NO. 13 / 2016

CHINA AFRICA RESEARCH INITIATIVE

JOHNS HOPKINS SCHOOL of ADVANCED INTERNATIONAL STUDIES

POLICY BRIEF

POLICY POINTS

Managed services contracts, contestations for legitimacy, and weak institutional frameworks impede technology transfer between vendors and operators in the South African ICT market.

Recognizing the central role of ICT in social and economic development, the government should prioritize ICT and overhaul the regulatory environment.

The South African government should specify stringent and outcome-focused regulations for local content provision and local skills development, going beyond catch-all specifications in BBBEE.

Huawei and ZTE should seriously address issues of legitimacy by contending by collaborating with local organizations and decentralizing their recruitment strategies.

TECHNOLOGY TRANSFER IN TELECOMMUNICATIONS: BARRIERS AND OPPORTUNITIES IN THE CASE OF HUAWEI AND ZTE IN SOUTH AFRICA

BY JUNE SUN

Two of the most rapidly globalizing multinational corporations emerging from China's recent economic transformation are Huawei Technologies (Huawei) and Zhongxing Telecommunications Equipment Corporation (ZTE). Recently, both have become telecommunications equipment providers for many markets across the African continent, replacing European vendors. Telecommunications, and the information and communication technologies (ICT) sector more broadly, presents a particularly interesting China-Africa case study. South Africa is one of the most important markets for Huawei and ZTE in Africa. Although its socio-economic climate is exceptional on the continent, there are still relevant lessons to be learned. Based on three months of fieldwork in South Africa, this policy brief outlines three main barriers to significant technology transfer from Chinese vendors to South African companies: increased managed services contracts, contestations for legitimacy, and weaknesses in the institutional framework.

RESEARCH METHODS

Fieldwork was conducted in South Africa from July to September 2015, primarily in Johannesburg. Fifty-two semi-structured interviews and 3 focus group discussions were conducted with sources from Huawei, ZTE, Vodacom, MTN, Cell C, other ICT companies, the South African government, and analysts and academics. Sources were identified through a snowball sampling technique.

INDUSTRY OUTLINE

The international ICT market is increasingly globalized. Huawei and ZTE have significantly squeezed market incumbents around the globe, particularly in Africa. This paper focuses on the telecommunications equipment sector, which is separate from, but linked to, devices (e.g., mobile phones and tablets) and enterprise (e.g., video-conferencing equipment).

Equipment vendors, like Huawei and ZTE, compete in an oligopolistic market. Their two main competitors are Ericsson and Nokia, which recently acquired Alcatel-Lucent. CISCO is another market leader which maintains control over significant industry patents.

HUAWEI AND ZTE

Huawei

- **Founded in 1988**
- **Employee-owned, private enterprise**

ZTE

- **Founded in 1985**
- **State-owned, publicly traded enterprise**

Huawei and ZTE are relatively recent entrants into the ICT industry. Headquartered in Shenzhen, both are partially products of China's investment into national technological capability, and are important companies in China's Going Global policy.

As equipment vendors, Huawei and ZTE's clients include mobile and fixed-line operators, and other companies providing telecommunications solutions.

In addition to these main operators, there are numerous smaller companies operating in the ICT space who interact with Huawei and ZTE as equipment vendors. Huawei has had more market penetration in South Africa than ZTE, and provides equipment for all five listed operators. As of September 2015, ZTE works only with Cell C and MTN. ZTE's training is mainly on-the-job, while Huawei has set up a regional training center in northern Johannesburg, which trains several hundred engineers annually. Both occasionally send staff and clients to headquarters in Shenzhen for training. For Huawei, training has become a separate product.

MANAGED SERVICES AND VENDOR FINANCING

The telecommunications sector in South Africa, like in many other regions, was deregulated and liberalized in the 1980s-1990s. Today, the industry is still responding to the demands of liberalization and internationalization, which largely manifest as financial pressures for operators. These pressures ultimately lower technology transfer from vendors to operators, as more managed services contracts (MSCs) are being signed. This impedes technology transfer through forward and horizontal linkages between vendors and operators.

Under MSCs, in addition to equipment sales, maintenance and service work is outsourced back to the vendors. This changes the deep forward and horizontal linkages which previously characterized the vendor-operator relationship, through which engineers from both sides work together on long contracts. In MSCs, by contrast, operators only deal with the very first layer of maintenance. Although some operators had bad experiences with MSCs and were increasingly concerned about maintaining control over technical work, the prevalence of MSCs was high, mainly because of the financial advantages MSCs brought.

Huawei and ZTE have significantly challenged Nokia and Ericsson in South Africa through price competitiveness. Not only have Huawei and ZTE offered price packages up to 50 percent less than European vendors, they also offer more competitive vendor financing packages. Vendor financing, whereby vendors help fund or loan part of the contract with operators, is not uniquely

Table 1: Main Operators

Operator	Notes
Vodacom and MTN	Two of Africa's largest mobile operators
Cell C	Mobile operator challenging Vodacom and MTN in South Africa
Telkom	South African state incumbent fixed-line operator; also entered mobile business SA government still has stake in Telkom shares, but has recently been privatized and reformed
Neotel	Fixed-line operator challenging Telkom Obtained license in 2005

Chinese. But Huawei and ZTE have been able to offer more appealing packages due to their access to funding through the China Development Bank and the Export-Import Bank of China. As a result, Huawei and ZTE have entered the market with a different business model than their competitors. Because capital expenditure is not a limiting factor for either, each company uses price to enter markets. Huawei was the first to adopt this strategy widely in South Africa, yet more recently, ZTE has been using the same strategy to undercut Huawei. Although both Huawei and ZTE are often grouped together, they are fiercely competitive and do not collaborate in the South African market.

CONTESTATIONS FOR LEGITIMACY

Two important channels of technology transfer in telecommunications are forward and horizontal linkages through collaboration with South African companies and local recruitment. Cultural differences manifest through contestations for legitimacy, which lowers the efficiency and scope of transfer from vendors to operators.

Interviewees indicated that Huawei's proportion of local recruitment is approximately 60 percent, while ZTE's is about 40 percent. However, interviews also exposed widespread stereotyping and the presence of cultural and language barriers on both sides, thus impeding technology transfer. Huawei and ZTE are disrupting a global market established entirely by European and American corporations, who have historically defined technical and reputational standards of legitimacy. The data illustrated an ongoing contest for legitimacy in the South African market.

On the South African side, there has been widespread concern about the quality of Huawei and ZTE equipment, which has led to lower trust and some reluctance to cooperate. Almost all quality concerns have been unfounded, either because Chinese equipment is actually of good quality, or because quality improved rapidly enough to avoid or mitigate adverse consequences. Some interviewees said the quality of Huawei equipment has now surpassed that of European incumbents

The fact that Chinese employees sometimes don't speak English fluently has also fed stereotypes and assumptions their equipment is of a poorer quality. As a result, Huawei and ZTE have had to overcome the "Made in China" stigma. Huawei has taken steps to address this lack of trust by exclusively hiring South African trainers in their training center.

An equally important indicator of legitimacy is business professionalism, which many South Africans viewed as lacking among Huawei and ZTE employees. In interviews, Huawei and ZTE were often described as unwilling to share information. The use of Chinese as the language of communication was seen as a gatekeeping device, and local employees were seen as unempowered.

These contests for legitimacy are significant challenges for China-South Africa vendor-operator relationships, and have significantly hindered technology transfer. However, respondents noted that the Chinese seem very willing to learn and adapt. Consequently, it is likely that this relationship will evolve in future years.

WEAKNESSES IN INSTITUTIONAL FRAMEWORK

Huawei and ZTE, like all foreign companies, must operate within the institutional framework of their host country, which heavily influences technology transfer. In South Africa, data showed the policy and regulatory environment and race-based empowerment laws have a significant impact on Huawei and ZTE's relationships with their clients.

The South African telecommunications market is one of the most mature and saturated in Africa, but the regulatory environment is weak. Due to low capacity and a lack of drive to prioritize and re-organize ICT policy, the policy mandate for ICT development and technology transfer is often lost. Thus, although South Africa would like a commitment from Chinese companies to actively transfer technologies and manufacture locally, they have not enforced particular regulations for local content. This is due in part to a market-oriented view that the government's and the regulator's role in the ICT market should be minimal, and also in part to an over-reliance on Broad-Based Black Economic Empowerment (BBBEE), South Africa's race-based empowerment laws.

BBBEE are a set of regulations concerning equity and employment that were implemented after the Apartheid regime. The goal of the BBBEE laws is to correct historical economic imbalances in the population, among groups who have faced discrimination for race, gender, or disability. Foreign companies are also subject to these requirements; to be eligible for certain public tenders, companies need to score a minimum number of points on their BBBEE scorecard.

Huawei and ZTE comply with BBBEE requirements, but face many of the structural limitations that BBBEE has been criticized for. The skills development requirements are often not stringent enough, and therefore the focus of BBBEE tends to be in compliance rather than transformative changes. Furthermore, according to some interviewees, South Africa's education system does not produce graduates with the right skill sets to absorb potential technology transfer. An over-reliance on BBBEE thus masks weaknesses in technology transfer.

POLICY IMPLICATIONS

Given the central role of ICT in social and economic development, it should be prioritized in government policy, and the regulatory environment needs to be overhauled. Relevant government departments, such as the recently separated Department of Telecommunications and Postal Services and the Department of Communications, need to work with the regulatory body, the Independent Communications Authority of South Africa, as well as the industry and civil society organizations, to have clear oversight of the state of network provision, and of future developments in the medium and long run. Government departments, state-funded research bodies, universities, and the private sector should work towards a more unified policy framework to match increased convergence in ICT.

The relevant government departments need to specify stringent and outcome-focused regulations for local content provision and local skills development, which go beyond catch-all specifications in BBBEE. Where foreign firms offer training, these should be implemented and disseminated without delay. Where they do not, regulations should be put in place to ensure corporations connect with the education system to provide skills development. Regulation should also try to address the outcomes of increased managed services contracts, perhaps by specifying alternative technical collaborations and training to replace the linkages lost.

Huawei and ZTE should address issues of legitimacy by seriously contending with the challenges of localization. For example, they can increase collaboration with local organizations, or focus on de-centralizing strategies of recruitment.

The **CHINA-AFRICA RESEARCH INITIATIVE (CARI)** at the Johns Hopkins University School of Advanced International Studies (SAIS) in Washington, D.C. was launched in 2014. Our mission is to promote research, conduct evidence-based analysis, foster collaboration, and train future leaders to better understand the economic and political dimensions of China-Africa relations and their implications for human security and global development.

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Carnegie CORPORATION OF NEW YORK

Support for this policy brief was provided by a grant from Carnegie Corporation of New York.

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