

Exploring the human capital development dimensions of Chinese investments in Africa: Opportunities, implications and directions for further research

RESEARCH ARTICLE

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Abstract

This article uses a case study approach to discuss the effects of Chinese Economic Engagement (CEE) on three dimensions of human capital development (HCD): local employment, training and skill building and knowledge and technology transfer. The study findings suggests that CEE can and does contribute to HCD in Africa, however this is dependent on certain sectoral factors and contextual conditions. This study advances a working hypothesis that the HCD impact of CEE will vary across countries and sectors of the African economy. This working hypothesis seeks to guide further research towards developing a theoretical framework for the study of CEE in Africa and its effects on HCD. The article also identifies research areas that should be further explored in order to gain a deeper understanding of the impact of CEE in Africa.

Keywords

China, Africa, Human capital development, Foreign direct investments, Sino-Africa Cooperation, Multinational corporations

Introduction

China's engagement in Africa is most visibly concentrated in the areas of trade, investment and aid. Africa in the past decade has witnessed an influx of Chinese investments in various sectors of its economy. On one hand, Chinese FDI stock in Africa continue to grow at a steady rate, as at the end of 2016, total Chinese FDI stock in Africa stood at US\$40 billion, showing an increase of US\$6 Billion from the previous year's volume of US\$34 billion (Atkins et al 2017, CARI 2018). On the other hand there has been a slight decline in FDI flows from China to Africa. Annual FDI flows for 2016 was US\$2.4 Billion, a decrease from 2013 volumes of US\$3.4 billion (CARI 2018). The decline has been attributed to the slump in the value of commodities globally as well as China's domestic economic slowdown (Atkins et al 2017).

Chinese investments in Africa are increasingly diverse in terms of investment locations and sector. While resource-rich African countries tend to attract more Chinese investments, this in itself is not peculiar as this is generally the case with western investments in Africa (Chen et al 2015). Having said that, the presence of natural resources is not the single determinant factor attracting Chinese investments. As Chen et al (2015) finds in their study on Chinese FDI in Africa, the size of the domestic market, the abundance of labour amongst other country factor endowments also influences the location decisions of Chinese investments. This is evident in Chinese investments in non-resource rich countries like Ethiopia, Kenya, Tanzania and Uganda. Similarly, sector-wise Chinese investments is not limited to the natural resources sector, in fact the services sector and increasingly the manufacturing sectors attracts more Chinese investments (Chen et al 2015).

One of the sectors with increasingly visible Chinese presence is the telecommunications sector. Chinese telecommunications companies have made significant inroads into the telecom sector in Africa. The presence of Chinese telecom giants such as Huawei, ZTE in Africa is closely tied to China's 'Going out' strategy launched in 1999, the objective of which is to encourage Chinese enterprises to invest abroad, raising their profile and competitiveness in the global market (Gagliardone and Geall 2014). The launch of the going out strategy coincided with the wave of liberalization of the telecom industry in most African countries. This created the perfect opportunity for Chinese telecom firms to invest in Africa's telecom sector and for African countries to raise much needed private capital to build and upgrade their telecom infrastructures and transform their telecom industries.

The Chinese government contributes to financing (via loans, export credits) and supplying telecom and information communication technology (ICT) infrastructure and equipment in Africa

through its telecom companies most notably Huawei and ZTE (Gagliardone and Geall 2014). For example, in 2006 through a Chinese EXIM bank loan of US\$1.9 Billion and a subsequent US\$1.6 Billion, the Ethiopian government contracted ZTE, Huawei to overhaul its telecommunications systems and expand mobile, and internet connectivity respectively. Similar examples are visible in countries like Nigeria, Ghana, Guinea, Tanzania etc. (see Gagliardone and Geall 2014). Though the foray of Chinese telecom companies into African markets have not been devoid of competition from western counterparts such as Ericsson, Nokia, Siemens etc. a combination of competitive pricing coupled with end to end service provision has seen Chinese telecom giants particularly Huawei dominate the African telecom market and get ahead of their western counterparts. Chinese investments in this sector contributed to significant upgrade to infrastructures and increased access to mobile and internet connectivity thus bridging the digital divide.

Despite the positive effects such investments could have on the African economy, the influx of Chinese enterprises has been welcomed on the one hand and criticised heavily on the other. African governments are keen on attracting Chinese investments into their respective countries with a view to create jobs, provide training to locals, contribute to infrastructural development and foster knowledge and technology transfer. Thus, these investments can contribute to socio-economic development in their respective host countries. However, Chinese economic engagement (CEE) in Africa has also triggered debates about its consequences on Africa's development. In fact, its effects on human capital development (HCD) have been among the most contentious topics in relation to Chinese investments in Africa (King, 2013). Claims that Chinese companies import workers from China, rarely employ locals – and offer little or no training to the ones employed – and subject workers to poor working conditions continue to dominate the China–Africa discourse. Research that investigates these claims is essential for a better understanding of CEE in Africa and its implications on HCD.

Though CEE in Africa is not without its challenges, it is logical to argue that the engagement could potentially contribute positively to HCD, particularly in sectors such as telecommunications and labour-intensive manufacturing. In other words, we argue that CEE presents opportunities for HCD in Africa; however, these opportunities may vary from sector to sector as well as from country to country. In investigating HCD opportunities presented by Chinese engagement, the paper specifically analyses how Chinese enterprises contribute to HCD dimensions such as local employment, training and skill building and knowledge and technology transfer.

While a large number of existing studies on Sino-Africa engagement have focused on the nature of the relationship and the larger economic and political implications of the engagement, few studies have addressed HCD related issues of CEE in Africa (See table 1 for a summary of extant literature that addresses HCD related issues of CEE in Africa). These existing studies discuss HCD dimensions within other wider issues such as trade unionisation and labour conditions (Baach and Jauch 2009), Chinese aid in Africa, industrialisation (Brautigam 2009), social and cultural dimensions of Chinese investments in Africa (Liu 2009) etc. Thus, offering only a glimpse of the HCD issues within the context of wider topic areas but not an in-depth look into the HCD dimensions of CEE in itself. Also lacking in these studies is a theoretical basis to analyse and understand the findings as related to HCD. This lack of theoretical understanding leaves much room for interpretation of the findings related to HCD. These theoretical considerations are important as they help to understand, explain and reconcile the existing inconclusive evidence on the effects of CEE on HCD in Africa. This paper fills this gap as it offers an in-depth view into the workings of a Chinese enterprise examining the intricacies from a human capital development perspective and offers theory driven rationalisations of the findings. Additionally, this paper offers more than just a general narrative of China in Africa but a concrete view of HCD in the context of Chinese MNEs in Africa. Furthermore, some other studies have focused solely on individual HCD issues, for

example, employment effects of CEE (Tang 2010, Sautmann and Hairong 2015), knowledge transfer (Calabrese 2017), education and training (King 2010, 2013) but there has been no research examining the totality of these HCD dimensions in one study. This study aims to fill that gap by investigating the HCD dimensions of employment, training and skills building and knowledge and technology transfer, thus presenting a full picture of the HRD dimensions of Chinese enterprises in Africa as represented in this case. The study concludes by discussing the research and practical implications of CEE for HCD in Africa, particularly the role of multinational corporations (MNCs) in human capital formation.

The paper is organised as follows: the first section summarises existing literature on the effects of MNCs on human capital formation in host countries. The second section explains the methodology and data collection process. The third section presents the findings, which are followed by a discussion of the practical and research implications of the engagement for HCD in Africa.

Analytical framework: Effect of MNCs on human capital formation in host countries

Apart from serving as a source of capital for growth in developing countries, FDI, in the form of MNC operations, can facilitate HCD through interactions with the host country's labour market (Majeed and Ahmad, 2008; Slaughter, 2002). This section summarises existing literature on the relationship between FDI, human capital formation and education in developing countries, particularly at a time when developing countries have adopted an increasingly favourable view towards FDI and MNCs. Studies from an international business perspective on human capital and MNCs are also reviewed. Drawing on these studies, this paper focuses on three dimensions through which foreign MNCs can facilitate HCD: local employment, training and skill building and knowledge and technology transfer.

Local employment

In countries characterised by relatively scarce capital and abundant labour, the employment creation effects of foreign MNCs are particularly important (Brancu and Bibu, 2014). Foreign MNCs contribute to job creation through *direct employment* of locals, and *indirectly* through the creation of a local supply chain, which ultimately contributes to the job creation process (Peng, 2014). In fact, studies suggest that MNC contribution to indirect employment is typically more significant – it may even outweigh that of direct employment (Lall, 2000; Miranda, 1994). Crucial to realising indirect employment creation is the presence of substantial linkages between MNCs and local firms. By promoting both forward and backward linkages with local companies and industries, where foreign MNCs subcontract to local companies, host countries can boost economic activity and thus job creation.

The job creation effects of foreign MNCs is one of the reasons that countries seek to attract inward FDI. FDI impact on local employment creation may be more positive when it is a greenfield investment as the MNC creates new jobs (Brancu and Bibu, 2014). Not only do they create jobs, they also often pay higher wages than domestic firms, particularly in developing countries (Aitken et al., 1996). Fosfuri et al. (2001) posit that MNCs use higher wages to attract and retain talent and prevent high labour turnover, which could potentially lead to knowledge spillovers that benefit local competitors. Further, MNCs tend to offer more training than their domestic counterparts (Abdullah, 1994; Mckendrick et al., 2000; Ritchie, 2001; Tan and Batra, 1995), particularly in industries that require higher levels of skills and technology, thus giving employees more opportunities for skill

and knowledge acquisition and upgrade. Thus, a large Chinese MNC operating in a high-tech sector in Africa, particularly as a greenfield investment, can not only generate jobs but also deliver better training opportunities and higher wages than domestic firms. Accordingly, to investigate the employment effects of CEE in Africa, this study examines both direct job creation and possible indirect employment.

Training and skill building

According to Tan and Batra (1995), enterprises are an integral means of skill development as they provide the largest share of training in most countries, and the training supplied matches the labour market demands. O'Donnell and Blumentritt (1999: 196) note that training is a mechanism for 'transferring product and process technology and for building the technical and managerial skills of the subsidiary's local workforce'. Apart from their employees, MNCs also train the employees of their customers, subcontractors and suppliers (Blomstrom and Kokko, 2002). Trainings can be formal or informal and can be delivered on the job, in classrooms or via seminars, formal schooling, international training courses, education, etc. The training effects of MNCs are particularly crucial for developing countries, characterised by relatively weak public education systems that result in an equally weak knowledge base (Blomstrom and Kokko, 2002).

Evidence suggests that MNCs carry out more training than local private firms do (Te Velde, 2002), though the type and duration vary depending on the mode of entry, the industry, size and time horizon of the investment, type of operations, motivation for the investment and local conditions (Blomstrom and Kokko, 2002). For example, MNCs in service sectors focus on strengthening the skills and expertise of their employees (Blunch and Castro, 2005). MNCs in high-technology industries or those requiring an educated workforce tend to provide more employee training (Tan and Batra, 1995; Te Velde, 2002). Some MNCs also *contribute to general education and training* in their host countries through grants, scholarships, voluntary assistance at different levels of education and setting up of public education centres (Te Velde, 2002). This is often done as part of the MNCs' corporate social responsibility (CSR) initiative in the host country or projects to develop skills and knowledge. For example, Te Velde (2002) notes that as a part of its CSR in Nigeria, Shell increased its investments in community development by providing secondary and tertiary scholarships as well as vocational training to locals from the communities it operates in.

Given the training effects of large MNCs, particularly those operating in high-tech sectors, the potential for Chinese enterprises operating in this sector to contribute to skill development via training in Nigeria is quite high. In relation to training and skill building, the paper investigates the contributions of Chinese enterprises particularly to Africa's formal and informal training as well as to general education.

Knowledge and technology transfer

Spillovers of knowledge, technological expertise and management are not only benefits of inward FDI (Slaughter, 2002) but also the primary expectations of host countries from MNCs. MNCs are regarded as catalysts of technology transfer from developed to developing countries (UNCTAD, 2010). However, such diffusion of technologies is rarely a planned objective of the MNCs; instead it occurs through external effects or spillovers (Blomstrom and Kokko, 2002). Technology transfer to host countries can occur through employee training and knowledge transmission that help local suppliers improve the efficiency and quality of their supplies (Saggi, 2004). According to Botelho and Pfister (2011: 211) business linkages between 'MNCs and [small and medium enterprises] SMEs can allow small local producers to benefit from an exchange of relevant information and

technical knowledge, promote production efficiency, production growth and market diversification, among other benefits'. Knowledge and technology transfer can occur through vertical or horizontal spillovers (Blyde et al., 2005).

Knowledge and technology transfer via horizontal spillovers

Horizontal spillovers are intra-industry spillovers between firms in similar stages of the production process. They typically involve transfer of sector-specific knowledge that would benefit the foreign firm's local competitors. One of the common mechanisms of knowledge diffusion from MNCs to local firms is via labour turnover/mobility (Glass and Saggi, 2002). According to Slaughter (2002: 13) 'if at least some of the knowledge particular to foreign affiliates is embodied in their labour force, then as affiliate employees leave to work for domestic firms this knowledge may move as well'. MNCs often provide their employees with regular training on the job to help them keep up with the latest technology and industry advancements. When these employees leave the MNC, the knowledge and skills acquired may spillover to local firms that they may join or to the firms they may start (Kokko, 1994).

Labour turnover is more common and perceived more favourably in certain sectors, such as high-tech, than others. Highlighting the peculiarities of the high-tech industry, Shankar and Ghosh (2013) assert that 'the first distinguishing feature is the persistence of substantial employee turnover'. They add that labour turnover is particularly high among high ability workers than less productive employees. Another distinguishable feature of labour turnover in high-tech industries is that it is perceived as a positive development; thus, no stigma is attached to it, unlike in traditional labour markets. This supports the notion that labour turnover and the consequent transfer of technical knowledge and skills have played a role in the success of many high-tech companies (Shankar and Ghosh, 2013). Given the high turnover rate experienced in the high-tech sector and the subsequent knowledge spillovers, one might posit foreign MNCs operating in a high-tech sector may likely experience knowledge transfer via labour turnover. This study aims to determine if there has indeed been a flow of knowledge via labour turnover through the operations of Chinese enterprises in Nigeria.

Knowledge and technology transfer via vertical spillovers

Vertical spillovers are inter-industry spillovers between firms in customer-supplier relationships. They are likely to involve the transfer of general knowledge, instead of sector-specific knowledge, that would benefit the suppliers or customers of foreign firms. Research has found that technology transfer often occurs through linkages between MNCs and local suppliers (Batra and Tan, 2002). Close linkages between the two create an environment where the local suppliers and customers can assimilate some technology and skills from the MNC (Porter, 1980).

According to Botelho and Pfister (2011), 'business links between MNCs and SMEs can allow small local producers to benefit from an exchange of relevant information and technical knowledge, promote production efficiency, production growth and market diversification, among other benefits'. Informally, local firms learn from MNCs via trade shows, marketing, supplier/distributor discussions and training, and exposure to MNCs' products, technical support and reverse engineering (Slaughter, 2002). In their study based in Thailand, Wisarn and Bunluasak (1995) found that local supplier firms acquired a basic knowledge of product, quality control and process technology through their interactions with MNCs. Thus, substantial linkages between MNCs and the local industry may serve as an avenue for knowledge transfer and technology diffusion.

Thus, to the extent that Chinese enterprises have an active network of local partners, suppliers and clients, opportunities for knowledge spillovers are likely. This paper aims to explore the linkages between Chinese firms and local firms in Nigeria and how these linkages have enabled the flow of knowledge and technology to the local industry.

Methodology

A case study approach was selected for this study because case studies allow for knowledge building through in-depth observation of a phenomenon, within a contextually rich environment (Schell, 1992). In this paper, the case study provides a deeper understanding of the processes and channels by which MNCs contribute to HCD in host countries and in particular, how Chinese MNC contributes to HCD in Africa.

The studied MNC, Huawei Technologies Ltd, is the leading telecom equipment manufacturer in the world and the leading Chinese MNC operating in Africa's telecom industry. Huawei was selected because of the nature of its business and the position and extent of its operations in Africa. Huawei began operating in Africa in 1998 as a complete solutions provider, starting with Kenya and today, with offices in 13 African countries and presence established in most of the 54 African states. Huawei has been highly successful in Africa, building a reputation of being a "preferred low cost yet high quality mobile network builder" (Chang et al 2009). Huawei has dominated the African market with a combination of superior pricing, customer service and brand awareness strategy (Chang et al 2009). The company is the market leader in terms of market share, ahead of popular brands such as Ericsson, Nokia and its Chinese counterpart ZTE. Huawei has embedded itself in the largest telecoms market in the world in diverse ways such as building and managing telecom backbone infrastructures, managing telecoms networks, offering solutions to network operators, businesses and selling products such as mobile phones and tablets to consumers. Huawei uses its business in Africa as a training ground to become a global brand using three channels of Policy, local investment and marketing (Chang et al 2009). It prides itself on its ability to leverage its products and resources to connect with development policy in Africa.

Its operations in Nigeria are particularly significant because Nigeria represents the largest telecom market in Africa. The telecommunication sector has increasingly become a significant sector for its economy particularly following the government's plan to diversify the economy, the sector as at Q1 2018 contributes up to 9.19% to the nation's GDP (NCC 2018). The presence of heavyweight global telecoms equipment companies such as Huawei, Ericsson, Siemens, ZTE in Nigeria has been pivotal to the transformation of the Nigerian telecoms industry leading to much needed upgrades to infrastructures, increased capacity, accessibility and coverage. Huawei entered the Nigerian market in 1999, establishing its West African headquarters in Lagos. Since entering the Nigerian market, Huawei has played a critical role in upgrading the country's ICT infrastructure. It has become the leading telecom network equipment provider in terms of market share, and the firm has worked with various network providers, the Nigerian government and other stakeholders in the sector to upgrade the country's information and communication technology (ICT) infrastructure.

The telecom industry was selected because this sector has seen a substantial flow of Chinese investments. Further, the telecom industry is a knowledge-intensive high-tech sector and one that is seldom studied in relation to CEE in Africa and its implications for HCD. This case study can potentially offer insights into other MNCs in the ICT industry from emerging economies operating in developing countries.

The findings in this study rely mainly on interview data and on-site observations carried out by the author from March to April 2016 at Huawei's offices in Lagos and Abuja, Nigeria. Twenty-nine semi-structured interviews were conducted. Participants were selected using purposive

sampling and the snowball technique. This ensures that individuals with an important perspective on the topic being studied were selected (Mason, 2002; Robinson, 2014). Details of the interviewed participants are presented in Table 2. The interviews explored Huawei's contributions to HCD in Nigeria via the dimensions of local employment, training and skill building and knowledge and technology transfer. The questions also addressed the policy measures and actions of the Nigerian government in leveraging FDI for HCD in the telecom sector.

Transcripts from the interviews were manually coded and analysed in line with the theory-driven conceptual framework presented earlier. The interview transcripts were also thoroughly examined to gain useful insights into the three HCD dimensions. Excerpts from the interviews have been used to shed light on these key concepts and how they manifest in this case. Interview data were supplemented by other documents such as company reports, press releases, training reports and policy documents. The supplementary documents were sourced from Huawei's extensive website and its in-house magazine called 'Huawei people', all available in English. Further, policy documents and industry data were sourced from a government agency in Nigeria, namely the Office for Nigerian content development. The document review focused on retrieving critical information about government policies on HCD in the ICT sector (e.g. local content in ICT policy document) and Huawei's training programmes and CSR initiatives. These documents were also used to supplement and triangulate data obtained from the interviews.

Findings and analysis

The main objective of this work is to investigate opportunities for HCD within CEE using the case study of Huawei technologies, a large Chinese MNC in Nigeria. The paper examines the following: the employments effects of Huawei's operations in Nigeria, its contributions to skills development and instances of knowledge and technology transfer via labour turnover and linkages between Huawei and local firms.

Local employment

The job creation opportunities that MNCs being are especially important to developing countries such as Nigeria, plagued by high unemployment rates. Given the influx of Chinese FDI into Nigeria, it is expected that Chinese enterprises will generate employment, among other benefits, for the local populace. Findings indicate that Huawei pursues a workforce localisation strategy in Nigeria, which is reflected in their labour practices. The company currently employs about 1,000 employees in Nigeria, out of which more than 70% are locals. The Chinese MNC recruits host country nationals (HCN) into both expert (engineering and technical) and non-technical/administrative positions. It also offers opportunities for career development based on employee performance. Though the data collected are not adequate to assess the creation of indirect employment by Huawei's operations in Nigeria, they do reveal that the Chinese MNC has an active network of local suppliers and partners. During interviews at Huawei's Lagos office, R21 shared that the company's supply chain currently includes over 500 local partners (suppliers, subcontractors). Given the Chinese multinational's engagement with local suppliers and partners, the indirect employment creation effects in this case are most likely as significant as its direct employment effects (as suggested by Miranda, 1994).

Huawei's labour practices in Nigeria have also been influenced by factors such as industry type, regulatory environment pertaining to work permits and expatriate quotas, presence of skilled labour, the firm's strategy and its size and scale of operations. Firstly, Huawei is a large MNC operating in a high-tech sector with its West African HQ in Lagos. This implies that its job creation

potential in Nigeria will be high as large MNCs tend to hire more than their local counterparts (Abdullah, 1994; Mckendrick et al., 2000; Ritchie, 2001; Tan and Batra, 1995). Secondly, because Huawei operates in a high-tech industry, its requirement for skilled employment will be high. Moreover, Nigerian policy on local content (ONC, 2013) and expatriate quotas permits the hiring of skilled expats only in the absence of local capacity. Interviews conducted at the Huawei HQ in Lagos revealed that the Chinese MNC has been successful in hiring locals as a majority of its workforce in Nigeria. A respondent (R21) credits this to the influx of foreign-educated Nigerians returning to the country, enticed by the opportunities. The respondent explained, ‘...a lot of people are coming back to Nigeria to work here because this is a booming economy. So I don’t think that is a challenge for us, we have enough highly sufficient skills’. These returnees or ‘repats’ have been satisfying the personnel needs of not only Huawei but MNCs operating in Nigeria.

Studies have shown that MNCs not only create jobs but also actively provide education and training in host countries (Majeed and Ahmad, 2008). Interviews with current and former employees revealed that jobs at Huawei include a high component of both formal and informal employee training, and it is one for the reasons that HCNs opt to join the company.

Training and skill building

While most MNCs provide some training to their local employees, the nature and duration vary depending on a number of factors such as mode of entry, industry, size and time horizon of the investment, type of operations, motivation for the investment and local conditions (Blomstrom and Kokko, 2002). This is true for Huawei: the Chinese MNC contributes to training and skill development in Nigeria’s telecom sector via multiple routes: internal employee training activities; training for clients and partners; and training programs in partnership with the Nigeria government. To date, over 50,000 people have been trained at Huawei’s training centre in Abuja (R22). The centre serves Huawei employees in Nigeria and the West African region. Interview responses from former and present employees confirmed that Huawei offers regular training, including classroom and on-the-job training sessions. In fact, the learning and training opportunities offered by the company are one of the reasons that many choose to join the Chinese MNC (R16, 17, 18, 19, 20). During an interview at the headquarters in Lagos, R21 emphasised that continuous training and learning is crucial in the industry. Both Huawei and its employees actively ensure they are up to date with the latest technology relevant to their operations. Below is an excerpt from R21’s response:

For the staff of Huawei, they are likely to get trained every year, because in our company is a technological company meaning that everybody in this organisation needs to learn fast. This is a basic request for our employee, everybody needs to be a big learner, you need to adapt to the technology, you need to know the new things about this industry so we need to learn ourselves and the company will also provide training for us. We have a training centre in Abuja, it was established in 2006, it’s for the whole region, not only Nigeria but for West Africa covering certain countries and we provide training for our staff.

These responses are in line with studies that show that training is a crucial component for MNCs operating in high-tech sectors (Tan and Batra, 1995; Te Velde, 2002). The rapid development of new technologies and innovations in the sector requires new skills and competencies and necessitates continuous employee training (Te Velde, 2002). To remain competitive, MNCs in such sectors rely on highly skilled workers and therefore invest considerably on employee training. Huawei participates in training programs every year, and its centre has become a crucial training ground for employees of partner firms, telecom operators, clients, Nigerian youths and government

employees (R21). Broadly, the trainings provided cover ICT deployment, telecom equipment operation, management training and general ICT solutions.

Huawei's training activities in Nigeria are also linked to its CSR objectives. The Chinese MNC actively collaborates with the Nigerian government and other relevant agencies for its training activities, with the aim of contributing to social development. Huawei has collaborated with the Nigerian government on two major training initiatives. In 2013, Huawei carried out the first multi-phase initiative: *1000 girls in ICT training programme*. As part of the programme, 1000 females were trained in technical ICT and soft skills. Stage 1 entailed 2 days of ICT training for 1000 trainees; Stage 2 consisted of 5 days of Huawei certified datacom associate (HCDA) training for 200 shortlisted trainees; Stage 3 entailed a 2-month internship for 50 trainees; and finally, Stage 4 consisted of a week-long training session in Shenzhen, China, for the 20 best trainees from the initial pool of 1000 trainees. The programme was concluded in 2016.

The second CSR initiative *ICTFORCHANGE - Nigeria 2000 youth ICT Training* aims at training young graduates from engineering and ICT on specialist ICT and telecom skills for use in different sectors such as banking, power, oil and gas, manufacturing, information technology, telecom and e-governance. The manager at Huawei (R21) said the following about the program:

We do not want to just make some noise. We really want to give them training and skills to enable them to find a good job in the ICT industry. Of course, Huawei also would provide some employment opportunities for them and also give recommendations for those people.

As part of its CSR activities, Huawei has also collaborated with tertiary educational institutes in Nigerian universities, namely the University of Lagos (UNILAG) and African University of Science and Technology, Abuja (an affiliate of Nelson Mandela Institute (NMI)). The firm provides scholarships and technical support and donates laboratory equipment (R21). This is an example of the direct link between FDI and higher education in host countries, which according to Blomstrom and Kokko (2002) often manifests in the provision of scholarships to students and active support of university development and other related institutes. Huawei's training activities in Nigeria have extended to include Nigerian government officials. In September 2016, Huawei, in coordination with the Nigerian government, organised a 15-day training course in China for 8 government officials. The training was designed as a 'train-the-trainer' programme to equip participants with the knowledge and skills necessary to competently carry out training programmes in their home country.

Huawei's training activities for non-employees shows the MNC's willingness to engage with the government and Nigerian public. This is in agreement with the observation by Te Velde (2002): MNCs, as part of their CSR activities in their host countries, invest in community development projects, including formal education and training.

Knowledge and technology transfer

According to the OECD (2002), MNCs are the world's most important source of research and development activity: they often possess more technological capability than most developing countries. Their potential to generate technological spillovers in host countries is valuable particularly to developing countries, where FDI is one of the most important sources of technology transfer (Blomstrom and Kokko, 2002; Glass and Saggi, 2002). Knowledge and technology transfer occurs through many routes such as demonstration effects, labour turnover and vertical linkages.

Knowledge and technology transfer via horizontal spillovers

When employees leave, they carry with them the knowledge, skills and know-how gained at their previous firm. Labour mobility is thus a channel by which knowledge and technology from an MNC is transferred to a local enterprise in the host country (Glass and Saggi, 2002). Shankar and Ghosh (2013) assert that high-tech industries, characterised by high labour turnover, enable the efficient transfer of technology. Given the relatively high turnover rate in the ICT industry, it is possible for some level of knowledge and technology transfer to occur via labour turnover in the case of Huawei. Interviews with former employees of Huawei confirmed this. Training and experience obtained by Nigerian employees from Huawei have proven valuable, enabling them to further their careers in other telecom companies. A former Huawei employee R16, who worked for 6 years at the Lagos head office as a Wireless 2G, 3G engineer, capitalised on his Huawei experience to obtain a higher paid position at another mobile telecom infrastructure company. He said, ‘my experience with Huawei has been so beneficial knowledge wise, working with Huawei gave me a holistic knowledge of telecoms... an edge at my current job’. Other Huawei ex-employees (R17 and R18) shared similar accounts: the skills and experiences they gained at Huawei helped their career progression at other firms. For instance, R17 joined a competing telecom MNC as a consultant engineer and a subject matter expert after leaving Huawei. Markusen (1991: 19) summarised this phenomenon in the following words:

It is difficult to prevent knowledge from being transferred to the local employees of the firm who work with and observe the technical and managerial techniques of the firm. After some initial learning period, the workers become capable of opening a rival firm or of transferring their knowledge to new firms in related industries. This becomes a positive externality effect for the local economy arising from the presence of the multinational.

These findings support previous research (Lampert and Mohan, 2016; Mohan and Lampert, 2013), which indicates that Nigerian employees have benefited professionally from their experience at Chinese telecommunications companies. It is important to note that skill and knowledge transfer from MNCs to HCNs could also be in the form of soft skills and work attitudes, which are not sector specific and as such easily transferable. A former intern at Huawei (T3) – a participant of the 1000 girls training programme – who was unemployed at the time was interviewed. She considered her internship at Huawei as her first real employment experience outside her compulsory national youth service year. T3 believed that her association with Chinese culture and approach to work would serve her well in the future because it help her ‘develop a hardworking attitude’. These experiences confirm how CEE can indeed contribute to HCD in Africa. Exploring and understanding skill transfer via labour turnover, particularly in high-tech sectors, could offer better insights into knowledge and technology diffusion in the context of China-Africa relations.

Knowledge and technology transfer via vertical spillovers

According to Batra and Tan (2002), technology transfer occurs via linkages between multinational companies and their local suppliers. Close links allow local suppliers and customers to assimilate some technology and skills from the MNC (Porter, 1980), and these, in turn, help the local suppliers improve the quality and efficiency of their services or products (Botelho and Pfister, 2011; Saggi, 2004). Huawei’s supply chain in Nigeria includes over 500 local partners, who provide management services, engineering services (civil work, external plant and telecom equipment engineers), auxiliary equipment, logistics, vehicle services, etc. The firm’s considerable international and local experience has enabled it to build and consolidate its local supply chain network. Moreover, its decision to engage local suppliers aligns with its localisation strategy. Further, as a market-seeking MNC (Gugler, 2008), Huawei needs strong local links to adapt its

products and services to the local conditions (Botelho and Pfister, 2011). Huawei's business in Nigeria is such that the company deals constantly with local suppliers and clients who purchase their products and solutions. R21 elaborates on the company's linkages with local suppliers and partners as follows:

Talking about local partners, we have a lot. I cannot get the specific figure but I can tell you that we have more than five hundred local partners working with us, because in our philosophy we are trying to build an ecosystem in the ICT industry not only for the telecoms operators or for Huawei to grow our business, but also for the end users to benefit from the telecommunication services and our partners. To give a very simple example, there are some partners who are building the base stations, who are providing the (inaudible), deploying the cables for us. All of these jobs are done by Nigerian companies, so we focus on the planning of the business. We work with our partners in the telecoms industry, we also purchase a lot from local markets that we need to deploy our projects. So all these jobs can be done by Nigerian companies so we are outsourcing them to the Nigerian companies.

MNCs often provide their suppliers with technical and managerial training to improve their overall capabilities in the value chain (Botelho and Pfister, 2011). Huawei's archival data and reports show that the company has defined clear guidelines for procurement requirements and audits to ensure that suppliers are up to industry standards and adhere to the code of conduct in the electronic industry. Huawei also conducts training conferences on quality for its partners and suppliers across the world. For example, in 2014 Huawei organised the 'Nigeria supplier quality conference', which was attended by 106 core supplier firms (Huawei, 2014). This conference is a part of Huawei's supplier development programmes (SDPs), which facilitate idea exchange, value integrations and quality and service enhancements for mutually beneficial MNC-supplier relationships. This signifies some form of knowledge and technology transfer which, according to Botelho and Pfister (2011) 'not only includes the technical support and training activities but also means informing and educating suppliers regarding product and process standards...'. Investing in the skills and capabilities of local suppliers and partners makes business sense as it improves the local procurement process and ensures that the firm spends less in hiring external expertise, thus reducing operating costs and strengthening local partnerships. The prominence of local firms in Huawei's supply chain and its supplier development programmes are indicative of considerable backward vertical linkages with local suppliers. This sets the stage for productivity spillovers to occur.

Batra and Tan (2002) argue that vertical spillovers tend to occur between firms in a customer-supplier relationship, typically via exposure to MNC products and services, provision of technical support by MNCs to clients, supplier/distributor training and discussions leading to knowledge transfer that enhances the productivity and capabilities of the firms involved (Slaughter, 2002). Forward linkages, according to Jindra et al (2009: 168), include 'all downstream relationships developed between foreign subsidiaries and customers, (sales) agents and distributors in a host economy'. Access to or the use of an MNC's advanced products, inputs and services can enhance the productivity of domestic firms (Driffield et al., 2002; Miozzo and Grimshaw, 2008). This study supports the above argument: substantial forward vertical linkages have developed because of Huawei's interactions with its clients (telecom operators) in Nigeria. For example, in 2013, Globacom Nigeria, a domestic telecom operator, contracted Huawei, for USD 750 million, to upgrade its entire telecom infrastructure network for the launch of 4G/LTE services (Telegeography, 2013). This upgrade has enabled Globacom to (1) provide better, reliable services to more than 25 million subscribers in Nigeria; (2) increase its network capacity; (3) grow its subscriber base; (4) ease network congestion and offer cheaper tariffs (Telegeography, 2015). Thus, Globacom's move has produced far-reaching effects on the productivity of the entire mobile ecosystem in Nigeria.

The introduction of new technology is beneficial not only to Huawei's clients – telecom operators – but also to a larger ecosystem of industries, business and individuals in Nigeria who are clients of these operators. For example, in the agricultural sector, increase in mobile penetration has improved agricultural production and distribution (GSMA, 2015). Further, the spillover effects of technology transfer have drastically changed the mobile ecosystem, as evidenced by the job creation effect of mobile expansion. According to a GSMA (2015) report, 118,600 jobs have been created for airtime dealers and retailers operating out of supermarkets, technology stores and small independent points of sale. Additionally, businesses are increasingly using mobile apps, websites and SMS to reach more customers. Nigerian retailers are increasingly using the internet to drive up their sales volume. In fact, online purchases is said to have increased by 15%, and 60% of online buyers have made purchases on their mobile phones from 2013 to 2014 (Aginam, 2014). These developments have been supported by the development and maintenance of critical telecom infrastructures by firms such as Huawei. They have contributed to increased digital penetration and the productivity of mobile operators and service providers in Nigeria. The introduction of new technology also ensures benefits for the wider telecommunications ecosystem, including the mobile operators' value chain and everyday Nigerians.

Responding to a question on Huawei leveraging its resources for development in Africa, R21 stated that the MNC has been successful in introducing new technology and upgrading existing infrastructures. These have not only helped telecom increase their productivity but have also led to lower tariffs for the end users. These results support the assertion by Kimura et al. (2011): private investments in Africa's telecommunications sector have led to infrastructural upgrade and an increase in broadband penetration, which have contributed significantly to economic growth in various countries.

Conclusions and implications of CEE for HCD in Africa

This paper investigated the opportunities for HCD inherent to CEE, using Huawei's operations in Nigeria as a case study. The paper examined three HCD dimensions: local employment, training and skill building and knowledge and technology transfer. Findings showed that Huawei is an active provider of employment for HCN and has achieved a workforce localisation rate of 70% in Nigeria. The Chinese MNC is actively engaged in training not only its employees, but also employees of its suppliers, partners, and clients, apart from Nigerian youths and government employees. Further, as part of its CSR efforts, Huawei has contributed to general education in Nigeria, providing scholarships, training and laboratory equipment to two universities. Additionally, the MNC partnered with the Nigerian government for skill development and training of Nigerian youths via two training programmes: *1000 girls in ICT* and *ICTforchange*. Interview responses showed that the MNC has facilitated skill and technology transfers via labour turnover and vertical linkages. That is, training and experience obtained by Nigerian employees at Huawei have proven valuable for their career advancement outside the firm. Huawei has over 500 local partners in its supply chain and plays an active role in supplier development programmes, organising supplier quality conferences and delivering training programmes for local suppliers, partners and clients.

The case of Huawei in Nigeria's telecom sector highlights the opportunities for HCD present in the operations of Chinese enterprises in Africa. However, these opportunities may not be realisable across board – they are subject to certain sectoral factors and contextual conditions, such as sectoral differences, institutional frameworks in host countries, firm profile and strategy, labour quality in the host country, etc. The practical and research implications of this study's findings are numerous (see Table 3 for a summary of the findings and practical implications). While there is a

growing body of research on Chinese enterprises in Africa, very few studies capture the interactions between these enterprises and their host countries in relation to HCD (King, 2013). This study fills this gap, however more research is needed to explore the impact of CEE on HCD, particularly across different sectoral and contextual conditions.

This study's findings contain some practical implications. Firstly, there is a clear need for African governments to attract and steer Chinese investments into crucial sectors of their economies to reap benefits for HCD. Government policies and measures are crucial for effectively leveraging these investments for development. While most African governments have relaxed their investment policy regimes to attract FDI, to maximise the benefits for HCD, they also need to encourage MNCs to upgrade their operations (to include value-added production processes) and actively promote linkages between MNCs and local firms. This will allow for better knowledge and technology diffusion. This study showed that the Nigerian government uses a local content policy and expatriate quotas to encourage MNCs, operating in the ICT sector, to employ more HCNs, contribute to HCD, and create value for the local ecosystem. In addition, the government should actively collaborate with Chinese enterprises to route investments and CSR contributions to the appropriate avenues, including training and skill-building programmes for the youth. Further, partnerships between MNCs such as Huawei and local tertiary institutions should be encouraged so that locals and graduates have the relevant skills needed to gain employment with these MNCs. The role of Africa's governments in this engagement cannot be over-emphasised. Gu (2009: 585) summarises this sentiment as follows: 'from the African perspective, in the final analysis, whether or not the development impact of Chinese private investment in Africa can be effectively realised rests with African governments and the wider policy making community including civil society'.

The study findings also highlight an important drawback in the extant research on HCD implications of CEE in Africa: while there is conflicting evidence in support of and against CEE in Africa (Ado and Su, 2016) and its impact on HCD (King, 2013), there are no theoretical underpinnings to the explanation of the findings. Hence, this paper poses some questions that can guide future research and act as the basis for developing a theoretical framework. The paper advances the following working hypothesis: the HCD impact of CEE will vary across different sectors of the African economy and across countries. For example, capital-intensive sectors are likely to offer more opportunities for training and technology transfer than labour-intensive sectors. Further, capital-intensive industries are more likely to benefit from HCD: employees will be provided competency-enhancing training for business reasons rather than for altruistic purposes. Likewise, the scope for local employment generation could be potentially higher in labour-intensive sectors than in capital-intensive sectors. Labour-intensive industries are more likely to benefit through direct employment. In other words, the host country's and the host industry's characteristics are the key factors determining the HCD impact of CEE, and these are highly likely to differ across sectors and industries. This working hypothesis raises the following research questions, which if addressed can contribute to a conceptual framework to guide comprehensive research on the HCD impact of CEE in Africa.

- Which sectors are more likely to benefit and suffer because of CEE in terms of HCD and why?
- What sectoral and contextual factors enable or constrain HCD through CEE?
- In what ways do host government policies enable or constrain HCD through CEE?
- Do African governments leverage CEE for HCD in Africa and if so how?
- In what ways do host country policies enable or constrain HCD through CEE?
- In what ways do Chinese MNCs' organisational strategies or policies enable or constrain HCD in Africa?

These questions and the working hypothesis provide an opportunity to examine holistically the impact of CEE on HCD in Africa and a range of research methods could be utilized in future studies to answer these questions. The qualitative case study approach was the preferred method for this study as it affords an empirically rich, context specific account of the implications of CEE for HCD in Africa. Due to the important nature of context in this study, the case study approach gives the opportunity to delve into context specific factors that may influence HCD contributions of Chinese enterprises in Africa. Having said that, the nature of the study sample size makes it difficult to generalize the results to Chinese enterprises in other industries and countries. This however further stresses and supports the working hypothesis proffered in this study that *the HCD impact of CEE in Africa will vary across industry sectors and countries due to the differences in sectoral and contextual conditions*. Further studies could test this by carrying out a comparative study on a wider sample featuring Chinese enterprises in different sectors and different countries. Additionally, a mixed method approach could be appropriate when looking at a wider scope of study. For example, the use of large-scale surveys coupled with in-depth interviews for multiple country cases, multiple organisations in different industrial sectors. Researchers can utilize large-scale surveys designed to capture and compare the role that factors such as sectoral conditions, organisational strategy and contextual conditions play and to what degree they influence the impact of Chinese enterprises on HCD in Africa. In addition to that, in-depth interviews will help gain deeper insights into the survey results. As emphasised by King (2013), detailed studies that consider the wider investment climate and the crucial role of ‘African agency’ are necessary to understand Chinese FDI and its impact on Africa’s industrialisation and HCD.

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Table 1: Current literature on Chinese engagement in Africa that addresses HCD issues

Author	Focus area	Summary
King (2010) King (2013)	China's soft power in Africa; China's HRD cooperation with Africa	Discusses China's human resource development (HRD) cooperation with Africa and the human resources dimensions of Chinese business in Africa giving a snapshot of how skills development and technology transfer are situated within different business settings of China in Africa.
Baah and Jauch (2009)	Chinese engagement with Africa-Labour prospective	Examines Chinese firms' labour practices against ILO decent work standards, unionisation, working conditions, wages in Chinese enterprises in Africa
Monson (2008, 2009)	Chinese development assistance to Africa (TAZARA railway project): Impact on skills and technology transfer	Presents an account of labour relations between Chinese and Africans on the TAZARA railway project noting an exposure of African workers to Chinese work ethics and new skills and technology.
Brautigam (2009)	China's engagement with Africa, Chinese aid in Africa – implications for development.	Dispels myths of labour practices of Chinese enterprises in Africa. Presents accounts of vocational training within China's aid financed construction in African countries, Short term training of Africans under the FOCAC agreements. Notes the involvement of private firms in setting up training institutes in African countries and Capacity building in manufacturing sectors in Eastern Nigeria
Liu (2009)	Socio-cultural dimensions of Chinese investments in Africa	Analyses interactions between Chinese companies and African labour through a cultural lens.
Tang (2010)	Employment, workforce localisation and labour relations in Chinese enterprises in Africa	Examines the impact of Chinese enterprises on local employment in Angola and DRC Congo and the factors affecting workforce localisation of Chinese enterprises in those countries.

Corkin (2012)	Chinese companies linkages in Angola	Examines Chinese construction companies in Angola from a local linkages perspective. The study further examines skills and labour relations within the context of Chinese construction companies in Angola.
Shen (2013)	Chinese private investments in Africa	Examines private Chinese investments in Africa, considers the policy implications for labour and migration issues.
Sautmann and Hairong (2015)	Employment, workforce localisation in Chinese enterprises in Africa	Based on a study of over 400 Chinese enterprises and projects in Africa, the authors examines workforce localisation of Chinese enterprises in Africa, concluding that workforce localisation is already well developed in Chinese enterprises in Africa. Discusses the implications for employment and labour standards in Africa.

Table 2: Details of interview participants and schedule

Code	Affiliation/ Role of interviewee	Number of Interviewees	Location	Interview format	Date of data collection
Government					
R1,2	Federal Ministry of Communications Technology	2	Abuja	Face to face (Individual)	30 March 30; 7 April 2016
R3	National Communications Commission	1	Abuja	Face to face	8 April 2016
R4	Federal Ministry of Trade and Investment	1	Abuja	Face to face	6 April 2016
R5, R6	Federal Ministry of Labour and Productivity	2	Abuja	Face to face (Paired)	4 April 2016
R7	One Stop Investment Centre (OSIC)	1	Abuja	Face to face	29 March 2016
R8, R9, R10	Nigerian Investment Promotion Corporation	3	Abuja	Face to face (Individual)	29 March 2016
R11,12	National Information Technology Development Agency	2	Abuja	Face to face (Individual)	6 April 2016

R13,14	Office of National content in ICT	2	Abuja	Face to face individual	30–31 March 2016
T1, T2, T3, T4	Trainee – 1000 Girls in ICT Training programme	4	Remote Contact	Skype interview	17 June – 22 July 2016
R15	University of Lagos Student Affairs Official	1	Lagos	Face to face	22 March 2016
S1, S2	Beneficiaries Huawei-UNILAG Scholarship	2	Remote Contact	Skype	16 June 2016
Huawei					
R16, R17, R18	Ex-Employees	3	Remote contact	Skype	2 August 2016–19 May 2017
Current employees					
R19, R20	Engineer	2	Lagos	Face to face; Skype	15 March 2016; 4 October 2016
R21	Manager	1	Lagos	Face to face	15 March 2016
R22	Training Centre Manager	1	Abuja	Email Communication	10 May 2016
R23	Trainer	1	Abuja	Face to face (Individual)	7 April 2016
Total number of interviewees		29			

Table 3: Summary of findings and practical implications

HCD dimensions	Main findings	Practical implications
Employment	<p>Direct job creation</p> <ul style="list-style-type: none"> • 1000 employees in Huawei’s Nigerian operations • Presence of an active localisation strategy evidenced in 70% localisation rate • Recruitment HCNs in both expert roles (engineers, technicians, network specialists etc.) and administrative/managerial roles (sales, marketing, project management, Human resources etc.) <p>Possible indirect job creation</p> <ul style="list-style-type: none"> • Presence of linkages with local firms such as suppliers, customers and partners 	<ul style="list-style-type: none"> • Employment opportunities for HCNs • Opportunities to gain valuable work experience in a high-tech sector working for an MNC • Increase in income and subsequently standards of living • Jobs with a high component of training and wages
Training and skill building	<p>Formal and informal training</p> <ul style="list-style-type: none"> • Employee training delivered in classrooms, on the job and at Huawei’s HQ in Shenzhen, China. • Training for local suppliers, clients and partners <p>Contributions to general education and training in host country</p>	<ul style="list-style-type: none"> • Increase in skills and expertise of HCNs that could potentially lead to career advancement • Acquisition of skills leading to better chances to gain employment.

	<ul style="list-style-type: none"> • Scholarships offered to students at the University of Lagos. • Student scholarships and donations for laboratory equipment at African University of Science and Technology. • Training programmes for Nigerian youths <ul style="list-style-type: none"> -1000 girls in ICT training -Ictforchange-Nigeria 2000 youth ICT Training • Training for Nigerian government officials 	
<p>Knowledge and technology transfer</p>	<p>Horizontal spillovers</p> <ul style="list-style-type: none"> • Labour turnover <p>Vertical spillovers</p> <ul style="list-style-type: none"> • Linkages with local suppliers, clients and partners • Supplier development programmes, e.g. 2014 Nigeria supplier quality conference 	<ul style="list-style-type: none"> • Former employees can start their own firms, thus leading to further job creation and increase in local content in the sector • Former employees can offer their experience and skills for career advancement in other choice firms • Opportunities for productivity and knowledge spillovers to occur • Exposure of local firms to industry product and process standards • Knowledge transfer and technology diffusion to local firms, leading to increase in productivity and capabilities • Introduction and exposure to new technology and processes with far-reaching spillover benefits across the entire telecommunications ecosystem

