate in Chinese value chains due to factors like bottlenecks in essential infrastructure, low capacity of critical public institutions, scale and quality limitations of African suppliers, and lack of personal ties between Chinese and African business owners.<sup>35</sup> McKinsey found that approximately half of the inputs by value of Chinese firms operating in Africa were sourced from local African firms.<sup>36</sup> In Nigeria, a study with a modest sample size (~20 firms) found that Chinese firms had limited backward linkages with local firms, but stronger linkages with downstream local distributors.<sup>37</sup>

Another possible mechanism for stimulating local economic growth theorized in the literature is the vehicle of special economic zones (SEZs), which in China has historically aided the processes of industrial agglomeration and clustering effects.<sup>38</sup> The Chinese government has committed to helping multiple African governments create special economic zones, but the results so far have been mixed. To be sure, a few Chinese-supported special economic zones in Africa have had good results. The Ogun-Guangdong Free Trade Zone in Nigeria employs over 4,000 local workers, providing reliable employment for low-skilled labor and stimulating growth of local businesses.<sup>39</sup> In Zambia, the Chambishi Multi-Facility Economic Zone had attracted over US\$1.2 billion in investment and created 8,735 permanent jobs by 2014.<sup>40</sup> However, the overall progress has been disappointing. All African special economic zones added together are estimated to have a total export amount of US\$8.6 billion and direct employment of 1 million, both of which are much lower than those of other special economic zones in other regions of the world.<sup>41</sup> In addition, scholarly fieldwork on Chinese-supported African special economic zones has also uncovered “inadequate local learning and local participation.”<sup>42</sup>

## LABOR AND SKILLS TRANSFER

ONE PARTICULARLY HEATED AREA OF DEBATE about the local impact of Chinese investment in Africa is in the area of local job creation and skills transfer. In many African countries, high fertility rates and low educational attainment are aggravating high unemployment rates. In Kenya, the youth unemployment rate is nearly double that of the rest of the population.<sup>43</sup> In Nigeria, the official unemployment rate is 12%, but the government also recognizes that an additional 19.1% of the working-age population is “underemployed.”<sup>44</sup> For young people, the situation is much worse, as the youth unemployment rate is a distressingly high 42%.<sup>45</sup> In addition, continent-wide, 77% of those lucky enough to have employment have what the International Labour Organization calls “vulnerable jobs”—those without formal working arrangements and that are likely to lack decent working conditions and job security.<sup>46</sup>



According to the World Bank, 90% of the jobs created in Africa today are in the informal sector.<sup>47</sup>

Furthermore, Africa's educational institutions have not been up to the task of up-skilling Africa's population. According to the Brookings Institute, most of the world's children who are not enrolled in primary school are Africans, and when African

children are in school, they are not learning: over one-third of children enrolled in school in Africa are not learning basic skills.<sup>48</sup> Twenty-five percent of African youth are illiterate—the highest rate out of any region in the world.<sup>49</sup> According to the African Development Bank, about 133 million young people, or over half of Africa's youth population, are uneducated. Even among the five million graduates that African universities produce annually, many display low employment capacity.<sup>50</sup> Compounding these issues is Africa's population growth rate, which will double by 2050 at current rates, according to the UN.<sup>51</sup> Given the current poor

performance of Africa's educational institutions, the large influx of working-age people is sure to exacerbate the unemployment problem in many African countries.

It is no wonder, then, that the question of job creation and skills development by Chinese companies inside of Africa has received increased media coverage. The general tenor has been critical, with Western leaders in particular characterizing China's engagement in Africa as “a new colonialism.”<sup>52</sup> Similarly, prominent African leaders such as former Nigerian Central Bank Governor Lamido Sanusi charged Chinese firms with building infrastructure in Africa “using equipment and labor imported from home, without transferring skills to local communities...This was also the essence of colonialism.”<sup>53</sup> Moreover, some local surveys within Africa also reveal negative perceptions of Chinese engagement. Specifically, a survey conducted by the Ethics Institute of South Africa suggests that nearly two-thirds of Kenyans and Nigerians believe that Chinese companies “only employ Chinese people,” and less than 30 percent believe that “Chinese companies treat their African staff with respect.”<sup>54</sup> However, given the survey's selection and confirmation biases, among other methodological weaknesses, we must maintain a level of skepticism towards the results.<sup>55</sup>

In contrast, the data available on local labor hiring rates by Chinese companies operating in Africa offers a different picture. Barry Sautman and Yan Hairong's review of the existing surveys across multiple African countries on Chinese companies' local labor hiring rates show that approximately 80 to 90 percent of workers hired by Chinese firms are locals.<sup>56</sup> McKinsey found that 89% of the employees of Chinese firms in Africa are local hires.<sup>57</sup> In Kenya, a survey of 75 Chinese firms found that 78 percent of full-time employees were hired locally, and 95 percent of part-time workers were hired locally.<sup>58</sup> Moreover, the longer Chinese firms have operated in Kenya, the higher their local hiring rates tend to be, suggesting that localization occurs as Chinese firms operate in African markets for longer periods of time.<sup>59</sup> However, at the same time, 21 percent of firms reported not having formal contracts with employees.<sup>60</sup>

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*Despite perceptions that Chinese companies only hire Chinese staff, research has shown that 80 to 90 percent of workers hired by Chinese firms in Africa are locals.*

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The data on skills transfer and local employees' career advancement is more limited. McKinsey found that two-thirds of Chinese firms operating in eight countries in Africa offer some form of skills training, defined as formal training programs or on-the-job apprenticeship arrangements.<sup>61</sup> A separate study in Ethiopia found that 75 percent of Chinese firms invested in worker training, compared to 27 percent of Ethiopian firms.<sup>62</sup> But the chances of career advancement for locals seem to remain limited to date: McKinsey found that only 44% of the managerial positions at Chinese firms in Africa are held by locals.<sup>63</sup> Given public perception that Chinese companies do not care about skills transfer to locals, it is ironic that Chinese companies have identified skills shortages as a major business issue that they face in operating in Africa.<sup>64</sup>

### AVIC INTERNATIONAL

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*AVIC International has invested in four major skills development projects in Kenya, all of which are still in place today.*

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AVIC INTERNATIONAL IS A LARGE CHINESE state-owned conglomerate that ranked 162<sup>nd</sup> on the Global Fortune 500 in 2016.<sup>65</sup> It emerged out of the China National Aero-Technology Import & Export Corporation (CATIC), which was founded in 1979. In 2008, CATIC and Beijing RAISE Science Limited were reorganized into AVIC International. Headquartered in Beijing, AVIC International has seven specialized companies, ten regional subsidiaries in China, and 60 overseas branches worldwide. Globally, AVIC International operates in over 180 countries and regions. The company holds more than RMB 60 billion (US\$8.7 billion) in assets, and its businesses are responsible for annual trade volume exceeding US\$40 billion.<sup>66</sup> In 2016, AVIC International had global revenues of RMB 33.0 billion (US\$4.8 billion), with profits of RMB 1.3 billion (US\$0.19 billion).<sup>67</sup>

Although CATIC has had sales representatives in Africa for several decades, it was only in the mid-2000s that AVIC International's Kenya business started picking up speed. At that time, AVIC's Kenya division won its first government contracts—albeit for relatively small amounts—for the provision of military vehicles and port container scanners.<sup>68</sup> In the late 2000s, AVIC International won several much larger contracts, including some of the largest construction projects in the country. These projects include:

- Supplying construction machinery and equipment, along with capacity building, for the National Youth Service (at the time under the Ministry of Youth Affairs and Sports of Kenya), 2007-2010. Contract total: US\$55 million.
- Designing and constructing the Greenfield terminal at Jomo Kenyatta International Airport in Nairobi, 2012-2014. Contract total: US\$650 million.
- Rehabilitation and upgrading of equipment, along with capacity building, for the Kenyan Ministry of Education, Science, and Technology, 2011-2013. Contract total: US\$27 million.<sup>69</sup>

Over the past decade, AVIC International has been unique among Chinese companies in Africa in the extent to which it has invested in local skills development. It has engaged in four major skills development projects in Kenya, all of which are ongoing

today.<sup>70</sup> Two of these are part of commercial, for-profit contracts with the Kenyan government, one is a purely non-profit, corporate social responsibility (CSR) project, and the last is a mixture of for-profit and non-profit models. In order, these projects are:

1. A capacity building component attached to a heavy equipment provision and maintenance contract for the Kenya National Youth Service (NYS), the country's vocational training institute for underprivileged youth. Initiated in 2007, the project's first phase concluded in 2010, followed by the completion of the second phase in April 2017 and anticipation of the third phase.<sup>71</sup> The model is a for-profit contract with the Kenyan government.
2. An equipment provision and capacity building contract for Kenyan vocational training institutions. Agreement for the first phase of this project was signed in 2010 and has since been fulfilled. An MOU for Phase 2 was signed in 2013 and it is scheduled to end by 2020.<sup>72</sup> The model is a for-profit contract with the Kenyan government.
3. The Africa Tech Challenge (ATC), a machining skills competition whereby vocational students compete for a US\$100,000 machine parts contract. Initiated in 2014 in Nairobi, it has been held for three consecutive years with the third year including teams from Ghana, Uganda, and Zambia. The ATC is a CSR project funded by AVIC, in cooperation with the Kenyan Ministry of Education.
4. The Sino-Africa Industrial Skills Upgrading Center (SAISUC), a training center for Kenyan vocational education instructors. The MOU for this project was signed and publicly announced in July 2016. The model for this is expected to be a mixture of charitable donations by AVIC, combined with the possibility of developing for-profit components (e.g., per-student fees for skills training) in the future.

## METHODS

GIVEN THE WIDESPREAD SKEPTICISM ABOUT the contribution of Chinese construction companies in Africa to local skills development, our study seeks to address the following questions:

1. How do Chinese companies like AVIC International view and address skills transfer and local capacity building?
2. Do Chinese companies like AVIC International perceive skills transfer and local capacity building to be salient business issues?
3. How do companies change their strategies and operations in response to perceived issues?
4. How do companies interact with local stakeholders, and what sorts of changes to their activities produced as a result of these interactions?
5. How are for-profit and not-for-profit models viewed by Chinese firms, and for what specific purposes or to address what problems?

6. Do stakeholders such as the local government, local training institutions, and the target trainee populations find AVIC International's skills development programs to be valuable?

We used four methods to answer these questions: document review, interviews, on-site observations, and participant surveys.

- **Document review:** We were granted permission by AVIC International's Kenya country representative to access project documents related to the company's skills development programs. These included internal planning documents, press and media materials, memoranda of understanding between the company and the Kenyan government, and other miscellaneous materials. These materials were provided by the company, so they likely represent an incomplete and selective record of the AVIC International's skills development programs.
- **Interviews:** We spent July 2016 in and around Nairobi, Kenya, interviewing AVIC International company executives and employees, the company's clients in Kenya, the company's potential clients elsewhere in Africa, and members of the Kenyan government that the company has worked closely with, as well as vocational school principals, teachers, and students who have participated in the company's programs. A complete interview list can be found in the Appendix.
- **On-site observations:** We secured the agreement of AVIC International's Kenya country representative to be present on-site in their offices during the period of our field research in July 2016. This gave us the opportunity to incorporate an anthropological perspective into this study by observing planning meetings, accompanying AVIC International managers as they made site visits and interacted with local stakeholders, and understanding the internal, informal dynamics inside the company. We also observed the public opening ceremony of two of AVIC International's vocational training programs, the Africa Tech Challenge machining skills competition and the Sino-Africa Industrial Skills Upgrading Center (SAISUC).
- **Participant survey:** We were also granted permission by AVIC International's management to survey participants at the Africa Tech Challenge at the beginning and at the end of the competition. However, when we analyzed the responses from the pre-program round of surveying, we found very similar responses from participants in each school, raising the suspicion that teammates might have copied each other's answers or coordinated their responses. Hence, we disregard multiple-choice responses from this initial round of surveying and only used data from the free response questions, which did not exhibit such suspicious repetition. Because we advised the instructor to emphasize individual responses during the second round of surveying, the post-program survey responses did not have similar issues.

Please note that we were able to secure the agreement of AVIC International for a study involving this rare level of depth and openness because Qi Lin, a co-author of this

study, is a former employee of AVIC International in Kenya. We realize that this introduced the possibility of bias in the study, but given how reticent Chinese companies are about allowing in outside researchers, we thought it was best to proceed with the study while actively managing the risk of potentially biased answers. Throughout this study, we were careful to avoid distortions in data collection; for example, the other co-author conducted interviews with Mr. Qi's former colleagues so that they would be more likely to provide objective answers.

## RESULTS

### FROM BUSINESS IMPERATIVE TO BUSINESS LINE

OUR FINDINGS INDICATE THAT AVIC International perceives and treats the issue of local skills development as a top business priority. This was evident in our interviews with AVIC International staff ranging from its top executive in Kenya to low-level managers, as well as in the way that the company markets and promotes its own image, in the way that managers spend their time, and in the consistency with which the company has invested substantial sums in this area.

When we spoke to Mr. Si Yanxuan, Chief Representative of AVIC International in East Africa and the company's Kenya country representative during the years in which it started investing in skills building programs, he described a mixture of both pragmatic business considerations and idealistic motivations for investing in skills development. On the pragmatic side, he described how in the early years, AVIC International's commercial contracts in Kenya were of limited scale and involved supplying such commodities as military uniforms and inspection equipment for ports. "This is a limited market, so we were desperately searching for other business lines," he recounted.<sup>73</sup> Hence, when the Kenyan National Youth Service put out a tender for heavy equipment provision and maintenance, AVIC International saw an expansion opportunity into what would be a more lucrative business line. As a result, the company doggedly went after the opportunity, offering the lowest price out of nine international companies that responded to the tender and staying patient during the eleven years it took to close the deal with the slow Kenyan government bureaucracy in order to, in Mr. Si's words, "break into this market." His determination seems to have paid off: that National Youth Service project spawned a second phase, which AVIC International also conducted, and now a third phase is imminent. The contracts for the two initial phases completed to date have been worth US\$125 million.

Despite these commercial considerations, both Mr. Si and Mr. Qian Rong, Deputy President of AVIC International's Project Engineering Company division, described social concerns as primary drivers as well. In Mr. Qian's words, there are two reasons to invest in skills building projects: "One, China has a competitive advantage in technical education. This is what helped change China itself from an agricultural to a manufacturing economy. Two, the impact on Africa...it's important that young people realize that they can use technical skills to change themselves."<sup>74</sup> Mr. Si also mentioned

social motivations, and interestingly, he saw the company investing in socially beneficial projects as a business imperative. “If you are a company, you have to do something for society, or else you have no future,” he insisted.

These sentiments seem to be more than a public relations stunt; they run deep in the company and have permeated its operations. During our month-long field study, we observed every company manager actively participating in planning and executing the AVIC Africa Tech Challenge CSR project. Granted, we had timed our field study to coincide with the annual running of the Africa Tech Challenge, but even so, the company could have confined the preparations to one or two managers, or outsourced it entirely. What we observed was deep commitment in terms of both time and management resources to this program: AVIC International not only hired an outside PR firm and a contractor project manager, but also consistently involved its staff and the rest of its leadership on a daily basis.

The attention paid to skills development is also evident in the way that AVIC International markets itself, which is reflective both of how the company sees its work as well as how it would like others to see its role. When Chinese premier Li Keqiang visited Kenya in 2014, AVIC International arranged for the premier to visit their National Youth Project site. Full-color billboards featuring Chinese and Africans clustered around heavy equipment of various sorts proclaim that the “NYS project has improved the social benefit as well as overall, sustainable economic benefit by cultivating young talents and high quality professionals of the new generation.” Similarly, at the 2016 Africa Tech Challenge opening ceremony, the Chinese ambassador to Kenya was present, as was the Principal Secretary (the highest ranking bureaucrat) of the Kenyan Ministry of Education. Clearly, investments in skills development provide AVIC International an opening and a reason to build relationships with powerful political actors, as well as to project an image of itself as an enlightened, socially conscious company.

Beyond the reputational benefits of investing in skills development, AVIC International has also turned these programs into an entirely new business line. As Mr. Qian stated, “We are the first Chinese company in Africa to have a new business line in skills development. We’ve started doing these types of programs in a lot of African countries: Gabon, Ghana, Zambia, Uganda, and we’re working on discussions for these programs in the Ivory Coast, Senegal, Tanzania, Benin, Namibia, Republic of Congo, and Cameroon.” The Africa Tech Challenge opening ceremony was telling: the company had invited—and paid travel costs for—representatives from the governments of Ghana, Uganda, and Zambia. AVIC’s hope is that by showcasing its skills development programs in Kenya, the country in which the company has its longest running and largest programs of this type, it can spur additional business opportunities in other African countries.

**INDUSTRIAL BOOTSTRAPPING: ONE PROJECT LEADING TO ANOTHER**

OUR SECOND MAJOR FINDING IS THAT AVIC International has adopted an extremely flexible and fluid approach towards designing and implementing its skills development. As opposed to pre-defining programs at the outset and implementing them according to a rigid timeline, project goals were co-created with a variety of stakeholders, and implementation has rarely followed the timeline envisioned at the beginning of each project. This may be suggestive of a Chinese approach towards development—one that dispenses with the procedural rigidity of the Western gold standard and instead follows a more flexible and unpredictable course of uncovering successive barriers and engaging in social learning. Charles Sabel termed this approach “bootstrapping development,” and it accurately describes what we observed in AVIC International’s skills development programs.<sup>75</sup>

Our interviews revealed that the very reason AVIC International ended up with four skills development programs rather than just one is because of this “bootstrapping” approach. Rather than pre-defining the number and types of programs at the outset, each project evolved organically out of obstacles encountered

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*The Chinese approach towards development dispenses with procedural rigidity and follows a more flexible approach that emphasizes social learning and adaptation.*

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in previous projects. As we described above, AVIC International pursued the first skills development project, a contract with Kenya’s National Youth Service, out of a desire to diversify their business in Kenya and put it on a more profitable footing. The work on this project led directly to the next project with the Ministry of Education. According to Mr. Shikoli Isalambo Benard of the Kenyan Ministry of Education, when the Ministry decided to invest in revamping technical and vocational education and sought help from the Chinese government in 2009, the embassy recommended AVIC International as an industry partner.<sup>76</sup> The result was a multi-year contract in which AVIC International outfitted 10 Kenyan vocational schools with industrial machinery, accompanied by maintenance support and training. During this project, it became clear that the schools were not utilizing the new machinery. To solve that problem, the Africa Tech Challenge—the third AVIC International investment in skills development—was created. According to Mr. Benard, he and an AVIC project manager were taking a seven-hour drive to visit a vocational school when he learned that AVIC International was trying to develop its CSR project for the year.<sup>77</sup> He recounted:

They [the AVIC International staff] were saying, ‘we could build a hospital...’ I said, ‘All that is good, but it is being done by many people. But where you’ll have impetus: you’ve given us huge equipment, but the equipment is just here. We’re not utilizing it. So if we have a competition to support this equipment, then really, you’ll be helping us as a country to build the confidence of our students, that they can make things which can actually go out there.’<sup>78</sup>

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*Despite positive impressions various stakeholders have of AVIC International's skills development programs, these programs have not yet generated widespread skills upgrading or job creation.*

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Mr. Benard was evidently very convincing as, after that long drive, he wrote a concept paper on the creation of what eventually became the Africa Tech Challenge, a competition to encourage students to develop and use machining skills. The manager on that long car-ride with Mr. Benard convinced his superiors at AVIC International to fund the program in full.

Interestingly, the story did not end there. Running the Africa Tech Challenge revealed another critical problem: vocational teacher skills. According to Mr Benard, “When we were doing the ATC, something came out clear: our instructors were worse than the students!” The Ministry and the company both became concerned that skills development in Kenya could never advance without upgrading instructor skills. As a result, over the course of two years, the parties co-designed the Sino-Africa Industrial Skills Upgrading Center (SAISUC), an industry-supported training program for vocational teachers in Kenya that launched in July 2016.

This history follows exactly the pattern that Sabel theorized in his notion of “bootstrapping development”: each project uncovered new opportunities and new challenges, which spawned new projects. AVIC International seems to be comfortable with such a creative and flexible approach. Mr. Si, the Chief Representative of AVIC International in East Africa, stated, “In these projects, we had to use non-normal means (非正常的手段) to solve problems.” One example Mr. Si cited was the willingness to think outside the box, and not follow pre-determined plans or terms. For one contract, AVIC International provided after-sales service for six months beyond the life of the contract. “You can’t be like the West, doing things strictly under contract,” Mr. Si admonished.

Indeed, compared to Western actors, AVIC International’s method was more flexible and more open to cooperation with local stakeholders. The Ministry of Education had worked with the World Bank on a previous vocational education project, and it found working with AVIC to be very different. “The World Bank people are very procedural, which I found very different with the Chinese,” said Mr. Benard. “The World Bank way is very tiring...every day they want to have a meeting; it’s very fatiguing. The advantage with the Chinese projects is that they are very direct...The Chinese are interested in the output, which we would co-define. But the World Bank would come with their own outcomes.”

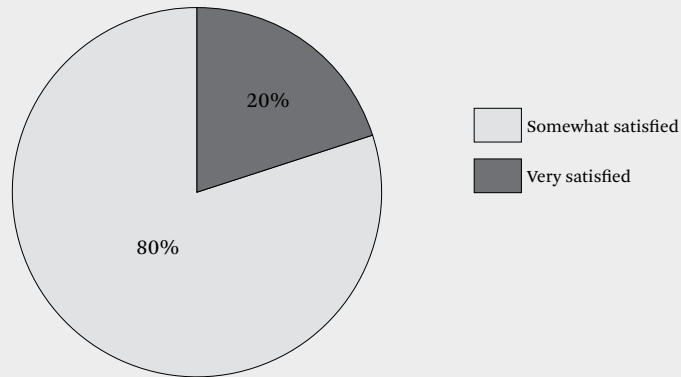
## **PROGRAM IMPACTS**

A FULL, RIGOROUS, AND QUANTITATIVE impact evaluation is beyond the scope of our study, but we gathered qualitative impressions of AVIC International’s various skills development programs from multiple stakeholders, including company staff, members of multiple parts of the Kenyan government, and teachers and students at vocational training institutions. Overall, the company’s programs seem to have had a mixed impact. Despite extremely positive impressions various stakeholders have of AVIC International’s skills development programs, these programs have not yet

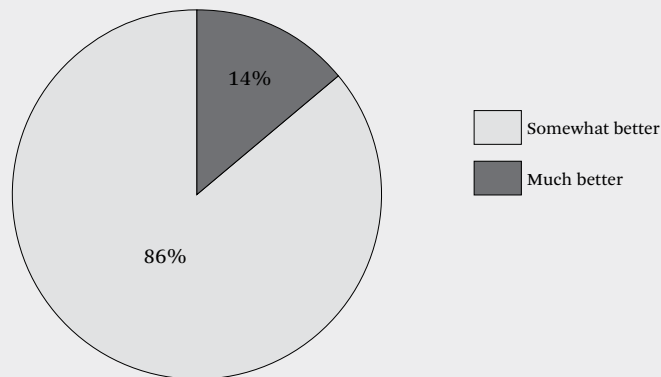


**Figure 1:** Survey results of 2016 Africa Tech Challenge (ATC) participants (n=30)

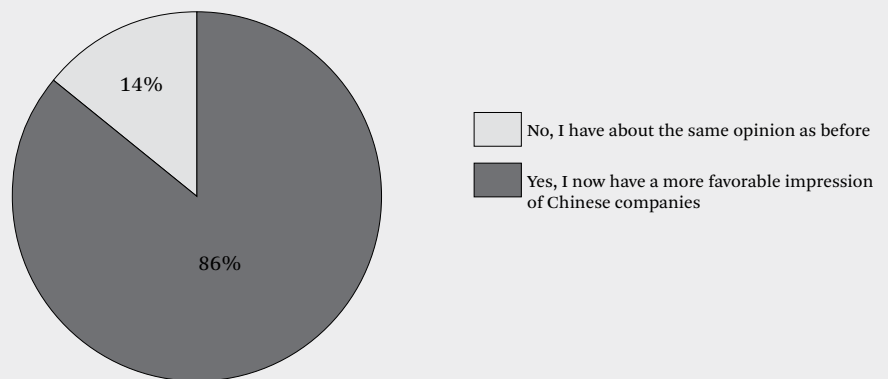
How satisfied were you with your experience at ATC?



How did the training you received at ATC compare to the training you received at school?



Has ATC caused you to change your opinion of Chinese Companies?



generated skills upgrading in entire technical trades as a whole, nor have they led to widespread job creation.

In interviews, stakeholders expressed extremely positive views about AVIC International's skills building programs. The Kenyan Ministry of Education praised AVIC International's project management, its deep technical expertise ("They had very specific people for very specific tasks"), its dedication to the project ("They kept staff

here even beyond the contract”), and the quality of the equipment that it provided (“The equipment from China is very good. We did the Africa Tech Challenge with equipment from the Netherlands, and their equipment broke down.”).

Students and teachers that participated in AVIC International’s training programs were even more enthusiastic about their experiences. One teacher, Daniel Barongo Meraba, who had taught for twenty-five years before participating in the Africa Tech Challenge, said that the experience “rejuvenated” him. As he described, “We are learning something from the Chinese...You feel rejuvenated. You wonder, ‘what else can I do?’”<sup>79</sup> Peter Njenga Kinyua, a student participant in the Africa Tech Challenge, was even more emphatic. “My life has completely changed,” he told us the moment we opened our interview, “Now I’m working because of the Africa Tech Challenge and the skills I gained there...During the Africa Tech Challenge, every single moment was a learning moment.”<sup>80</sup>

These overwhelmingly enthusiastic sentiments were supported by our survey of thirty participants at the 2016 Africa Tech Challenge. At the end of the program, 24 of the 30 participants (80 percent) said that they were “very satisfied” with their experience in the program, with the remainder reporting that they were “somewhat satisfied.” Twenty-five of 29 respondents to the question, “How did the training you received at ATC compare to the training you received at school” answered that the ATC training was “much better,” with the remainder responding “somewhat better.” And most importantly for the AVIC International, when asked “Has ATC caused you to change your opinion of Chinese companies?” 25 of 29 respondents said that they now have a “more favorable” impression of Chinese companies (Figure 1).

Despite these rave reviews, concrete outcomes have been mixed. Again, a rigorous impact evaluation is beyond the scope of this study, but the high-level measures that are available show only qualified success. Mr. Benard of the Ministry of Education cited three criteria that the Ministry uses to gauge success of its projects with AVIC International: first, whether the equipment is commissioned, delivered, and installed; second, whether the instructors are trained before the equipment is delivered; and third, whether the equipment is used effectively. Of these criteria for success, only the first two were met. The average machinery utilization of the schools that AVIC International outfitted was only about 35 percent, roughly similar to the utilization rate that the Ministry of Education has achieved previously in projects with a Dutch company and the World Bank. When we interviewed Chinese master trainers and their trainees at the National Youth Service industrial skills project, the Chinese trainers were unsatisfied with the progress of their students, whereas the students were thrilled about the training they had received—a curious juxtaposition.<sup>81</sup>

The evidence for impact on employment rates is similarly mixed. Despite individual success stories, AVIC International’s skills development programs have yet to produce widespread job creation. According to AVIC International project managers, the six or so previous Africa Tech Challenge participants that got jobs as a result of their participation in the program were provided jobs directly by AVIC International or by its affiliated companies.

This juxtaposition—very satisfied stakeholders, but unremarkable outcomes—is curious and may be the result of several factors, none of which are mutually exclusive. One potential reason is the relative lack of technical sophistication of Kenyan stakeholders versus Chinese stakeholders: one side sees how far they have come, whereas the other side sees how much further there is to go. Another potential reason is that the Kenyan stakeholders most willing to speak to us were the ones who benefited the most and/or enjoyed the programs the most, hence skewing our impression of the view of Kenyan stakeholders in a more positive direction than is really the case. Another potential issue is that AVIC International and its government partners have not yet built a model that is primed to produce large-scale impact. In a telling interview, an official at the Kenyan Ministry of Industry told us that he had never heard of AVIC International’s programs in vocational training.<sup>82</sup> This suggests that the linkages between the company and various parts of the Kenyan government needed to push vocational training to the masses have not yet been formed. A final potential factor is timing: technological upgrading is a process that takes decades and is thereby difficult to perceive in the short term. Hence, it’s possible that the programs may truly be having a positive impact, but that it will not show up in industry-level data for some time.

## CONCLUSION

IN CONCLUSION, WE WOULD LIKE TO HIGHLIGHT some of the policy implications arising out of this in-depth study. First and most importantly, this case challenges the stereotype that Chinese companies operating in Africa do not care about socially relevant issues. This case study should provide an impetus for African governments, educational institutions, and other stakeholders to begin engaging Chinese companies. Certainly not every Chinese company operating in Africa will invest in such programming or in such a large-scale, sustained way, but there is no reason to think that AVIC International, as a typical large, bureaucratic Chinese firm, is an outlier in terms of how Chinese companies perceive their business environment.

Second, this case provides an interesting example of how a mixture of public and private models can be incorporated to address the same social issue. In its skills development programs, AVIC International used a mixture of for-profit contracting and non-for-profit corporate social responsibility programming. This flexibility has allowed it to work with various stakeholders to tackle a variety of related problems in local skills development, from machine availability to student training to teacher training. From the Kenyan government perspective, one attractive feature of working with AVIC International was its willingness to fund non-for-profit programming even while fulfilling for-profit contracts. This arrangement constitutes a self-reinforcing feedback loop: the company’s non-profit activities give it an important competitive advantage with its core customer (the Kenyan government), and the for-profit business that this helps sustain generates further profits to support additional non-profit activities.

Finally, this study has implications for the process of developing socially impactful programs. One of the factors that has contributed to AVIC International's successful program implementation is its flexibility—its willingness to pivot, try new ideas, and conceive of additional programming as new information is uncovered. The fact that the Kenyan Ministry of Education proposed the idea that became the Africa Tech Challenge demonstrates the company's willingness to brainstorm with and genuinely listen to the ideas of its developing country partners. This policy of “bootstrapping” to develop better and more effective programming, rather than rigidly applying pre-defined programs, is needed to address the largest and most intractable issues in development. As Deng Xiaoping famously pointed out, the best way to cross the river is probably not in a straight line, but in a zigzag as one feels the stones underfoot. ★

## APPENDIX

List of interviewees		
Name	Organization	Title
<b>Chinese staff at AVIC International and affiliated companies</b>		
CHEN Zhe 陈哲	AVIC INTL Beijing E.A. Co, Ltd	General Manager
HAN Jiang 韩江	Dalian Machine Tools Group	Technician
JIN Yetao 金也淘	AVIC International	Project Manager/ Former Country Representative of South Sudan
LI Jing 李京	AVIC Shenzhen	Project manager, NYS Project
LIU Yi 刘毅	Shantui	Master trainer/Technician, NYS Project
QIAN Rong 钱容	AVIC-INTL Project Engineering Company	Vice President
SI Yanxuan 司炎轩	AVIC International	Chief Representative
ZHANG Hang 张航	AVIC International	Project Manager/ Former Country Representative of Ghana
ZHANG Xin 张昕	AVIC International	Project manager, ATC
ZHAO Leilei 赵磊磊	AVIC International	Project manager, TVET
<b>Training program partners and participants</b>		
Tony Kahi Chore	Technical University of Kenya	Former student, former ATC participant
Peter Njenga Kinyua	AVIC INTL Beijing E.A. Co, Ltd	Spare parts salesman, former ATC participant, former KTTC student
Humphrey J. Kariuki Kuria	Kabete National Polytechnic	Chief Principal
Humphrey Mahiva	National Youth Service	Mechanic
Daniel Barongo Meraba	KTTC	Technician, former ATC participant
Alex M. Muumbo	Technical University of Kenya	Professor of Mechanical Engineering
Dangaru Obadiah Ng'ang'a	KTTC	Lecturer
Wilfred Njenga	Kabete National Polytechnic	Head of Department Mechanical
Joseph Nyakundi	Technical University of Kenya	Staff participant, ATC
Charity Ojwang	Kenyatta University	Student, Mechanical Engineering, former ATC participant, AVIC International intern
Sam Onkoba	MoboMall	Founder & CTO, former ATC participant

Suleiman Salim	National Youth Service	Mechanic
Stephen Sigei	Kabete National Polytechnic	Former student, former ATC participant
Haggai Wambisi	MoboMall	Founder & CEO, former ATC participant
Daniel Emmanuel Wekesa	Technical University of Kenya	Former student, former ATC participant
<b>Government representatives and experts</b>		
Shikoli Isalambo Benard	Ministry of Education, Science, and Technology	Project Manager, originator of idea for ATC
Alick Kamiji	Zambia National Service	Deputy Commandant
Loy K.A. Muhwezi	Uganda Ministry of Education, Science, Technology and Sports	Principal Education Officer, TVET
Njuguna Ndung'u	Central Bank of Kenya	Former Governor
Paul Ojukwu Osogo	African Centre for Technology Studies	Government and Diplomatic Liaison Officer
Stephen Odua	Ministry of Industry, Investment and Trade	Acting Director, Private Sector Development
Dr. Meshack C. Opwora	Ministry of Education	Deputy Director TVET

## ENDNOTES

1. "Fortune Global 500," *Fortune*, accessed July 18, 2016, <http://fortune.com/global500/>.
2. Hanauer and Morris, *Chinese Engagement in Africa*, 26.
3. Hanauer and Morris, *Chinese Engagement in Africa*, 30.
4. "China Statistical Yearbook 2013," *National Bureau of Statistics of China*, accessed September 8, 2017, <http://www.stats.gov.cn/tjsj/ndsj/2013/indexeh.htm>; "Bilateral FDI Statistics 2014," *United Nations Conference on Trade and Development*, accessed September 8, 2017, <http://unctad.org/en/Pages/DIAE/FDI%20Statistics/FDI-Statistics-Bilateral.aspx>; "China-Africa FDI Data 2003-2015 by Country Breakdown," China Africa Research Initiative, School of Advanced International Studies, Johns Hopkins University, accessed September 8, 2017, [http://www.sais-cari.org/s/FDIData\\_05182017.xlsx](http://www.sais-cari.org/s/FDIData_05182017.xlsx).
5. Tian Xuejun, "Remarks at the South African Institute of International Affairs," last modified July 17, 2012, <http://www.focac.org/eng/dwjbzjhys/t951978.htm>.
6. "Africa and China: More Than Minerals," *The Economist*, March 23, 2013, <https://www.economist.com/news/middle-east-and-africa/21574012-chinese-trade-africa-keeps-growing-fears-neocolonialism-are-overdone-more>.
7. Tang Xiaoyang and Irene Yuan Sun, "Social Responsibility or Development Responsibility? What is the Environmental Impact of Chinese Investments in Africa: What are its Drivers, and What are the Possibilities for Action?" *Cornell International Law Journal* 69 (2016): 69-99.
8. "China Statistical Yearbook 2014," *National Bureau of Statistics of China*, accessed September 8, 2017, <http://www.stats.gov.cn/tjsj/ndsj/2014/indexeh.htm>.
9. "China's Outward Direct Investment," *OECD Investment Policy Reviews: China 2008*, accessed August 19, 2017, <https://www.oecd.org/investment/investmentfordevelopment/41792683.pdf>; "The International Comparability of China's FDI Statistics," *OECD Investment Policy Reviews: China 2003*, accessed August 19, 2017, [https://books.google.co.ke/books?id=EBH\\_RiPU4FMC&lpq=PP1&pg=PA187#v=onepage&q&f=false](https://books.google.co.ke/books?id=EBH_RiPU4FMC&lpq=PP1&pg=PA187#v=onepage&q&f=false).
10. "Database of Registered Investment Projects," *Chinese Ministry of Commerce*, accessed January 31, 2015, [http://wszw.hzs.mofcom.gov.cn/fecp/fem/corp/fem\\_cert\\_stat\\_view\\_list.jsp](http://wszw.hzs.mofcom.gov.cn/fecp/fem/corp/fem_cert_stat_view_list.jsp).
11. Jeffrey Gutman, Amadou Sy, and Soumya Chattopadhyay, "Financing African Infrastructure: Can the World Deliver?" *Brookings Institute*, March 2015, <https://www.brookings.edu/research/financing-african-infrastructure-can-the-world-deliver/>.
12. Vivien Foster and Cecilia Briceno-Garmendia, *Africa's Infrastructure: A Time for Transformation*. *Africa Development Forum*, (World Bank, 2010), 212, <https://openknowledge.worldbank.org/handle/10986/2692>.
13. "The World Bank Open Data: Sub-Saharan Africa," *World Bank*, accessed August 19, 2017, <http://data.worldbank.org/region/sub-saharan-africa>; Ernest & Young, "Planning to Deliver," *Dynamics 8* (December 2013): 16-19.
14. *Africa's Infrastructure: A Time for Transformation*, eds. Vivien Foster and Cecilia Briceno-Garmendia (World Bank, 2010), <https://openknowledge.worldbank.org/handle/10986/2692>.
15. Gutman, Sy, and Chattopadhyay, "Financing African infrastructure," 27.
16. "Mapping Support for Africa's Infrastructure Investment," *OECD*, 2012, <http://unohrlls.org/custom-content/uploads/2013/09/Mapping-Support-for-Africas-Infrastructure-Investment.pdf>.
17. Gutman, Sy, and Chattopadhyay, "Financing African infrastructure," 17, 28.
18. Ibid.

19. Deborah Brautigam and Hwang Jyhjong, "Eastern Promises: New Data on Chinese Loans in Africa, 2000-2014," Working Paper No. 2016/4, China-Africa Research Initiative, School of Advanced International Studies, Johns Hopkins University, Washington, D.C. (April 2016), <http://www.sais-cari.org/publications>.
20. David Dollar, "Supply Meets Demand: Chinese Infrastructure Financing in Africa," *World Bank*, July 10, 2008, <http://blogs.worldbank.org/eastasiapacific/supply-meets-demand-chinese-infrastructure-financing-in-africa>.
21. Deborah Brautigam, *The Dragon's Gift: The Real Story of China in Africa* (United Kingdom: Oxford University Press, 2009).
22. Håvard Halland, John Beardsworth, Bryan Land, and James Schmidt, "Resource Financed Infrastructure: A Discussion on a New Form of Infrastructure Financing," *World Bank*, May 29, 2014, <http://documents.worldbank.org/curated/en/394371468154490931/pdf/884850PUBoBox300EPI2102390May292014.pdf>.
23. Halland, Beardsworth, Land, and Schmidt, "Resource Financed Infrastructure," 5.
24. "Kenya signs infrastructure, energy deals worth \$5 bln with China," *Reuters*, August 19, 2013, <http://www.reuters.com/article/kenya-china-idUSL6NoGK2MT20130819>.
25. Zhang Pengfei, "Chinese premier wraps up 'fruitful' Kenya visit with railway deal," *CCTV*, May 12, 2014, <http://english.cntv.cn/2014/05/12/ARTI1399854947716296.shtml>.
26. Uwe Wissenbach and Yuan Wang, "African Politics Meets Chinese Engineers: The Chinese-built Standard Gauge Railway Project in Kenya and East Africa," Working Paper No. 2017/13, China Africa Research Initiative, School of Advanced International Studies, Johns Hopkins University, Washington, DC (June 2017), <http://www.sais-cari.org/publications>.
27. "East Africa: Chinese-Built Lamu Port On Course to Transform Kenya, E. Africa," *All Africa*, July 15, 2015, <http://allafrica.com/stories/201507151694.html>.
28. George Mwangi, "Chinese Firm Signs \$478.9 Million Kenya Lamu Port Deal," *The Wall Street Journal*, August 3, 2014, <http://blogs.wsj.com/frontiers/2014/08/03/chinese-firm-signs-478-9-million-kenya-lamu-port-deal/>.
29. Martin Mwita, "Kenya: Lamu Port Construction Slows Down Over Funds," *All Africa*, December 3, 2015, <http://allafrica.com/stories/201512030532.html>.
30. Justin Yifu Lin, "From Flying Geese to Leading Dragons: New Opportunities and Strategies for Structural Transformation in Developing Countries," Policy Research Working Paper 5702, *World Bank*, June 2011, [http://siteresources.worldbank.org/INTMOZAMBIQUE/Resources/WIDER\\_Lecture-Justin\\_Lin-05-03-11.pdf](http://siteresources.worldbank.org/INTMOZAMBIQUE/Resources/WIDER_Lecture-Justin_Lin-05-03-11.pdf); Justin Yifu Lin and Yan Wang, "China-Africa Co-operation in Structural Transformation: Ideas, Opportunities, and Finances," United Nations University WIDER Working Paper 2014/046 (February 2014), <https://www.wider.unu.edu/sites/default/files/wp2014-046.pdf>.
31. Shigehisa Kasahara, "The Asian Developmental State and The Flying Geese Paradigm," Discussion Papers No. 213, United Nations Conference on Trade and Development (November 2013), [http://unctad.org/en/PublicationsLibrary/osgdp20133\\_en.pdf](http://unctad.org/en/PublicationsLibrary/osgdp20133_en.pdf).
32. Miria Pigato and Wenxia Tang, "China and Africa: Expanding Economic Ties in an Evolving Global Context," World Bank, Investing in Africa Forum, March 2015, <https://openknowledge.worldbank.org/bitstream/handle/10986/21788/951610WP00PUBL050March01600PUBLIC0.pdf?sequence=1&isAllowed=y>.
33. Irene Yuan Sun, Kartik Jayaram, Omid Kassiri, "Dance of the Lions and Dragons: How are Africa and China engaging, and how will the partnership evolve?" *McKinsey & Company*, June 2017, <http://www.mckinsey.com/~media/mckinsey/global%20themes/middle%20east%20and%20africa/the%20closest%20look%20yet%20at%20chinese%20economic%20engagement%20in%20africa/dance-of-the-lions-and-dragons.ashx>.
34. Apurva Sanghi and Dylan Johnson, "Deal or No Deal: Strictly Business for China in Kenya?" The World Bank Policy Research Working Paper 7614 (March 2016), <http://documents.worldbank.org/curated/en/801581468195561492/pdf/WPS7614.pdf>.
35. Pigato and Wenxia, "China and Africa: Expanding Economic Ties."
36. Sun, Jayaram, and Kassiri, "Dance of the Lions and Dragons."



37. Yunnan Chen, Irene Yuan Sun, Rex Uzonna Ukaejiofo, Tang Xiaoyang, and Deborah Brautigam, "Learning from China? Manufacturing, Investment, and Technology Transfer in Nigeria," Working Paper No. 2016/2, China Africa Research Initiative, School of Advanced International Studies, Johns Hopkins University, Washington, DC (January 2016), [https://static1.squarespace.com/static/5652847de4b033f56d2bdc29/t/575ab816e707eb2bbd884091/1465563159778/Chen\\_Nigeria+working+paper.pdf](https://static1.squarespace.com/static/5652847de4b033f56d2bdc29/t/575ab816e707eb2bbd884091/1465563159778/Chen_Nigeria+working+paper.pdf).
38. Douglas Zhihua Zeng, "Global Experiences with Special Economic Zones: With a Focus on China and Africa," World Bank, Investing in Africa Forum, February 2015, <http://www.worldbank.org/content/dam/Worldbank/Event/Africa/Investing%20in%20Africa%20Forum/2015/investing-in-africa-forum-global-experiences-with-special-economic-zones-with-a-focus-on-china-and-africa.pdf>.
39. Andrew Caruso, Danielle Nesmith, Teresa Peterburs, and Egle Vilkelyte, "Toward Sustainable Growth of Chinese SEZs in Africa: The Zhongfu Case Study," Private report for Zhongfu International Investment Company, May 10, 2016, [http://www.sais-jhu.edu/sites/default/files/Zhongfu\\_IDEVpracicum\\_Report160506.pdf](http://www.sais-jhu.edu/sites/default/files/Zhongfu_IDEVpracicum_Report160506.pdf).
40. "If Africa Builds Nests, Will the Birds Come? Comparative Study on Special Economic Zones in Africa and China," *United Nations Development Programme*, June 2015, <http://www.cn.undp.org/content/dam/china/docs/Publications/UNDP-CH-Comparative%20Study%20on%20SEZs%20in%20Africa%20and%20China%20-%20ENG.pdf>.
41. Zeng, "Global Experiences with Special Economic Zones."
42. Deborah Brautigam and Tang Xiaoyang, "African Shenzhen: China's Special Economic Zones in Africa," *Journal of Modern African Studies* 49, no. 1 (2011): 27–54, [https://deborahbrautigam.files.wordpress.com/2013/04/brautigam\\_tang\\_jmas-2011.pdf](https://deborahbrautigam.files.wordpress.com/2013/04/brautigam_tang_jmas-2011.pdf).
43. Boaz Munga and Eldah Onsomu, "State of Youth Unemployment in Kenya," *Brookings Institute*, August 21, 2014, <http://www.brookings.edu/blogs/africa-in-focus/posts/2014/08/21-state-of-youth-unemployment-kenya-munga>.
44. "Unemployment / Under-employment Watch Q1 2016," Nigeria National Bureau of Statistics, May 2016, file:///Users/Irene/Downloads/UNEMPLOYMENT%20UNEMPLOYMENT%20WATCH%20Q1%202016%20sg%20fn.pdf.
45. Ibid.
46. "Where is the Unemployment Rate the Highest in 2014?" International Labour Organization, accessed December 8, 2015, [http://www.ilo.org/global/about-the-ilo/multimedia/maps-and-charts/WCMS\\_233936/lang-en/index.htm](http://www.ilo.org/global/about-the-ilo/multimedia/maps-and-charts/WCMS_233936/lang-en/index.htm).
47. "Africa Development Indicators 2008/09: Youth and Unemployment in Africa," World Bank, 2009, <http://documents.worldbank.org/curated/en/953751468009960130/pdf/538410WPoADI1210Box345632Bo1PUBLIC1.pdf>.
48. Justin W. van Fleet, Kevin Watkins, and Lauren Greubel, "Africa Learning Barometer," *Brookings Institute*, accessed December 8, 2015, <http://www.brookings.edu/research/interactives/africa-learning-barometer>.
49. "Enhancing Capacity for Youth Employment in Africa: Some Emerging Lessons," African Development Bank, Africa Capacity Development Brief Vol. 2 Issue 2, December 2011, [http://www.afdb.org/fileadmin/uploads/afdb/Documents/Publications/Africa%20Capacity%20Dev%20Brief\\_Africa%20Capacity%20Dev%20Brief.pdf](http://www.afdb.org/fileadmin/uploads/afdb/Documents/Publications/Africa%20Capacity%20Dev%20Brief_Africa%20Capacity%20Dev%20Brief.pdf).
50. Ibid.
51. "World Population Prospects: The 2015 Revision," United Nations Population Division, [https://esa.un.org/unpd/wpp/publications/files/key\\_findings\\_wpp\\_2015.pdf](https://esa.un.org/unpd/wpp/publications/files/key_findings_wpp_2015.pdf).
52. "Clinton Warns Against "New Colonialism" in Africa," *Reuters*, June 11, 2011, <http://www.reuters.com/article/us-clinton-africa-idUSTRE75AoRI20110611>.
53. Lamido Sanusi, "Africa Must Get Real About Chinese Ties," *Financial Times*, March 11, 2013, <https://www.ft.com/content/562692bo-898c-11e2-ad3f-00144feabdco>.
54. "Africans' Perception of Chinese Business in Africa: A Survey," *Ethics Institute of South Africa*, Aug 2014, [http://www.tei.org.za/phocadownloadpap/Research\\_Reports/AfricanPerceptionSurveyChineseBusinessWEBSITEVERSION.pdf](http://www.tei.org.za/phocadownloadpap/Research_Reports/AfricanPerceptionSurveyChineseBusinessWEBSITEVERSION.pdf).
55. Deborah Brautigam, "Are Africans Negative about Chinese Business Impact? Good Folks, Bad Research," *China in Africa: The Real Story*, October 2016, <http://www.chinaafricarealstory.com/2016/10/are-africans-negative-about-chinese.html>.

56. Barry Sautman and Yang Hairong, "Localizing Chinese Enterprises in Africa: from Myths to Policies," HKUST Institute for Emerging Market Studies, February 2015, [http://iems.ust.hk/wp-content/uploads/2015/02/HKUST\\_IEMS\\_Thought\\_Leadership\\_Brief\\_Issue5.pdf](http://iems.ust.hk/wp-content/uploads/2015/02/HKUST_IEMS_Thought_Leadership_Brief_Issue5.pdf).
57. Sun, Jayaram, and Kassiri, "Dance of the Lions and Dragons."
58. Yuan Wang and Yating Luo, "Business Perception Index Kenya 2014," *Sino Africa Centre of Excellence Foundation*, 2014, [http://www.sacefoundation.org/wp-content/uploads/2015/10/BPI-Index\\_Executive-Summary.pdf](http://www.sacefoundation.org/wp-content/uploads/2015/10/BPI-Index_Executive-Summary.pdf).
59. Ibid.
60. Ibid.
61. Sun, Jayaram, and Kassiri, "Dance of the Lions and Dragons."
62. Sajitha Bashir, "The Imperative of Skills Development for the Structural Transformation of Sub-Saharan Africa: Potential for China-World Bank-Africa Collaboration," World Bank, Investing in Africa Forum, May 2015, <http://documents.worldbank.org/curated/en/357611468187793783/pdf/97838-WP-Box391494B-PUBLIC-imperative.pdf>.
63. Sun, Jayaram, and Kassiri, "Dance of the Lions and Dragons."
64. Bashir, "The Imperative of Skills Development."
65. "Fortune Global 500."
66. The average currency exchange rate in 2016, 1 USD = 6.910 CNY, is used here. AVIC International Holdings Limited, *2016 Annual Report*, <http://www.avic161.com/UploadFiles/NewsSmall/2017041318122012434054.pdf>; AVIC International, "Competency Reference of AVIC International Holding Corporation," 2014.
67. AVIC International Holdings Limited, *2016 Annual Report*.
68. AVIC International, "肯尼亚高教项目概况," 2013.
69. AVIC International, "Competency Reference of AVIC International Holding Corporation," 2014.
70. Based on Qi Lin's previous experience working at AVIC International.
71. AVIC International, "Kenyan National Youth Service Project by AVIC International is Completed," May 11, 2017, <http://www.avic-intl.cn/html/news/4076.html>.
72. "China Helps Boost Technical, Vocational Training in Kenya," *Xinhua*, July 19, 2017, [http://news.xinhuanet.com/english/2017-07/19/c\\_136454099.htm](http://news.xinhuanet.com/english/2017-07/19/c_136454099.htm).
73. Mr. Si Yanxuan, Chief Representative of AVIC International in East Africa, interview with authors, Nairobi, Kenya, July 12, 2016.
74. Mr. Qian Rong, Deputy President of AVIC International in Kenya, interview with authors, Nairobi, Kenya, July 12, 2016.
75. Charles F. Sabel, "Bootstrapping Development: Rethinking the Role of Public Intervention in Promoting Growth," November 14, 2005, <http://www2.law.columbia.edu/sabel/papers/bootstrapping%20deve%20send5.pdf>.
76. Mr. Shikoli Isalambo Benard, Kenyan Ministry of Education, interview with authors, Nairobi, Kenya, July 8, 2016.
77. In the interest of full disclosure, Qi Lin, one of the authors of this study, was the manager that Mr. Benard refers to in this story. This interview was conducted by Irene Yuan Sun, the other author, and Mr. Lin was not present during the interview in order to lessen the chance that his presence would influence Mr. Benard's responses.
78. Mr. Shikoli Isalambo Benard, Kenyan Ministry of Education, interview with authors, Nairobi, Kenya, July 8, 2016.
79. Daniel Barongo Meraba, Teacher, KTTC, interview with authors, Nairobi, Kenya, July 10, 2016.
80. Peter Njenga Kinyua, former Africa Tech Challenge participant, interview with authors, Nairobi, Kenya, July 11, 2016.
81. Author interviews and site visit at National Youth Service, Nairobi, Kenya, July 8, 2016.
82. Stephen Odua, Kenya Ministry of Industry, interview with authors, July 12, 2016.

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