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Working Paper

Chinese Manufacturing Investments and Knowledge Transfer: A Report from Ethiopia

Working Paper, No. 2019/24

Provided in Cooperation with:

China Africa Research Initiative (CARI), School of Advanced International Studies (SAIS), Johns Hopkins University

Suggested Citation: Xiaoyang, Tang (2019) : Chinese Manufacturing Investments and Knowledge Transfer: A Report from Ethiopia, Working Paper, No. 2019/24, China Africa Research Initiative (CARI), School of Advanced International Studies (SAIS), Johns Hopkins University, Washington, DC, <http://www.sais-cari.org/publications-working-papers>

This Version is available at:

<https://hdl.handle.net/10419/248152>

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WORKING
PAPER

NO. 24

MAR 2019

CHINA★AFRICA RESEARCH INITIATIVE

Chinese Manufacturing Investments and Knowledge Transfer: A Report from Ethiopia

Tang Xiaoyang

NO. 24 | MARCH 2019:

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TO CITE THIS PAPER:

Xiaoyang, Tang. 2019. *Chinese Manufacturing Investments and Knowledge Transfer: A Report from Ethiopia*. Working Paper No. 2019/24. China Africa Research Initiative, School of Advanced International Studies, Johns Hopkins University, Washington, DC. Retrieved from <http://www.sais-cari.org/publications>.

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ACKNOWLEDGEMENTS:

The author would like to thank Ma Jie for her research assistance.

NOTE:

The papers in this Working Paper series have undergone only limited review and may be updated, corrected or withdrawn. Please contact the corresponding author directly with comments or questions about this paper.

Editor: Daniela Solano-Ward

ABSTRACT

**SAIS-CARI WORKING PAPER
NO. 24 | MARCH 2019:**

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THIS STUDY AIMS TO SHED LIGHT ON THE KNOWLEDGE transfer effects of Chinese investment in Africa’s manufacturing sector with a concrete case study of Ethiopia. As of January 2015, 117 firms were registered with the Chinese Ministry of Commerce (MOFCOM) as investing in Ethiopia, reporting to have manufacturing activities. Since 2010 the Ethiopian government has put great emphasis on boosting the manufacturing sector and developing local technological and marketing capabilities, consciously guiding FDI from China and other Asian countries to the manufacturing sector. Such efforts offer a remarkable case to explore how African agents play an active role in shaping the dynamics and outcomes of engagements with China, which thus far has been seriously under-investigated. This study finds that the effectiveness of knowledge transfer by foreign investors is largely decided by industrial conditions in the host country and forming manufacturing clusters is a helpful approach to improve learning. This paper examines knowledge transfer mechanisms between Chinese investments and Ethiopian firms, institutions, and individuals at four different levels in the manufacturing sector. The lessons learned from this case may provide insights into China-African cooperation and Africa’s development process in general.

INTRODUCTION

ALTHOUGH FDI IN MANUFACTURING SECTORS IS USUALLY welcomed by host countries, its impact on the development of local human resources and technological capacity are hotly debated. Based on worldwide research of FDI performance over the past decades, a majority of scholars conclude that multinational corporations and their investment projects can make great contributions to knowledge transfer between countries.¹ The kinds of knowledge transferred cover a broad spectrum, ranging from “hard” patentable technologies to “soft” skills such as managerial know-how and professionalism.² Correspondingly, knowledge spillover channels are diverse, including labor mobility, training, demonstration, collaboration, supply linkage, and even competition.³

However, a few scholars point out that the relationship between FDI and growth can be highly heterogeneous across countries.⁴ Both de Mello and the OECD stress that the way in which FDI affects growth is likely to depend on the economic and technological conditions in the host country.⁵ While Aitken and Harrison found no evidence of positive technology spillover of foreign firms in Venezuela, Modarress *et al* indicate that FDI had a significant impact on human capital formation in the UAE.⁶ Studies in China, Vietnam, and Lithuania show that vertical linkages between local suppliers and foreign firms have positive effects on productivity spillover while horizontal relationships, such as competition and demonstration, have negative effects.⁷ Yet, UNCTAD suggests that foreign companies’ participation in Uganda’s mobile telephone market contributed to efficiency improvements across the sector through increased competition.⁸ Managi and Bwalya discovered significant intra- and inter-industry productivity spillovers from FDI in Kenya and Zimbabwe, but only inter-industry spillover in Tanzania and Zambia.⁹ In Ghana, FDI was also found to have positive effects on the export performance of local competitors as it brought in technologies and management skills.¹⁰ The uniqueness and diversity of socio-economic conditions in Africa call for a careful case-by-case examination to understand the real impacts of FDI on knowledge development.

Regarding investor behavior, quite a few commentators express particular concerns about Chinese investments. Kaplinsky, McCormick, and Morris suggest that Chinese firms tend to use labor brought from China and have a negative impact on knowledge transfer in Africa.¹¹ Many researchers and politicians in the West are skeptical about what knowledge has been transferred and its potential impact.¹² Yet, according to another recent study, various African interviewees depict the knowledge transferred by Chinese firms as, “not cutting edge but more practical and contextually specific.”¹³

This study aims to shed light on the knowledge transfer effects of Chinese investment in Africa’s manufacturing sector with a concrete case study of Ethiopia. As of January 2015, 117 firms were registered with the Chinese Ministry of Commerce (MOFCOM) as investing in Ethiopia, reporting to have manufacturing activities. After Nigeria (172) and Zambia (123), Ethiopia is the next largest destination for Chinese manufacturing investors in Africa.¹⁴ Moreover, since 2010 the Ethiopian government has put great emphasis on boosting the manufacturing sector in its Growth and

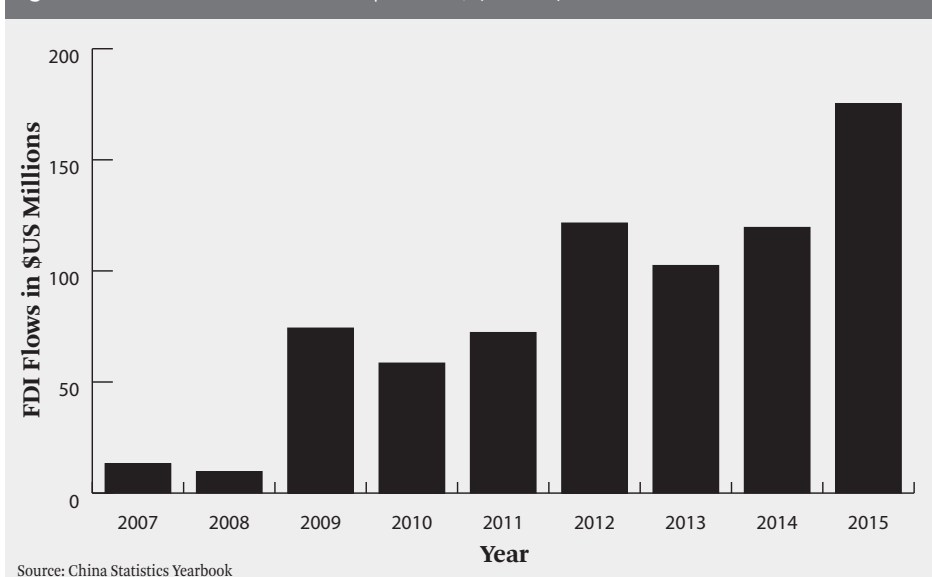
Transformation Plans. The government strives to develop local technological and marketing capabilities and has consciously guided FDI from China and other Asian countries to the manufacturing sector.¹⁵ Such efforts offer a remarkable case to explore how African agents play an active role in shaping the dynamics and outcomes of engagements with China, which thus far has been seriously under-investigated.¹⁶ This study finds that the effectiveness of knowledge transfer by foreign investors is largely decided by industrial conditions in the host country and forming manufacturing clusters is a helpful approach to improve learning. This paper examines knowledge transfer mechanisms between Chinese investments and Ethiopian firms, institutions, and individuals at four different levels in the manufacturing sector. The lessons learned from this case may provide insights into China-African cooperation and Africa's development process in general.

BACKGROUND

CHINESE INVESTMENT IN ETHIOPIA'S MANUFACTURING SECTOR

CHINESE INVESTMENT IN ETHIOPIA'S MANUFACTURING sector has seen explosive growth during the last decade. Figure 1 shows the trend of Chinese FDI flow into Ethiopia since 2007. Although the amount of Chinese FDI in Ethiopia is not the highest among all African countries, it is impressive given that Ethiopia does not have a strong extractive sector.

Figure 1: Chinese FDI Flow into Ethiopia in US\$ (millions)



In value terms and in recent years, compared with other sources of FDI, China is the largest investor in Ethiopia (see Table 1). According to the Ethiopia Investment Commission's (EIC) records, 1,022 Chinese investment projects were licensed in the country between 2007 and 2017, also making them the largest group of foreign investors in terms of numbers of projects. During the same period, India and the United States each had 440 projects, followed by Sudan (387), Great Britain (234), Turkey (226), Saudi Arabia (176), and Italy (148).¹⁷

Out of the 1,022 licensed Chinese projects, 576 were marked as "in operation" as of August 2017.¹⁸ Seventy-seven percent, or 446 projects, of all operating Chinese projects were in the manufacturing sector. Such a high concentration of investments in the manufacturing sector is partly a result of the Ethiopian government's targeted investment promotion. The Ethiopian government hopes that investors from China and other countries can facilitate the nation's industrialization

Table 1: FDI Flows in Ethiopia by Geographical Origin (US\$ millions)

	2004	2005	2006	2007	2008	2009	2010	2011	2012
Belgium	-	-	-	-	-	-	-	1	-1
Italy	-	-	-	-	41	32	10	8	-39
China	-	5	24	13	10	74	59	72	122
Turkey	-	-	-	4	6	-	-	-	1
US	1	-2	1	-	-	-	4	2	-

Source: UNCTAD FDI/TNC database.

process.¹⁹ However, the arrival of foreign investors is merely the first step. It is essential for the local economy to acquire skills and knowledge from foreign investors, to build linkages to them, and to set up indigenous businesses by following their models. Otherwise, industrialization that relies solely on foreign investments cannot be broad or comprehensive.

This study is mainly based on field research conducted in July and August 2017. The research team surveyed 73 Chinese manufacturing projects within four weeks and interviewed managers and workers within these firms. As contact information in the EIC list was often outdated, we looked for firms by using both the list of licensed projects and the snowball sampling method.²⁰ We covered most Chinese enterprises in the three operating industrial zones in Ethiopia, namely Eastern, Bole-lemi, and Hawassa. The other surveyed projects were located within a 100-km radius of Addis Ababa. In addition to the firms surveyed, we also interviewed the Ethiopian investment and industrial zone authorities, industrial associations, and a dozen Ethiopian firms in the manufacturing sector. Some materials were drawn from the researchers' previous research trips to Ethiopia from 2011-2016. The paper is organized as follows. First, it examines skills learning within firms. Then it discusses knowledge transfer between enterprises, followed by an analysis of the effect of industrial clustering. Finally, the paper concludes with remarks on the characteristics of knowledge transfer in general.

SKILL LEARNING WITHIN FIRMS

EMPLOYMENT

THE 73 FIRMS SURVEYED PRODUCE A WIDE ARRAY of products, including garments (11), textiles (10), plastic products (9), cement and gypsum (9), leather products (8), furniture (5), plastic recycling (5), wood products (3), steel (3), vehicles and autoparts

(3), chemicals (2), machinery (2), metal parts (1), electronics (1) and pharmaceuticals (1). Chinese manufacturers are clearly present in diverse sectors in Ethiopia and the size of firms is also quite varied. Fourteen firms reported investments of over 100 million CNY (US\$ 15.15 million) in their Ethiopian projects, whereas fifteen firms had invested less than 7 million CNY (US\$ 1 million). As for the number of workers, fifteen surveyed factories were each employing more than 500 workers. The largest, Huajian shoe factory, had over 6,300 employees. By comparison, sixteen factories had fewer than 50 workers. Correspondingly, employment practices and training programs in these Chinese firms vary considerably, although they also share some common characteristics.

First, Chinese manufacturers employ a large number of Ethiopian workers. The 73 factories reportedly employed a total of 27,690 Ethiopians and only 1,434 expatriates. While most expatriates were Chinese, dozens were also from Kenya, Mauritius, Sri Lanka, Myanmar, Vietnam, India, South Korea, and other countries. There are apparent sectoral differences regarding the use of local employees, with the garment-making sector having the lowest expatriate ratio. In none of the eleven garment makers do expatriates make up more than 5% of the entire work force; the expatriate ratio is as low as 2.5% when we count all 4,505 workers. Table 2 compares the employment structure among five major sectors. The factories in plastics, textile, and cement sectors use more expatriates perhaps because their production depends on the operation and monitoring of large, sophisticated equipment, which require foreign technicians.

Table 2: Composition of Employees in Chinese Factories in Ethiopia by Sector

	Garments	Leather Products	Plastic Products	Textiles	Cement & Gypsum
Ethiopians	4,395	11,830	3,061	1,840	2,592
Expatriates	110	440	150	152	291
Local Employment Ratio (%)	97.56	96.41	95.33	92.37	89.91

Source: Author's survey

TRAINING

ALL SURVEYED FIRMS CONSIDERED LEARNING-BY-WORKING as the most effective training approach for their workers. Many firms simply ask new employees to follow experienced workers -- sometimes Chinese and sometime more experienced Ethiopian employees -- in the production line. "Initially local workers watch Chinese experts

The effectiveness of knowledge transfer by foreign investors is largely decided by industrial conditions in the host country and forming manufacturing clusters is a helpful approach to improve learning.

operating, later Chinese watch (monitor) locals operating,” described an interviewed manager. Workers may become capable of independent operation after several weeks or a couple of years, depending on the sector and work positions. There are also shortcomings to such a pragmatic approach, the biggest being that workers do not grasp in-depth knowledge about machinery and the production process. Some factory managers complained that local workers did not know how to maintain or repair machines and were reluctant to entrust local workers with operating sophisticated machinery critical to production.

Linguistic barriers also hinder precise learning. Most Chinese and Ethiopian workers do not speak English well. They often have to use a combination of Chinese, English, Amharic, Oromian, and gestures to communicate with each other. Although some factories employ translators to assist management in delivering key messages to workers, translators cannot cover most of the everyday communication between Chinese technicians and local apprentices. One manager estimated that communication causes 70-80% of production problems. “Ethiopians assume that they understand something, but they turned out not to really understand it when they implement it.”²¹ One approach to address this challenge is to adapt Chinese production techniques to the local reality. For instance, while a line of upper stitching at Huajian shoes in China initially consisted of 15 workers, the factory in Ethiopia simplified the production process by dividing certain tasks into two or three steps. The whole line was extended to 25 or 30 workers, but the tasks were broken down to be easier to learn for each worker. Likewise, a wood manufacturer hired three Ethiopians for a position that would have been filled by one Chinese worker, so that they could help each other at work.

A few factories offer more systematic and advanced forms of training, especially when they produce for the international market. Huajian Group is one of the largest manufacturers of ladies’ shoes in the world, producing for famous brands like Guess, Tommy Hilfiger, and Ivanka Trump, among others. Their Ethiopian factory has a multi-level training system. Every newly recruited worker receives a weeklong, pre-work training. Workers do military style drills and learn the company’s culture of strict discipline. After that, workers are instructed in a special training center within the factory itself. They learn how to use sewing machines to stitch various patterns, starting from basic sewing and stitching knowledge used to stitch a square and then move on to stitching the letters of the alphabet and animals. Once they pass certain tests, they can start to work on the production line.

Training continues at work as every day as production line supervisors monitor every worker’s performance and provide personal tutoring. There is a “theory training center” within the workshop and employees occasionally gather there to receive instructions regarding enterprise management and technical updates. The company regularly sends good workers to China for further training. Since the establishment of the Ethiopian factory, approximately 500 local employees have been sent to the firm’s headquarters in Dongguan, China. Their length of stay in China ranges from three months to one year. Apart from learning skills by working with Chinese workers

together in the factory, Ethiopian trainees also improve their Chinese language proficiency.

Wuxi Jinmao is a global supplier for US-based PVH Group. In 2015, Wuxi Jinmao hired 30 Ethiopian university graduates who had majored in textile, chemicals, and information technology. These trainees received seven months training in the Chinese language and were then sent to the company headquarters in Wuxi, China for half a year for technical training. After they came back in October 2016, they were assigned to various departments to manage and train local workers. Ultimately, in July 2017, Wuxi Jinmao set up a textile mill in Hawassa industrial park as one of dozens of suppliers that invested in Ethiopia after PVH's encouragement. Sino-Ethio Associates, a pharmaceutical joint venture, has also sent six Ethiopians to China for two to three months for training.

As sending Ethiopians overseas is a costly undertaking, more firms are choosing to bring foreign technicians to Ethiopia to train local employees. When a Hong Kong-based garment maker, Smart Shirts, opened its factory in Ethiopia in 2017, it started by having four Sri Lankan technicians conduct intensive training for twenty local workers. After they grasped the skills, these local workers were supposed to continue to teach others. However, another factory from Hong Kong, New Wing shoe factory, found that more expatriates were required as their operation grew. The Italian general manager told us that he and two Italian engineers came to train local workers when the factory started in 2011, but they were too few. He then brought ten Chinese trainers. That was still not enough. He had to add another twenty Chinese to train the 1,500 local workers in his factory. The Italian manager expressed frustration with slow training progress, "I cannot trust them and cannot be worry free about quality... (Expatriates) have to control them (Ethiopians) very tightly."²²

One challenge for training is the export market's high quality demands. The manager of Chinese garment maker Linde, whose products sell both within Ethiopia and in Europe, said that his workers only require one or two months of training for domestic orders, but require up to six months for international orders. The manager of New Wing was also upset that local workers failed to understand the requirements of export customers, "[workers] do not care about scratches!" Addressing this problem, some international buyers provide additional training assistance. A small, 120-employee Chinese Cut, Make & Trim (CMT) factory, together with two local garment factories, regularly hosts Chinese experts sent by a Hong Kong based international buying agent. In the workshop, experts teach the supervisors how to arrange the production process, guarantee quality, and stick to deadlines. For large Free on Board (FOB) factories, buying agents also send inspectors to control quality and offer suggestions, although these inspectors play a smaller role in training workers. When factories shift production models, workers often require time to adapt to the new models; some times additional training has to be offered.

TURNOVER

A LARGE PROBLEM AFFECTING TRAINING OUTCOMES is the high turnover rate among workers. At the Boli-lemi industrial zone, which began operations in 2015, the general manager of a large Taiwanese firm, George Shoes, complained, “The turnover rate is too high and workers change all the time. Much training is wasted. The factory always has semi-skilled workers. It’s hard.” Four factories located in the same industrial zone reported on average a 10-15% turnover rate per month. Fewer than half of recruited workers stay longer than a year.²³

According to managers, workers leave for several reasons, including low wages, a need to care for family members, attraction of other new factories, and the desire to work in less laborious sectors.²⁴ One manager estimated it could take another two to three years for the work force to stabilize. Stabilization appears to have already happened in older factories. For example, Huajian shoe factory, in operation since 2012, reported that annually only 5% of its local workers leave the company. A few workers have stayed four or five years and have become very skilled and reliable.

However, Huajian has found it challenging to keep its workers who were trained overseas. In 2012, when the first group of Ethiopians sent by Huajian to China returned, over 70 of the 86 trainees left the company within six months. We interviewed eleven of these workers, and at that time they cited low income and dashed expectations as the main reasons for their departure. They had expected to become supervisors with high salaries after being trained in China, but in reality they remained working in the assembly line and earning almost the same as newly recruited workers. After repeatedly demanding a wage increase in vain, the frustrated workers chose to find other jobs or even just quit to stay at home.

As there were no other large shoe factories in the area near Huajian, none of the interviewees were working in shoe production and the learned skills were simply wasted. Likewise, Wuxi Jinmao’s manager discovered that trainees sent to China, “are easy to get overly proud, regard themselves as management level and don’t want to do physical work. Some people returning from training demand salary raises of up to 300 percent.” In addition, other Chinese firms actively poach Ethiopians trained in China. Chinese managers from various companies said that quite a few former Huajian trainees quit to go to other manufacturing firms, although not necessarily in shoe production.²⁵

Because of these constraints, many Chinese employers are reluctant to provide expensive overseas training or to invest in any form of relatively intensive training. The formation of a relatively stable work force is critical for both effective transfer of production skills and firms’ investment in advanced training, but the balance between training and retention is still a work in progress.

LOCAL MANAGERS

KNOWLEDGE AND CAPABILITY AT THE MANAGEMENT LEVEL is essential for successful factory operations. The participation of Ethiopians in enterprise management indicates the extent of more sophisticated knowledge learning. Furthermore, it is necessary to have local managers to build a stable and efficient local work force. Among the 73 surveyed firms, only 10 companies reported having no local managers or supervisors. These companies were mostly very small; eight had fewer than 50 employees. The other two firms, which employ approximately 200 full-time workers and 800 part-time workers respectively, actually belong to people who are part of the same family. The owners consider local workers as incapable of managing other workers. In their two firms, Chinese supervisors, “inspect the whole process from packaging to production.”

Ethiopians who rise to management positions usually start by managing workers in the production lines, often assisting Chinese managers, and gradually move up to higher responsibilities. Using Huajian as an example, Ethiopians were selected as team leaders in the workshop shortly after it started operations in 2012. Two team leaders led every production team, made up of 15-25 workers, one Chinese and one Ethiopian. Chinese team leaders served as the main authorities, whereas local team leaders demonstrated their capabilities during on-the-job training by performing their tasks diligently. Apart from supervising production, the Ethiopian team leader also had to participate in additional training. They slept in the same dormitories as the Chinese supervisors during the weekdays and jogged together in their factory workplace every morning. In the evenings, they attended Chinese classes twice a week. Every day team leaders needed to hold two meetings with all the team members to brief on work performance, resolve emerging problems, or indicate areas for improvement.

The selection of team leaders was not based on workers' educational background or previous experience, but rather on their “good work attitude,” namely whether the workers demonstrated outstanding performance, abided by regulations, and were willing to work hard. Those who were sent to China for training received special attention from the company, but only those who achieved high scores in training were assigned as group leaders after returning.

Revisiting the factory three years later, an Ethiopian, nicknamed “Shanghai”, had been promoted to manager. He managed a group of 20 people by himself and his team often won production competitions. As of mid-2017, the number of Ethiopian managers had increased to four and there were approximately 15 Chinese managers of equivalent rank. Additionally, there were over thirty Ethiopian team leaders and assistant managers. An Ethiopian manager named “Fazhan”, told us two skills were critical for being managers at Huajian. One was communication. Here, he said, Chinese proficiency helped a lot. All four local managers were among the first group of trainees in China and worked in Huajian's headquarters for more than a year and spoke Chinese fluently. The other was work efficiency. When management sets targets, they have to be finished by the end of the day. In his view, “The work and management

Some factory managers complained that local workers did not know how to maintain or repair machines and were reluctant to entrust local workers with operating sophisticated machinery critical to production.

here (at Huajian) is standardized... Working hard does not only mean working overtime, but also includes the notion of quality and the notion of time.”

Apart from the production department, Ethiopian managers are often used in Human Resources and Administration departments. They are considered mediating agents between Chinese executives and Ethiopian workers. The Chinese CEO of one packaging firm said, “using locals to manage locals is easier and cheaper.” He has hired three administrative managers, one of whom studied in Beijing for five years and can communicate with Chinese managers smoothly. Using local managers instead of foreign managers can significantly improve labor relationships and avoid conflicts.

However, there is a limit to these local managers’ skills. For one thing, they only concentrate on labor-intensive production processes and do not know the industry’s entire value chain. Export-processing factories usually receive their orders from overseas headquarters. These headquarters source raw materials from all over the world and are home to the design teams that create new products. Ethiopian factories merely implement the production instructions. Studies on apparel manufacturing investments in other African countries confirm that the knowledge transferred to the relocated production base is elementary and partial, due to investors’ strategies as well as the nature of global value chains.²⁶ Of course, individual managers can identify opportunities for further skills development in these multinational companies. We see this when professionals from Bangladesh, Kenya, Mauritius, Myanmar, Philippines, Sri Lanka, and Vietnam are sent by Chinese firms to Ethiopia to train and manage local workers. Ethiopian managers may be sent to other countries soon as well. Yet, even here, development of these skills is still largely dependent on foreign investors and limited within a part of the firms’ business fields. Developing more comprehensive market knowledge and independent operational capacity requires enterprise-level learning.

KNOWLEDGE TRANSFER

KNOWLEDGE TRANSFER BETWEEN ENTERPRISES

EXISTING LITERATURE SUGGESTS THAT KNOWLEDGE TRANSFER between foreign investors and local firms takes place in the following forms: i) the movement of highly trained and skilled staff to domestic firms; ii) “demonstration effect” of advanced technology and managerial skills; iii) “competition effects”, which may force rival domestic firms to upgrade production techniques; iv) development of backward and forward linkages to local enterprises; v) joint venture or technological collaboration. This section examines these spillover mechanisms in the context of Chinese investments in Ethiopia.²⁷

MOVEMENT OF TRAINED STAFF

AS NOTED EARLIER, ETHIOPIAN WORKERS FREQUENTLY leave Chinese firms for other jobs. Some do move to local firms in the same sector, usually for higher wages. However, local firms can only offer higher wages when they receive orders. Since the Ethiopian factories' business operations are less stable than foreign investors, workers may move in the opposite direction back to Chinese firms. A Chinese manager of a glove factory described a local supervisor as an example. A newly established Ethiopian company poached the supervisor, but he came back several weeks later because the new company had no orders to work on.²⁸ A manager in an Ethiopian shoe factory, Fontanina, explained, "workers from Huajian do not come to Fontanina, rather workers from Fontanina go to Huajian for wages and working conditions. Although the wage level is similar, we have problems of cash flow."²⁹

Another problem is the effectiveness of skills learned in the new environment. The manager in F shoe company admitted that they had hired several Ethiopian supervisors from Chinese shoe factories, but they turned out to have hardly changed production efficiency in F. "The skills of the workers in different factories are the same ... they [the supervisors] are rather led by the existing production methods."³⁰ He realized that establishing an efficient management and production system was more important than acquiring experienced workers and supervisors trained in the shoe-manufacturing sector. In the leather processing business, the most critical knowledge is about the usage of chemicals in treating the skins. In order to learn Chinese knowledge on chemical use, the owner of a local tannery, Mesaco, raised the wage more than 40% to hire a technician who used to work for China-Africa Overseas Tannery. Yet, he was disappointed to find that the technician did not know much more than other Ethiopians. The owner concluded, "The Chinese tannery does not teach Ethiopian workers the essential formula."³¹ The technician told us that the work in the Chinese and the Ethiopian tanneries was the same, but in his view, the Chinese work harder than local people.³²

In a separate interview, a Chinese tannery owner explained the "secret" of his knowledge. He used to sell chemicals before starting the tannery business. Therefore, he learned to make the optimal formula through a lengthy process of trial and error. He claimed to be producing the best black-colored sheep leather, but even his son had not yet grasped the skill. He said, "technology learning requires 'wuxin' (savvy talent), otherwise you may not get it after 4-5 years of learning."³³

Fewer than 10 percent of firms in our survey had invested in Ethiopia prior to 2010 and only one of those had arrived before 2008. We did not find any examples of disseminating key technology to other firms through former Ethiopian employees in Chinese firms. Neither did we find any spinoff firms established by former local employees with skills and business knowledge acquired in Chinese firms. In other African countries, CARI researchers have found a few cases of local employees of Chinese firms setting up their own firms later. Most of them are limited to sectors that do not require much capital or sophisticated technologies.³⁴

"The turnover rate is too high and workers change all the time. Much training is wasted. The factory always has semi-skilled workers. It's hard."

“DEMONSTRATION EFFECT”

RESEARCHERS SUGGEST THAT DOMESTIC FIRMS MAY improve productivity by observing nearby foreign firms and adopting superior production technologies, managerial, and organizational skills.³⁵ The arrival of large Chinese firms has had a “demonstration effect” for some Ethiopian firms, but the more lasting impacts on local firms are uncertain due to various obstacles. Ethiopia has a relatively long tradition of shoe making. Indigenous firms are not only able to compete with imported shoes, which used to inundate the Ethiopian market, but some have also been able to venture into the export market.³⁶ However, when Huajian and other foreign shoe factories arrived, local shoe firms were surprised to see a very different business model. Ethiopian firms used to export only seasonally and in small quantities. A Fontanina manager recounted his experience, “When I visited Huajian, I saw their massive operation, I was shocked. It was an army of people. Everybody was chikchikking [sewing and working], that’s crazy! Ethiopians were not used to that. We could not do that. It was the first time that we saw this.”³⁷ Seeing the management and productivity gap, Fontanina decided to buy machines from Italy and hire five Italians to train their workers. The manager was confident his workers would be able to catch up with Huajian’s workers in two years. The firm fortunately got a test order from a US buyer and was confident about its prospects in the export business at that time.

However, when revisiting the firm two years later, the manager reported that the firm had not received any more export orders. The key problem in the test order was the supply of accessories. There are no qualified manufacturers of shoe accessories in Ethiopia. The US buyer connected its certified accessory suppliers in China with Fontanina. However, the Chinese suppliers required a down payment before shipment. As Fontanina had already borrowed to buy equipment, it had working capital constraints and had to import accessories in several batches. Because of the long transportation distance, shipments were often delayed and production was disrupted. When the US buyer sent experts to inspect, the factory was temporarily closed due to an accessory shortage.

In the manager’s opinion, the workers’ skills in various factories are almost the same after training. Yet the workers at Huajian and other Chinese shoe factories appear busy and disciplined because they always have enough orders and work. By comparison, Fontanina cannot keep its workers busy because of funding, supply, and market constraints. The factory was running at 30-40% of its designed capacity in 2017, and focused only on the domestic market. Over 200 workers were trained at the beginning, but only around 100 workers remained in the factory. Likewise, several other shoe factories also wanted to become big after seeing the foreign investors’ success, but few were able to do so. Instead, local firms turned their attention to domestic and African regional markets. After experimenting with exports, they found that foreign clients had more exacting standards and the demand for working capital was high, but the profit margin was low, only 5-7%. Sales in local markets, by contrast, had margins of approximately 10%.³⁸

“COMPETITION EFFECT”

The formation of a relatively stable work force is critical for both effective transfer of production skills and firms' investment in advanced training, but the balance between training and retention is still a work in progress.

WHILE THE “DEMONSTRATION EFFECT” MAY BE LIMITED because of foreign customer’s high standards, the “competition effect” uses a different mechanism. Domestic firms are forced by foreign firms to upgrade production techniques so that they can remain competitive.³⁹ Among the 73 Chinese firms surveyed, nine shoe and garment factories focused exclusively on the immense export processing markets and did not directly compete with local firms. Eight other firms did not have competitors in the same sector (pharmaceuticals, auto parts, ceramics, etc.). All of the rest were in competition with Ethiopian firms either in selling the products or in getting supplies, particularly in the construction materials and leather processing sectors.

During interviews both Chinese and Ethiopian firms had a tendency to claim they were technologically superior to their competitors. Chinese firms considered they had newer equipment, better designs, and more efficient management. Yet, Ethiopian firms did not necessarily agree. Most of the machinery in Ethiopian factories was also imported from Europe and China. We found Ethiopian firms hiring technicians from Italy, India, and China to improve production and management performance. In fact, several Ethiopian factory managers pointed out that some Chinese companies did not have the same knowledge as the local ones, as the Chinese were originally just traders.

It appears that although the technological level varies among companies, there is no clear distinction between Chinese and Ethiopian firms when they are in direct competition in one sector. Some Ethiopian firms even outperform Chinese competitors, whereas others are losing by comparison. For example, all Chinese cement plants operate on a relatively small scale and use shaft kilns. A handful of newly built Ethiopian plants adopted rotary kilns and have achieved higher productivity. As a result of this competition, the number of Chinese cement mills fell from nine to four as of 2017. Chinese manufacturers built most of the large-scale African-owned cement factories in Ethiopia, including Derba, Messebo, Mughher, National, and Dangote (owned by a Nigerian).⁴⁰ Here, we see African firms using Chinese technology to beat Chinese investors in local market competition.

Interestingly, Ethiopian firms and the government do not have the same views on the competition effects of Chinese investors. Most firms criticized the Chinese for not bringing new skills while taking advantage of the Ethiopian market. The general manager of an Ethiopian tannery said, “foreign investors have not fulfilled these expectations (of introducing brainpower and technology), they come just for raw materials.”⁴¹ By contrast, Ethiopian officials think more positively about the new investments. “With the arrival of foreign investors... low competition and low value-added (of the leather processing sector) has been changed to competition with international companies and this pushed an increase in value,” said the director of Leather Industry Development Institute (LIDI), a government agency. Although he acknowledged that increasing demands from Chinese and Indian tanneries had raised the price of the leather supply and reduced existing tanneries’ margins. LIDI consequently provided assistance, e.g. technical training, to selected local tanneries to

improve their productivity. Similarly, the Ethiopian government encouraged foreign investors to enter the cement sector and was happy to see competition had reinvigorated the industry.⁴²

The contrast between “competition” and “demonstration” effects suggests that learning through direct competition may be more effective than learning a new production and marketing model, though African firms may have a more positive opinion of the latter. Face-to-face competition can really force local firms to catch up and to not shy away from difficulties. Of course, local factories may continue learning a new production and marketing mode and eventually adopt it, but this process takes longer. Follow-up research could track whether or not this ends up happening in Ethiopia.

BACKWARD AND FORWARD LINKAGES

PREVIOUS RESEARCH FOUND INTER-INDUSTRY BACKWARD and forward linkages also have significant spillover effects, often more obvious than intra-industry knowledge transfer mechanisms like demonstration and competition.⁴³ Foreign investors may directly provide training and support to their local suppliers so they can meet the buyer’s technical requirements.⁴⁴ Likewise, foreign buyers may assist their local clients to improve efficiency, though the forward linkage may not be as important as the backward one.⁴⁵ In our survey, 48 of 73 Chinese investors (65.75%) have local suppliers. These firms operate in the construction materials, furniture, plastic, and leather products sectors. Local suppliers mainly provide raw materials such as limestone, minerals, wood, leather, and recycled plastics, as well as cartons, label printing, and other accessories. Firms that do not source locally are mainly garment making factories and machinery/vehicle producers. They cannot find necessary fabrics or machine parts in Ethiopia and have to import them, primarily from China.

To become suppliers for Chinese investors, local firms usually need to go through a selection and competition process. Taking the leather sector as an example, when New Wing shoe company arrived in Ethiopia, it gave test orders to three major local tanneries. They selected one as their long-term supplier because, “It is the only one who delivered on time and provided seven or eight colored leathers.”⁴⁶ Huajian and George Shoes both started sourcing from local tanneries for a portion of their raw materials and then increased the proportion of local supply over time. Three years after its operation, Huajian used locally supplied leather for over 90% of its shoes. As of 2017, George shoes was also sourcing 70-75% of its leather from local tanneries. Local tanneries even beat out Chinese competitors as authorized suppliers. As Huajian and other shoe firms produce for international clients, the leather supply requires agreement on behalf of the firms’ clients. So far, all three authorized leather suppliers for Huajian are Ethiopian firms, although one Chinese tannery was still struggling to get the authorization. The strength of local tanneries lies in their ability to secure good raw skins and production stability.

Local suppliers occasionally received technical instruction from foreign firms. Local tanneries reported that Chinese customers, both from Chinese factories in Ethiopia and those in China, sent technicians to work together with local producers to improve quality, usually visiting for one or two weeks. In order to obtain a good raw skin supply, China-Africa Overseas Tannery taped a video of skin cutting processes in China and showed it to workers in Ethiopia's abattoirs. In other sectors such as wood processing, cement, and plastic recycling, buyers do not offer intense technical tutoring to upstream firms, for they mainly buy unprocessed raw materials like limestone and wood.

However, the training effects for Ethiopian suppliers may be limited due to various factors. Chinese buyers sometimes hesitate to give technical details because of commercial concerns. In an interview, a leather trader expressed worries that Ethiopian suppliers might raise their prices once they learned how to improve the quality. Therefore he never sent technicians to the suppliers. Ethiopian suppliers sometimes quickly forget the knowledge garnered from their clients. And sometimes government efforts can be counter productive. For instance, the local authority ordered local abattoirs to change supplying destinations every three months to guarantee all tanneries equal access to leather and avoid a monopoly. Consequently, China-Africa Overseas Tannery found that the skills imparted through their video training were almost forgotten when the abattoirs supplied them again after the rotation. To secure a quality supply, a few Chinese firms chose to invest in upstream production. Before its closure, China-Africa Overseas Tannery had a plan to build a meat-processing factory so that it could gain access to a larger supply of skins. George Shoes and New Wing have both established their own tanneries to supply leather. The technical training and management within the same firm through vertical integration can be more effective than that between different firms.

Forward linkages can also be observed as Chinese firms invest in machinery and accessory manufacturing. Huajian set up a production line to make shoe materials and accessories in Ethiopia, mainly to supply its own factory. Since the capacity is large enough, they also sell a small portion (approximately 30%) to local shoe factories. Small and medium sized shoemakers particularly welcomed their products. A manager at the Ethio-International Footwear Cluster Cooperative Society (EIFCOS), a cooperative of hundreds of workshops, said that, "the impact of Huajian is very positive." Before Huajian's arrival, lasting machines, which stretch shoe uppers over the foot form and join the uppers and soles of a shoe, were rare and expensive in Ethiopia.⁴⁷ While the few existing Ethiopian workshops offering lasting services for shoemakers were very slow, Huajian provided lasting services with a faster turnaround time. "You call and they come without transportation charge." It supplies molds with "whatever type you want" and the price is good.⁴⁸ Another Chinese manufacturer produces large equipment for breweries in the local market. Previously, breweries purchased machines from abroad. After the firm invested in 2014, it started to provide integrated design-produce-install services and a quick reaction to help the breweries take more advantage of the booming beer market in Ethiopia and East Africa.

Clustering helps Chinese businesses overcome a number of obstacles and create special impacts on the technological development of the host country.

JOINT VENTURES

In comparison to backward and forward linkages, a more intensive form of technical collaboration between firms is to establish joint ventures. Deborah Brautigam's study of Mauritius sheds light on the significant role of joint ventures with Asians in the development of the Mauritian textile industry.⁴⁹ Beata Javorcik, based on firm-level data from Lithuania, showed that productivity increase is visible in investments with joint foreign and domestic ownership, but not in engagements with fully owned foreign affiliates.⁵⁰ In our survey, six firms reported themselves as joint Chinese and Ethiopian ventures. Additionally, a Chinese supplier of steel-processing equipment had a long-term cooperation agreement with an Ethiopian steel maker to provide technical services. They made up less than 10% of the firms surveyed, but the technology transfer effects in these enterprises were remarkable.

Among the seven joint ventures, Sino-Ethiopian Associate Plc. had the longest history. The Ethiopian partner, Zaf Tsadik, was originally hired as a regional agent for a Chinese medicine trading company in 1991. Seeing opportunity in African markets, the Chinese firm decided to build a capsule factory in Ethiopia in 2001. Two Chinese investors own 70% of the shares and Zaf has a 30% stake. Thanks to long term cooperation and mutual trust, Zaf was appointed as the general manager of the entire business in Africa. The company is said to be the first and only capsule maker in sub-Saharan Africa and has acquired a certificate of Pharmaceutical Inspection Co-operation Scheme (PIC/S) conformity, which is an internationally harmonized Good Manufacturing Practices (GMP) standard. As of 2015, the firm employed 170 staff, of which only two were Chinese: an engineer and a production manager. Six Ethiopians have been sent to China for two to three month trainings and Chinese technicians have come to train staff when new technology was introduced. Two new lines were added in 2015, doubling production capacity. Deputy general manager Shegaw Aderaw claimed, "Now the technology is fully transferred." The Chinese engineer usually left local technicians to operate the machinery and did not intervene unless the machines had serious problems. According to the engineer, the Ethiopians were still not able to grasp sophisticated mechanical knowledge and fix all mechanical problems. He attributed this primarily to a weak industrial base in Ethiopia and lack of practice with the machines.⁵¹

In the other six factories, Chinese teams were still the leading technical force at the moment of our survey. As they started operating between 2009 and 2017, the training process for local workers had not yet been completed. The proportion between Chinese and local managers in these firms was on average 1:1, not much different from that in firms fully owned by Chinese. However, local managers in joint ventures were in charge of sales, finance, human resources, and general management, occupying more critical positions, whereas the role of Chinese partners in three of the six projects was mainly limited to production and procurement. This is a positive sign for Ethiopians to actively and comprehensively learn entrepreneurial skills, but the real effects will still take some time to unfold.

Investment concentration facilitates interconnections and forges value chains between enterprises. This reduces transaction costs and increases FDI projects' competitiveness.

CLUSTERING & KNOWLEDGE TRANSFER

ALL THE ABOVE-MENTIONED PATTERNS OF KNOWLEDGE TRANSFER within firms and between firms can be found more or less among investors from other countries too, as literature shows.⁵² The challenges facing individual Chinese projects are quite common for firms operating in Africa. However, Chinese firms tend to invest in groups either by sector or geographically. Clustering helps Chinese businesses overcome a number of obstacles and create special impacts on the technological development of the host country, as explained below.

INDUSTRIAL ZONES

A CHINESE FIRM, QIYUAN GROUP, SET UP THE FIRST industrial park (Eastern Zone) in Ethiopia in 2007. Growth was quite slow in the early years and five years after the start of the project, only nine companies had invested in the zone, of which six were affiliates of Qiyuan group. Change came at the end of 2011, when Huajian group decided to establish a production base in Ethiopia and chose to settle in Eastern Zone because of its relatively good facilities. The Huajian project was widely reported on by Chinese and international media and it was seen as an example of Chinese manufacturing capacity moving from China to Africa. Since 2013, Ethiopian officials have also increased efforts to attract foreign investment in the manufacturing sector. Consequently, the Eastern Zone became a hot spot for enthusiastic investors from various countries. As of August 2017, the zone hosted 69 firms, of which over 90% were Chinese manufacturers. The rest included multinational companies like Unilever as well as Indian and Ethiopian firms. The firms in the zone employed more than 10,000 workers. Following the success of Eastern Zone, Huajian Group opened its own industrial zone in 2016, which will not solely accommodate its own factories but also provide space for other investors. Four Chinese companies have already moved into the Huajian zone.

From the Chinese zones, the Ethiopian government learned industrial parks could be an effective instrument to attract foreign investment. With some assistance from the World Bank, the Ethiopian government launched its own zone program.⁵³ The first government-run zone in Bole-lemi began operations in 2014. A dozen foreign companies quickly occupied all the industrial sheds. Another government-run industrial park opened in 2017 in Hawassa and had already hosted 17 investors by July of that year.

While the whole country is still extremely deficient of infrastructure, the concentrated industrial areas in the zones have first-class facilities. Bureaucratic administration is also streamlined in the zones to reduce the burden for investors. Ethiopian authorities, including the Ethiopia Investment Authority (EIA) and the Ministry of Industry, did not know the implications and benefits of industrial parks until Eastern Zone demonstrated its success in attracting FDI. When we interviewed an official in the EIA in 2009, he viewed the zone to be merely an industrial estate project, which leases land to factories for profit. The zone developer was supposed to buy the land and develop the infrastructure on its own. The Ethiopian government did not

want to give any privileges to this foreign investment project.⁵⁴ The zone developer, Qiyuan Group, spoke persistently with Ethiopian officials about the importance of preferential policies for attracting investors and the comprehensive benefits of zone development for the country. The boss, Lu Qiyuan, repeatedly took Ethiopian ministers, mayors, and administrators to visit Shanghai, Suzhou, and his hometown Zhangjiagang city to let them personally witness the operation and achievement of Chinese industrial zones.

As Eastern Zone is one of the officially supported Chinese overseas zones, the Chinese government also helped with communication and idea sharing. China's Ministry of Commerce (MOFCOM) offered a series of zone development policy study workshops in Beijing and invited Ethiopian officials to attend.⁵⁵ When MOFCOM minister Chen Deming met the Prime Minister, Minister of Finance, and Minister of Industry in Ethiopia in 2010, he started every discussion by mentioning the Eastern Zone, emphasizing the important role of development zones for attracting FDI and the need of preferential policies for zones. Late Prime Minister, Meles Zenawi agreed that Eastern Zone was a good platform to share China's experience with zone management and market reform. He also instructed the Ministry of Finance and Ministry of Industry to design appropriate policies for the zone project.⁵⁶

However, Ethiopian officials complained about the Eastern Zones' slow progress. According to an official, the zone planned to host over eighty factories within five years starting in 2007, but there were only six companies in operation as of 2012. Now, viewing industrial zones as a helpful policy instrument to attract FDI, the Ethiopian Ministry of Industry commissioned China's Association of Development Zones to design a more comprehensive industrial zone program.⁵⁷ Special Advisor to the Prime Minister, Dr. Arkebe Oqubay, led the restructuring of the industrial zone's administration with the assistance of Chinese consultants. A dedicated state-owned enterprise, Ethiopian Industrial Parks Development Corporation (IPDC), was created in 2014 to develop and administer industrial parks with "standards of professionalism."⁵⁸ IPDC plans to construct eleven industrial parks in various cities around Ethiopia and actively promote them internationally. Among them, Bole-lemi and Hawassa Zones have already been put into operation. The Eastern Zone and Huajian Industrial Zone also profit from IPDC's improved administration and are seeing a rapid growth of FDI projects.

CLUSTERING DEVELOPMENT

APART FROM GEOGRAPHICALLY DEFINED ZONES, CHINESE investors tend to flock into certain industrial sectors when opportunities are found. This is a common phenomenon for Chinese investments in Africa and various researchers describe how Chinese investments in Ethiopia concentrate on textile and garment, leather, plastic, and construction materials.⁵⁹ Often, Chinese businessmen come to invest through friends, relatives, business partners, former employers, and so on. For instance, a Chinese textile trader in Zhejiang province was invited to see the booming market by

Thus, the learning of industrial knowledge seems to have a paradox: skill development requires more manufacturing activities, whereas manufacturing investments tend to flow to where a skilled work force and administration already exist.

his childhood classmate, who made his fortune in Ethiopia. The trader then brought two partners to set up a textile mill in 2014. One year later the trader met a manager of a neighboring Chinese garment factory and they worked out a business plan. The manager quit his position to co-invest in a new bag-manufacturing firm with the trader. In another case, the owner of a Chinese plastic shoe factory, Huihuang, said that there were only six Chinese plastic shoe producers in early 2015. Barely two and half years later, the number of Chinese plastic shoe producers had risen to around 50. Most are from the same Fujian province, the same province where Ethiopian factories source machines and molds. Many businessmen in China sensed market opportunities in Ethiopia because of the high demand for supplies and from the accounts of their neighbors. Family members of Hui Huang's owner also created three new projects, including two shoe factories and one plastic pellet producer.⁶⁰ Both cases illustrate Chinese investors' quick actions and the cluster formation mechanism.

Investment concentration facilitates interconnections and forges value chains between enterprises. This reduces transaction costs and increases FDI projects' competitiveness. Prior studies also found that industrial clustering can speed up the rate of technology diffusion to local firms.⁶¹ Clustered FDI primarily transfers technology and knowledge via its workers. Researchers discovered that workers recruited and trained by clustered multinational corporations (MNCs) were more likely to move to local competitors or create their own firms, whereas dispersed MNCs appeared to soak up and retain experienced labor from other parts of the economy; in other words, firms within clusters experienced higher levels of staff turnover.⁶² The survey in Ethiopia shows that turnover rates in Chinese firms are indeed quite high, partly because numerous firms exist in the same zone or in the same sector. Yet, as noted earlier, Chinese firms began training staff relatively recently and local firms have not yet seen the benefits of experienced labor from foreign firms. As the local experienced labor force continues to grow, local firms will likely begin to benefit.

Clustering also extends the production value chain in Ethiopia and increases opportunities for engagement with local firms. Export-oriented garment makers used to import almost all their fabrics and had virtually no backward linkages with Ethiopian suppliers. The establishment of Hawassa Industrial Park has attracted more than a dozen garment makers to invest and a textile maker, Wuxi Jinmao, to supply high-quality fabrics for these factories. Wuxi Jinmao sources chemicals, like caustic soda and sodium carbonate, from local firms. This creates supply linkages between the garment FDI and local firms. Wuxi Jinmao considers it would use locally produced yarn as well if its quality could be improved. This might eventually help Ethiopia build a complete supply chain from cotton and yarn to fabrics and garments.

SECTORAL ADMINISTRATION

IN ORDER TO SUPPORT SECTORAL CLUSTERING DEVELOPMENT, the Ethiopian government has improved the administration structure. Since 2010, three specialized institutes have been created to lead and develop key industries, the Leather Industry

The concentration of Chinese investors can attract numerous local workers to look for manufacturing jobs, drive local firms to learn business models, strive for competition or seek collaboration, and draw attention from the Ethiopian government to improve the industrial environment. Unlike individual projects, clusters and zones create eco-systems for manufacturing, which nurture diverse and complex interactions between various stakeholders.

Development Institute (LIDI), the Textile Industry Development Institute (TIDI), and the Metal Industry Development Institute (MIDI). Their tasks include technological and market research, investment support and promotion, policy recommendations, training services, and facilitation of knowledge transfer.⁶³ All firms in the related sectors confirmed in their interviews that these three institutes were critical to the success of investment projects, as the institutes are in charge of comprehensive issues in their respective sectors. When it comes to knowledge transfer, all the institutes actively encourage training and employment of local technicians by limiting the number of expatriates. When a firm wants to obtain work permits for foreign employees, it has to explain to the institutes why Ethiopians cannot do the job. Otherwise, the firm will not receive support letters needed for expatriates' immigration. The institutes also occasionally invite international experts to give educational lectures. For instance, LIDI launched a program in 2011 to send dozens of Indian experts to eleven Ethiopian tanneries to provide technical instruction. The institutes also have training arms that are supposed to supply trained workers to the industries. They are equipped with state-of-the-art technology and modern training and research facilities.

Enterprises have mixed views on the role of these institutes, however. Some consider them to be knowledgeable about the sectors and capable of providing professional assistance. When Chinese tanneries and shoe factories started their business, many of them worked together with LIDI to recruit and train new workers. Local firms also appreciated the technical and training services provided. However, both foreign and indigenous enterprises pointed out that the institutes often hold impractical understandings about sector development. For example, Chinese textile makers complained that TIDI only gave work permits to Chinese technicians who had bachelor degrees or higher. This causes big problems when Chinese firms want to bring appropriate expatriates to Ethiopia, since experienced machine operators in China rarely have university-level education. In addition, technicians are required to transfer all their skills to locals and leave the country after three years. A Chinese manager argued against the time limit, "people can't teach everything in three years. Machine operation needs rich experience."⁶⁴ The training program was criticized as ineffective. Although four of the six Chinese tanneries reported to have accepted interns or employed graduates from LIDI, the feedback was overwhelmingly negative. Chinese managers portrayed LIDI students as "not modest" and "not having true [practical] knowledge." A tannery owner who had taken five LIDI interns two years before described their stay in the workshop, "they did not help with anything, but just looked around and wrote down something every day." The students considered themselves knowledgeable experts, but in fact lacked practical experience. The curriculum taught in the institutes was also said to be out of date. Consequently, foreign firms are no longer willing to employ graduates from the institutes and prefer to train workers themselves. Likewise, in regards to the Indian experts sponsored by LIDI to train local tanneries, several of the tanneries viewed the Indian experts' help to

not be as successful as expected. “(Indian experts) just tried to produce leather quality according to Indian standard, not according to market demand.”

The institutes are widely criticized for their deficiency in market orientation and overreliance on administrative power. The institutes strongly encourage firms to export, but only through repetitive exhortations and threats of penalty. Enterprises find that the institutes have done little to improve the market environment to facilitate export. Once, TIDI threatened to stop granting work permits for Chinese textile companies in the Eastern Zone if they did not export.⁶⁵ Chinese firms collectively wrote a letter to TIDI’s director, listing major obstacles and promising to export once these problems were resolved. The issues included simplifying and accelerating customs clearance, facilitating access to foreign exchange to insure a timely supply, improving local workers’ training, and allowing overtime work. However, the Chinese firms have not yet received a response from TIDI and have not seen any change in the obstacles mentioned.⁶⁶ While LIDI urges tanneries to export, their regulations are at times counterproductive. For example, in order to avoid a monopoly, LIDI forbid small collectors, who collect raw skins directly from farmers, from selling skins to larger collectors. But in order for small collectors to be able to collect enough supply for the tanneries, they have to store skins for a long time. The delay causes serious damage to the skin quality and makes it difficult to export. LIDI also requires that exported leather go to the country that pays for it. This is inconvenient, as funds may come from China, but the leather may need to go to another country like India, for example.

A Chinese investor commented, “Ethiopia government wants to assist companies, but they don’t know how.”⁶⁷ The institutes have ambitious goals to increase exports and produce international standard goods. To achieve these targets, the institutes put a lot of emphasis on attracting more investors. As the director of TIDI says, “the government is committed...to scale up production only through more investments.”⁶⁸ However, foreign and indigenous enterprises already in the country receive less support and attention. A Chinese tannery established three years ago reported that LIDI officials no longer come to visit. The institutes also seem to have insufficient communication with enterprises prior to making new policies. The above-mentioned problems of skin collection and foreign exchange sources could have been handled better if there had been more direct consultation with the firms themselves.

In addition, LIDI’s capacity is limited so that they cannot address some fundamental industry constraints, as other institutes do not understand the special requirements in the sector. A number of leather and garment firms complained about the customs offices’ sluggish pace. A manager said, “it takes 12 days for goods to ship from Italy to Djibouti, but 13 days from Djibouti to Addis Ababa,” because customs officials frequently change and are inexperienced. “German customers want shoes within one month, but it’s impossible to do that in Ethiopia.”⁶⁹ Indeed, LIDI officials understand this problem too. Zulfikar, director of the shoe department at LIDI said, “Production skills are not difficult. The key is to find right buyers and to improve logistics to secure on-time delivery.” However, he admitted that it is beyond LIDI’s, and even the Ministry of Industry’s, control. The tax authority forced Huajian to stop

selling shoe materials within Ethiopia, even when local small and medium-sized shoemakers wanted Huajian's supply and services. Additionally, the tax authority imposed a high tax on domestic sales, ignoring the positive spillover effects on sectoral growth.

CONCLUSION

RESEARCH INTO CHINESE INVESTMENTS IN ETHIOPIA'S knowledge transfer effects reveals multi-level learning and interacting processes. At the intra-enterprise level, tens of thousands of Ethiopians are employed in the production line. Most of them acquired machine operation knowledge directly through hands-on work. The skills acquired are practical, but not sophisticated. To some extent, the language barrier and a lack of systematic education affects the efficiency and depth of the skills learned. However, the instability of the emerging local work force prevents enterprises from further investing in training at this stage. Additionally, the limited range of operational activities in Ethiopia confines the knowledge of local employees solely to the factory production field. Even local managers have little exposure to design, procurement, marketing, and integrated corporate management.

At the inter-firm level, Ethiopian firms have actively engaged with arriving Chinese investors in various manners. Through competition, forward and backward linkages, and joint ventures, local firms have managed to expand their business areas and improve technological efficiency. By comparison, demonstration of advanced business models by Chinese firms and movement of workers from foreign companies may be welcomed by Ethiopians, but they do not have substantial effects on local firms because local firms do not have the corresponding financial and market resources.

At the cluster development level, Ethiopia has benefitted from unique, first-hand knowledge of Chinese investments. Chinese investors introduced the industrial zones model to Ethiopia with the support of China's own development experience and the Chinese government. The Eastern Zone's establishment provides a concrete example of using zonal clustering to attract manufacturing investments. From Chinese practice, the Ethiopian authorities gradually understood the benefits of industrial zones and launched their own comprehensive industrial zone program. The concentration of Chinese firms in textile, leather, plastic, and other sectors also boosts the overall growth of these sectors. Clustering creates an improved operational environment and knowledge sharing opportunities for workers and companies in the sector. The Ethiopian government's policies and capacities have evolved to support sectors, learning enterprises' demands and characteristics. Although there is room for improvement regarding governance and the presence of a number of foreign investors, their interaction with authorities offer precious first-hand experience and lessons.

Out of these practices, across different levels, we observe several general characteristics of the knowledge learning mechanism. First, knowledge transfer constraints are often caused by a lack of industrial capacity. For Ethiopian workers and companies, a main reason for their lack of skills is that they are not familiar with

international markets' requirements and standards. They ignore details like product scratches and color differences, unacceptable for foreign customers. Likewise, being inexperienced in export manufacturing, Ethiopian authorities create counter-productive custom, foreign exchange, and visa permit regulations, among others. In addition, the training provided by sectoral institutes is not practical for factory operations. Thus, the learning of industrial knowledge seems to have a paradox: skill development requires more manufacturing activities, whereas manufacturing investments tend to flow to where a skilled work force and administration already exist.

This chicken-and-egg like paradox suggests that knowledge transfer is not simply a give-and-take process, but requires synergy development. To understand and absorb manufacturing industry knowledge, Ethiopia needs to first increase their industrial engagement. More local people should come to workshops to become a stable work force. Local entrepreneurs should set up more factories to compete or work with foreign companies. Local authorities should encourage more projects in the country's manufacturing sector as a necessary condition for skill development. Conversely, foreign investors have to put an emphasis on skill training and experience sharing to make the investment environment more favorable for their own business growth. Yet, neither side can scale up their efforts unilaterally. Ethiopians can continue their industrial growth only if their skills are elevated to a more advanced level, whether by training, competition, forward-and-backward linkages, or other forms of technical cooperation. On the other hand, the training and sharing of knowledge between Chinese and Ethiopians can be sustained and have lasting effects only when there are enough manufacturing enterprises and robust sectoral growth in Ethiopia. Reciprocal and balanced efforts from all local and foreign stakeholders can form a progressing synergism. Otherwise the development in terms of both investment and skill may stagnate or even regress.

Industrial clustering and industrial zones may facilitate the formation of such a synergism. The concentration of Chinese investors can attract numerous local workers to look for manufacturing jobs, drive local firms to learn business models, strive for competition or seek collaboration, and draw attention from the Ethiopian government to improve the industrial environment. Unlike individual projects, clusters and zones create eco-systems for manufacturing, which nurture diverse and complex interactions between various stakeholders. For Ethiopian workers, they may move between firms in similar sectors and may find more suitable positions in different factories. Although staff movement between firms may affect training outcomes, foreign firms also benefit from the movement because they have a competitive advantage in attracting workers. In addition, gathering tens of thousands of workers in clusters makes it easier for the overall work force to stabilize, as transportation and housing services are more available due to the economy of scale. By comparison, a German firm set up a leather product factory in Gondar, far away from any competitors, to prevent workers from moving to other firms. However, their turnover rate is 30-40% per year even after five years of operation, much higher than the average rate in leather production clusters

For the Ethiopian government, the grouping of Chinese firms does not only bring desired financial and technical resources, but also promotes political economic ties with the Chinese government. In a resource-poor country like Ethiopia, Chinese-invested industrial zones and numerous manufacturing projects become the highlight of bilateral collaboration.

near Addis Ababa. A manager said, “People (in Gondar) do not have industrial working culture. They are not willing to work under factory conditions.”⁷⁰

For local manufacturers, the arrival of Chinese firms also enables multiple levels of interaction and opportunities for knowledge sharing and technology transfer. From observation and imitation to competition and cooperation, Ethiopian firms can explore various approaches to engage with Chinese investors according to their own capacity and interests. These engagements help local enterprises obtain practical experience and business ideas from Chinese investors, while Chinese firms expand their business and expand their presence deeper into the local market.

For the Ethiopian government, the grouping of Chinese firms does not only bring desired financial and technical resources, but also promotes political economic ties with the Chinese government. In a resource-poor country like Ethiopia, Chinese-invested industrial zones and numerous manufacturing projects become the highlight of bilateral collaboration. As noted before, Ethiopian and Chinese high-ranking officials frequently exchanged viewpoints on zone development. The Ethiopian government established a new zone program and sectoral institutes to better manage foreign investment. Chinese-funded infrastructure projects like Addis-Djibouti Railway and Addis-Adama Expressway are also designed to better serve the industrial zones and clusters. The improved facility and policies then attract more investors from China and other countries. Knowledge development and investment promotion can be mutually stimulating through the zones and clusters platform.

Nonetheless, it is not clear whether this synergism between knowledge development and investment promotion can be sustained in Ethiopia’s manufacturing sector. On the one hand, challenges facing foreign investors are still daunting. Ethiopians have to continue their efforts to build up a stable work force, enhance local manufacturers’ capacity, and ameliorate infrastructure and administration burdens. Slow progress in these aspects may hinder further investment and technological upgrading in more sophisticated production. On the other hand, Chinese firms ought to overcome their prejudice of Ethiopians and other Africans to have a more open attitude to entrust local workers with technical responsibilities and engage with local enterprises. Otherwise they will find themselves isolated in Ethiopia and limited in future growth. Sharing and co-development of knowledge is indeed a vital approach for foreign manufacturers to become integrated into African industries and a key indicator for the sustainable success of foreign investors in Africa. ★

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This research was funded by research grant ES/M004074/1 from the UK's Department for International Development and the Economic and Social Research Council (DFID/ESRC), which supports research to provide evidence-based analysis of technology transfer, linkages, learning, and spillovers associated with Chinese investment in African manufacturing, agribusiness, and construction industries.



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