

Mapping the Technological Capabilities of Ethiopian-owned Firms in the Apparel Global Value Chain

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Publication date:
2017

Document Version
Publisher's PDF, also known as Version of record

Citation for published version (APA):
Whitfield, L., & Staritz, C. (2017). *Mapping the Technological Capabilities of Ethiopian-owned Firms in the Apparel Global Value Chain*. Roskilde Universitet.

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Center of African Economies

CAE Working Paper 2017: 4

Mapping the
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Lindsay Whitfield
and Cornelia Staritz



CAE Working Paper 2017:4

CAE · Center of African Economies

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CAE working papers ISSN: 2446-337X

ISBN 978-87-7349-952-8

CAE working papers can be downloaded free of charge from www.ruc.dk/cae

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ABSTRACT

Foreign direct investment has played an important role in the apparel export industry in Ethiopia, but what makes Ethiopia different to most other Sub-Saharan African countries is the existence of locally owned exporting firms. There were 48 Ethiopian-owned firms in 2016, of which 14 firms were exporting apparel or made-up textiles. To export, local firms have to be able to deliver consistently products at a certain price and quality and to meet delivery deadlines, which require developing new technological capabilities. This paper analyses the level of capabilities among Ethiopian-owned exporting firms and their positions within the apparel global value chain, as well as how they have fared and which challenges they continue to face. Generally, the 14 local exporting firms have low technological capabilities and struggle to meet export requirements, despite important diversity among them. Learning is a costly process and takes time, thus many local firms are experiencing losses or just break even in their export business. Straddling the domestic and export market plays an important role, as firms make profits in the protected domestic market while they are learning how to meet the cost, quality and delivery standards of export markets. Therefore, most local firms use the domestic market as a means to subsidize the cost of learning to compete, but they also use what they learn through exporting in terms of productivity, quality and design for their domestic market business.

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African-owned firms building capabilities in global value chains (AFRICAP)

AFRICAP examines industrialization in African countries in the context of increasingly globalized production networks coordinated through transnational inter-firm linkages. African-owned firms often struggle to enter new export sectors in manufacturing and agro-processing, to remain competitive within them, and to capture greater value. AFRICAP focuses on firm-level capability building and combines this firm level analysis with an understanding of global value chains and national institutional factors. The project analyzes various channels that facilitate learning among firms: industrial policies, foreign direct investment linkages, and firm-specific networks and experience.

This research is funded by the Danish Council for Independent Research in the Social Sciences and runs from 2016 through 2018.

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Mapping the Technological Capabilities of Ethiopian-owned Firms in the Apparel Global Value Chain

Introduction

The apparel export sector in Ethiopia emerged as a result of a combination of factors, including comparatively low labor costs, duty free access to the EU market under Everything But Arms and to the US market under the African Growth and Opportunities Act, active industrial policies targeting the apparel sector, and the decisions of some EU and US buyers to convince their core suppliers to invest in or source from Ethiopia.¹ Foreign direct investment played an important role in starting the apparel export industry in Ethiopia and in driving its growth, but what makes Ethiopia different from most other Sub-Saharan African countries is the existence of locally owned exporting firms.

In 2016, there were 84 apparel and textile firms in Ethiopia.² This total included 4 spinning mills, 15 textile mills, 16 vertically integrated textile and apparel firms, and 49 solely apparel firms. There were 48 Ethiopian-owned firms, comprised of 32 apparel firms, 8 integrated textile firms, and 8 vertically integrated textile and apparel firms. However, only 14 of these local firms were engaged in exporting in 2016, and only 2 firms were exporting 100% of their production. The other 12 firms produced both for the domestic market and for export. These local exporting firms include a range of ownership types: private, private diaspora, state-owned, and party-owned. They include firms that started out purely exporting, as well as firms that started producing for the domestic market and later began exporting.

For local firms, the comparatively low costs of labor, trade preferences, and the interest of EU and US buyers to source from Ethiopia are important, but taking advantage of the possibilities offered by these factors to enter and remain in the apparel export sector is not easy. In addition to having low production costs, including wages, firms have to be able to deliver consistently products of a certain quality and to meet delivery deadlines. Meeting the cost, quality and delivery requirements of global buyers requires that Ethiopian-owned firms develop new technological capabilities. These capabilities include not only manufacturing capabilities related to production processes, but also non-manufacturing capabilities such as sourcing inputs from across the globe, product

¹ For a detailed discussion of the emergence and evolution of the apparel export sector in Ethiopia, see Staritz and Whitfield (2017b).

² Available figures on the number of firms show some discrepancy. We used the Ethiopian Textile Sector Profile of January 2016 from the Ethiopian Textile Industry Development Institute as a basis, which was adapted based on findings during our fieldwork. For more details, see Staritz and Whitfield (2017b).

development, inventory management and stock holding, logistics and financing, communicating with buyers, and meeting labor and environmental standards. These are the minimum criteria for entering and remaining in the apparel global value chain.

This paper analyses the level of capabilities among Ethiopian-owned firms and their positions within the apparel global value chain, as well as how they have fared and which challenges they continue to face. The motivation behind this objective was developed in the first working paper of the AfriCap project, which argues that technological capabilities are crucial for firms to become and remain competitive in global export sectors and that they have to be conceptualized and assessed in the context of globalized production arrangements in which the majority of trade takes place (Staritz and Whitfield 2017a). The first step in understanding how locally owned firms build capabilities and learn is to assess what capabilities these firms actually have, before we can move to explaining what factors affect their level of capabilities and the channels through which firms learn. We also wanted to get a sense of how much variation there is among Ethiopian-owned firms, and thus it is important to assess local firms' capabilities in a way that allows for comparison across firms.

This assessment of local firms is based on a survey conducted with all 14 of the local firms engaged in exporting in June 2016. The survey questionnaire was designed based on the technological capabilities matrix specified for the apparel global value chain, and the matrix is used as the benchmark for assessing the capabilities of Ethiopian-owned firms. This matrix was first presented in Staritz and Whitfield (2017a) and is explained again in this paper. The 14 local exporting firms are scored based on their function in the apparel global value chain, as well as on indicators of their product, production, end-market and linkage capabilities. Some of the indicators are based on quantitative information, such as number of buyers, while other indicators are a composite subjective score based on several questions that involved a combination of qualitative and quantitative data. The method used in moving from the survey questions to the key indicators for scoring is explained in detail in the paper.

Generally, the 14 local exporting firms have low technological capabilities and struggle to meet export requirements, despite important diversity among them. Two firms have mixed overall scores, because they are vertically integrated textile and apparel firms that use their own textile for their apparel exports but are only exporting made-up textiles (e.g. bed sheets and towels) and also have low capabilities in other areas. Of the 12 other firms, 50% score an overall low on technological capabilities, 25% score medium-low and the remaining 25% score medium. These 12 firms include firms only involved in sewing apparel (CMT) as well as firms also involved in input sourcing (FOB) and textile production (FOB-textile). There are FOB and CMT firms with comparatively higher capabilities, including stable relationships with buyers; and there are FOB and CMT firms that are struggling in developing the capabilities most important for their specific function, which also have more unstable buyer relationships. Generally, there is a trend towards FOB and also vertical integration to FOB-textile. The latter is seen as a way to

become competitive and increase value added in the context of Ethiopia where factors exogenous to the firms result in delays to receive inputs, combined with firms' lack of experience with global inputs sourcing. This allows firms to build on the existence of local textile and cotton production, but requires updating machinery and technology in textiles to be able to fulfill buyers' fabric requirements. There is also a group of local firms that remain CMT suppliers and are focusing on deepening production and product capabilities within that function. Such a strategy seems to be possible and sustainable with certain buyers that prefer CMT as well as understand the context of Ethiopia, particularly in terms of meeting delivery times.

The paper has six sections. The next section discusses what technological capabilities are required to enter the apparel global value chain and remain competitive, as well as to capture more value. This is followed by an overview of the key characteristics of the 14 local exporting firms. The third section discusses how technological capabilities were measured, explaining the use of certain indicators and how scores have been produced. The next sections analyse and compare the scores of the 14 local firms based on the survey results as well as how these technological capabilities scores relate to competitiveness measures. These sections also identify different trajectories among these 14 firms that importantly relate to their specific technological capability scores and competitiveness performance.

Technological capabilities required in the apparel global value chain

Table 1 presents a matrix describing the technological capabilities demanded to enter to, remain competitive and to capture increasing value in the apparel global value chain. The types of categories of technological capabilities in each column reflect what is important to entering and remaining competitive in global value chains, but also reflect that firms can deepen and strengthen their capabilities within a specific node in a global value chain. They include investment, production (with the sub-categories process and product) and linkages (with the sub-categories supply chain, end market, and logistics, finance and support). The vertical axis of the table corresponds with functional upgrading, as moving to different functions in the value chain often requires more complex capabilities. Thus, each row indicates that firms are operating at a particular node in the global value chain. The technological capability matrix for the apparel global value chain was created based on information collected and analyzed from existing literature combined with our previous work on apparel industries (for a more detailed discussion on the matrix see Staritz and Whitfield 2017a).

The apparel matrix has five rows: Cut-Make-Trim (CMT) subcontracting, CMT with direct buyer link, full package/free on board (FOB), original design manufacturer (ODM) and textile vertical integration (Gereffi 1999). The first step to enter apparel global value chains is often through CMT subcontracting. This is related to difficulties in establishing

direct relationships with buyers and often involves subcontracting work for foreign owned firms, but may also include larger local firms with established buyer relationships. CMT subcontracting involves generally three steps: fabric is cut and bundled by style, size and color; the different sewing steps are performed; and the finished products are trimmed, checked for quality control, and packed for shipment. A CMT supplier may also only fulfill the “make” step, but generally they do all three steps. Even these simple activities have to be fulfilled by complying with buyers’ or first tier suppliers’ process and product requirements, which already requires quite high capabilities with regard to production. These requirements include price, quality, reliability, lead times and flexibility, and fulfillment of specific process and product standards, as well as labor and environmental compliance.

In this context, the first upgrading step is normally to strengthen and deepen these capabilities and later on to diversify first tier suppliers and build direct links with buyers. The most important new activity in functional upgrading from being a subcontractor to establishing a direct link with buyers is generally pattern/sample making, which is critical for getting direct orders from buyers. This necessitates at least a small sampling room with a few good technicians that can provide samples at rather short lead times. Within the category CMT, there can be quite a large variation among firms in terms of deepening capabilities. Improving production processes is where firms will put most effort in the initial phase. This might also include investment in automatic cutting equipment, which can help improve quality and save on fabric consumption. But deepening capabilities also involves products, because CMT suppliers can be very different in terms of the complexity and variety of products produced. Hence, after deepening production processes, firms may diversify or change to more complex products before engaging in functional upgrading.

The next functional upgrading step is full package, where the supplier purchases fabric and all other inputs required for apparel production, provides all production services, finishing, and packaging and is responsible up to loading onto the export carriers. The customer provides the design and often specifies textile suppliers. This requires no new functions in production processes and products, but additional functions in financing and managing the sourcing of inputs and part of the transport of inputs and outputs and being able to deal with related risks. Another additional activity that full package suppliers have to fulfill is pricing. Hence, these are new areas of capabilities that are not “simply learnt” on the way while being involved in CMT production. The shift from CMT to full package may be associated with the development of a domestic textile industry, as this makes input sourcing easier. If apparel exporters rely on imported inputs, then some financing mechanism to allow them to get access to foreign exchange and a working capital advance is required at the country level to allow for FOB operations.

The next step involves upgrading to ODM where the supplier is involved in the design and product development process, including the approval of samples and the selection, purchase or production of required materials. This again does not change much the

capabilities required for the production process, but requires particularly new capabilities in product development and design, including investing in Computer Aided Design equipment and capabilities. ODM generally also requires more marketing skills, as own designs have to be actively sold to buyers with the aim to replace buyer designs by own designed products.

It is important to note that upgrading processes may often happen in parallel. For example, on the way to full package supplier, the deepening of production functions that are already required for CMT production may take place. Further, when developing ODM capabilities, diversifying to new buyers that more extensively demand product development and design services can be required, as the investment in these new capabilities needs to pay off. Hence, these investments and the related change in production set up can make it unprofitable for a firm to remain a CMT or full package supplier.

The link to regional or domestic markets complicates this upgrading picture further, as firms that supply these markets in addition to global export markets often fulfill different functions in these various markets. Often they are in charge of input sourcing and also design or even branding in the domestic market (with variation in regional markets) that require related capabilities. Hence, firms can be full package or even ODM suppliers in the domestic market and CMT suppliers in the global export market. They can even be involved in selling their own brands (as own brand manufacturer, OBM) and in retailing in the domestic market alongside CMT export production.

The capabilities needed in different foreign export markets also vary significantly. EU buyers generally demand lower volumes, more complex products, higher flexibility and broader capabilities in the area of product development and design. In contrast, US buyers demand larger volumes, stricter quality standards and the ability to produce to buyer specifications (Gibbon 2008). A share of EU and US buyers, particularly retailers, also increasingly demand full package capabilities from their suppliers. US and EU buyers both demand social compliance, but they have different standards. US buyers generally refer to Worldwide Responsible Accredited Production (WRAP), while EU buyers refer to Business Social Compliance Initiative (BSCI). Regional and domestic buyers are generally less strict concerning social compliance or do not look at this at all. Environmental compliance has also become more important, particularly for textile firms or vertically integrated firms, with the most important certificates including ISO 14001 (environmental management systems) and Ecotex.

With regard to supply chain linkages, there are several categories of inputs required in apparel production: direct raw material inputs (e.g., fabric and yarn); apparel trim and accessories (e.g., buttons, zippers, thread, elastic, labels, hangers); non-essential inputs such as packaging (e.g. cartons and poly bags); capital equipment and machinery parts; and broad services applicable to a range of industries such as transportation, logistics, catering, IT, construction, cleaning, security, human resource and training. Furthermore,

there are possibilities for subcontracting linkages, where subcontractors perform a portion of assembly or finishing activities on behalf of the supplier. The most important supply chain linkages are to the textile sector, as fabrics are the most expensive input into apparel production and the quality of textiles is directly related to the apparel product's quality (Staritz and Frederick 2012).

The last functional upgrading step involves vertical integration into textiles. This generally does not take place in a sequence from apparel production to textile production, but rather most firms that are vertically integrated have always done textile along apparel or started with textile and added apparel later. Textile (fabric and yarn) production requires different capabilities, because it is more capital-, infrastructure-, skill- and scale-intensive (Staritz and Frederick 2012). For investments into textile production, a minimum scale is required due to its scale-intensive nature. Thus, a certain minimum size of the apparel industry locally or regionally is a requirement for textile investments.³ Further, access to finance is crucial for textile investment due to the capital-intensity of fabric and yarn production. Reliable and low-cost infrastructure is also more important for textile production, in particular with regard to electricity and water. Textile production requires more skilled labor with technical experience using industrial machinery as well as quality control personnel. Besides these issues related to local capabilities and the local business environment, sourcing policies of buyers or first tier supplier are also crucial to determine the extent of backward linkages into textile production. Many global buyers and first tier suppliers require suppliers to import inputs from specified textile mills for their orders, which limits vertical integration or local linkage possibilities.

³ This is particularly the case in the woven segment of textile production, as it requires a larger scale.

	Investment	Production		Linkages		
Function	Investment	Process	Product	Supply chain	End market	Logistics, finance & support
CMT – subcontracting	Selection of product(s) (knit/woven, complexity, fashion content, volume); Choosing location; Choosing machinery; Choosing size; Selection & training of workers (management, technicians, machinists); Negotiating contracts with utility & service providers (electricity, water, transport, etc.); Getting access to investment & working capital; Getting access to domestic first-tier supplier(s)	Controlling production costs (meeting price points, working capital/inventory management); Controlling quality (at end of line/multi stage in-line, fulfilling defect/reject rates); Controlling production reliability; Controlling production lead times & flexibility; Machinery, equipment & plant layout maintenance & improvements; Labor productivity improvements & continuous training; Compliance with safety standards; Compliance with labor & environmental standards	Producing according to sample received from first tier supplier; Fulfilling volume requirements (large/small); Increasing variety of products; Shifting to higher value products (complexity, fashion, lead times); Managing & improving volume flexibility; Investing in & improving finishing equipment	Links to other firms & collaboration in collective schemes; Participation in industry association	Managing relationship with first-tier supplier(s) (communication, negotiation, potential audits); Manage first-tier supplier diversification	Containing & re-negotiating contracts with utility & service providers (electricity, water, transport, etc.); Dealing with investment & working capital finance; Relation with training institutes; Relations with consultants; Link to state support institutions & participation in initiatives
CMT – direct buyer link	Getting access to export buyer(s) (contacts, trade fairs); Selection & training of workers with pattern/sample making skills; Selection & training of workers with buyer communication skills		Pattern/sample making based on buyers' design & specifications; Fulfilling sampling lead times	Assurance of systematic separation of buyers' inputs & finished products; Conformity to buyers' storage norms	Managing relationship with buyer (s) (communication/account management, negotiations, audits); Manage market diversification; Manage buyer diversification; Increase market intelligence gathering	
Full Package/FOB/OEM	Selection & training of workers with input sourcing, finance &	Controlling total supply chain costs (total inventory management);		Managing input sourcing (fabric/yarn,	Providing pricing & offer based on buyer request	Managing input sourcing finance & related instruments (L/C);

	textile/trim product skills; Getting access to input sourcing finance & related instruments (L/C)	Controlling total supply chain lead times & flexibility; Supply chain management improvements		trims/ accessories, packing material); Managing support service provision (embroidery, washing, dyeing, etc.); Localization of input & service sourcing; Managing subcontracting linkages	within short lead times	Managing part of transport of inputs & outputs (transport, logistics, customs clearance, etc.)
ODM	Selection & training of workers with design, product development & marketing skills; Getting access to design & product development finance		Investing in Computer-Aided Design (CAD) equipment; Design & CAD capabilities & provision of design services; Product development capabilities & management; Improvements in design & product development	Improving supplier relations & cooperation for product development	Offering & selling own design to buyer(s); Investing in market & buyer research	Managing design & product development finance
Textile	Selection of product (s) (knit/woven, yarn/fabric); Choosing location; Choosing machinery; Choosing size; Selection & training of workers (management, technicians); Negotiating contracts with utility providers; Getting access to investment & working capital & input sourcing finance	Controlling production costs; Controlling quality; Controlling production reliability; Controlling production lead time & flexibility; Machinery, equipment & plant layout improvements; Compliance with safety & environmental standards	Produce according to buyer requirements; Product development capabilities & management; Increasing variety of products; Shifting to higher value products; Add dyeing & laundry facilities; Access to or own laboratory for chemical tests	Links to other firms & collaboration in collective schemes; Participation in industry association (if textile specific); Managing input sourcing (cotton, other fibers); Managing support service provision (dyeing, laundry, etc.); Localization of input & service sourcing	Offering & selling apparel products with own textile inputs to buyer(s); Offering & selling to apparel firms in country or region if textile production higher than required for own apparel production	Containing & re-negotiating contracts with utility & service providers; Dealing with investment & working capital & input sourcing finance; Managing part of transport of inputs (transport, logistics, customs clearance, etc.); Relation with training institutes; Relations with consultants; Link to state support institutions & participation in initiatives

Overview of local firm survey and exporting firms

The categories of capabilities and related indicators described in the apparel global value chain matrix presented in Table 1 were used to develop the local firm survey questionnaire (see Annex 1).⁴ The survey questions identified the functions within the apparel GVC that local firms perform and then assessed their performance of those functions across the categories of capabilities. The questionnaire included questions with both quantitative and qualitative answers, where for the latter firms were asked questions with a range of set responses to choose from as well as open-ended questions. Although the questions were aimed to examine the current conditions of the firms at the moment of the survey (June 2016), firms were asked questions about their initial experience and investment capabilities. The questionnaire was relatively long, but not all questions were relevant for all firms; the specific set of questions asked depended on their functions within the apparel GVC. Additionally, if the interviewee was pressed for time, the survey interview was limited to the core questions for each category of capabilities, which were indicated in bold on the questionnaire. These core questions were asked in all survey interviews in order to have a minimum base of comparable data. However, in a few instances, data on some of these questions are missing.

The questionnaire was administered to 18 local firms that we thought were exporting, based on data collected from the Ethiopian Textile Industry Development Institute.⁵ During the survey process, we found that only 14 of these firms were actually exporting at that time. One of the 4 firms not exporting anymore had been engaged in CMT-subcontracting for a foreign firm, but had stopped and was undertaking investments in new equipment and facilities that would allow it to produce its own fabric for apparel exports. Another firm had previously exported, but had lost buyers and was looking for new ones, and thus was not exporting at the time of the survey despite a state-of-the-art apparel factory. In a similar situation, another firm was exporting only a negligible amount and had effectively decided to stop exporting apparel and was shifting into training in fashion design. Moving in the opposite direction, the final firm had been exporting in the regional East Africa market and producing for the domestic market, and was attempting to move into the international export market, but was still in the process of investing in the right equipment, facilities and scale to produce for the US market. While the experiences of these four firms are very important and inform the overall study

⁴ The order of the questions in the questionnaire does not directly correspond to the matrix, as the questions had to be ordered and asked in a way that made sense in an interview.

⁵ In many cases the questionnaire was administered to the owner or owners of the firm. In some cases this was not possible, and the questionnaire was administered to the general manager or production manager. Where possible the survey interview was held at the site of the factory, or the factory was visited after the survey interview, sometimes to collect missing data from the production manager. Only 1 of the factories located in or around Addis Ababa was not visited, and the survey interview took place with the owner in his Addis office. Concerning the 4 firms that are located in the Amhara and Tigray regions, the survey interviews were carried out with staff in their head office in Addis Ababa, typically the export marketing manager.

on local firm learning and building capabilities, this working paper only considers the 14 local firms that were exporting at the time of the survey, as it was only possible to capture accurate and comparable data for these firms.

The ownership profile of these 14 local firms engaged in exporting apparel and made-up textiles is quite diverse. Most of the state-owned firms in the sector were privatized, but two could not be sold and thus were rehabilitated by the government. The private owned firms can be categorized into different types: one endowment-owned firm linked to the TPLF party, a firm that is part of Al-Amoudi's MIDROC diversified business group, 4 firms owned by Ethiopian diaspora who do not have official citizenship⁶, and all other private owned firms that are either part of a diversified business or single operations.⁷

Table 2 provides a summary of the key characteristics of these firms. The table shows the year when firms started exporting, including whether they started by sub-contracting for another firm; whether they are apparel, integrated textile or integrated textile and apparel firms; what percentage of their production is for the export market (roughly); their main export products; their main end markets; and their function within the global value chain: CMT, FOB or FOB with their own fabric (FOB-textile). There are no Ethiopian-owned firms engaged in ODM for global buyers, but some firms have their own designs and brands in the domestic market, such as Lucy Garments (men's formal shirt brand) and Almeda (t-shirt brand).

The two state-owned firms are both vertically integrated textile mills producing woven fabric and made-up textiles (bedsheets and towels), which makes them different to the other firms that are all involved in apparel production. These state-owned firms export because they were pushed by the government to do so, after the investments in renovation and upgrading their factories. One of them only started exporting made-up textiles in 2015, while the other began exporting in 2009/10 with buyers who supply hospitals in Italy and Switzerland. The latter has ambitions to move into polycotton knit textile and apparel production for the US market, and has a proposal with the government to finance this expansion project through the Ministry of Public Enterprise (which provides zero interest loans) or through the Development Bank of Ethiopia.

What is noticeable for the firms exporting apparel is that Ethiopian-owned firms are selling to the same small group of buyers and that these buyers circulated among local firms to find suppliers that could deliver and to reach required scales. US buyers are concentrated among three sportswear and workwear buyers that source largely basic and some intermediate woven products from Ethiopian-owned firms. Only two other buyers

⁶ This group includes Ethiopians who have lived abroad for a long time and returned to Ethiopia in the 1990s or 2000s. They kept the citizenship of the country in which they were living, but acquired a status in Ethiopia that gives them all the rights of Ethiopian citizens except the right to vote.

⁷ For more background information on local ownership, see Staritz and Whitfield (2017b).

selling to the US were mentioned, and both are intermediaries. With the emergence of large-scale foreign direct investment in the industrial parks, other large US buyers have started sourcing from Ethiopia, but these buyers require large quantities and specifications they cannot get from Ethiopian-owned firms. Hence, up to now they only source from foreign firms that largely have already been their global suppliers and have located part of their production in Ethiopia.

European buyers are slightly more diverse. There are 8 different buyers sourcing basic and some intermediate knit products from Ethiopian-owned firms. The specific types of products among knit or woven that local firms produce are determined by the buyers that local firms are able to secure, and given instability in these relations may change from one order to another. These EU buyers include H&M, which sells largely to the EU but also to the US; Teddy Group and Lidl/Distra, which sell to the EU; Miss Kelani, George and Trimark, which sell to the UK; and Kik that sells to Germany. Most of these EU buyers demand that their suppliers produce FOB. Given the non-availability of suitable local textile inputs and thus the need to import textile inputs, FOB production is very challenging for local firms, due to problems in accessing working capital in foreign currency with which to buy inputs and long, unpredictable lead times for importing and exporting. Only recently have these infrastructural and financing challenges been addressed. T-shirts is the most common product sourced by EU buyers from Ethiopia. Some suppliers are developing their own fabric to be used, particularly for t-shirts, or plan to do so in the future, to deal with the import challenges and to improve value added and lead times.

The most prominent EU buyer that has marketed its move to Ethiopia is H&M. It opened an office in Ethiopia in 2012 and began trying to source from local firms to supply its retail shops in the EU and the US market. As of 2016, only two local firms produced for H&M, as H&M faced challenges to secure suitable and reliable FOB supply from more local firms and has shifted to sourcing mostly from foreign firms in Ethiopia. One of the local firms supplying H&M is an apparel factory and has to import fabric, while the other has knit fabric production and has been approved by H&M to use its own fabric. Several other local firms tried to produce for H&M, but stopped for several reasons. One of the main reasons is that integrated textile and apparel firms that want to use their own fabric had to invest in a new waste water treatment plant that meets the standards set by H&M. This was the case for at least two local firms. Many local firms with only apparel facilities commented that the margins were too low with H&M in relation to their high requirements and particularly when the fabric had to be imported. Hence, supplying H&M was not profitable for them. Part of the issue with profitability, of course, are their low capabilities in production processes, as will be seen in the analysis of the capability scores below, which means that their productivity is too low or they are unable to meet the strict quality and delivery deadlines.

Besides very tight price policies of nearly all global retailers, the price issue seems to be a larger problem for European buyers that compare Ethiopia to other least developed countries from which they can source duty-free (including Bangladesh). For US buyers Ethiopian prices are more advantageous in this regard, as Asian supplier countries have to pay tariffs that are especially high for synthetic and polyester-rich apparel products (up to 32%). This is also an important reason why US workwear and sportswear buyers are sourcing from Ethiopia, as these products have a high synthetic and polyester content and hence preferential market access is more valuable. However, a challenge for a typical large US buyer is volume, as Ethiopian-owned firms are too small to provide the required volumes. This also explains why there are only a few and very specific US buyers sourcing from Ethiopian-owned firms.

On the US side, most of the local apparel firms engage in CMT production for the same three US buyers: Cintas, Champro and Superior Uniform Group (SUG). Cintas and SUG are in workwear, selling polo shirts and uniforms such as scrubs and chef clothes. Champro does sportswear. These buyers source synthetic and polyester rich woven items from Ethiopia given the higher duty advantage compared to cotton products in the US market. These products are also quite standard and have longer delivery and lead times, as they are not part of increasingly shrinking fashion cycles. The owner of Champro has been in Ethiopia for a long time as he was part of the Peace Corps and worked for a NGO in Ethiopia. There seem to be very specific and also personal relations to Ethiopia that led Champro to advocate for getting Ethiopia into AGOA. Champro was one of the first international buyers in Ethiopia, and it started sourcing from one particular local firm before AGOA was signed. Today Champro sources from 3 Ethiopian-owned firms; two of them only work for Champro, while one has an additional US buyer. One supplier just started working with Champro, but the other two have long term stable relationships.

Cintas also started sourcing from Ethiopia early on, but left in 2009 due to performance issues related to just-in-time production and shifted to China. Cintas came back, however, around 2014. Today it works with 2 Ethiopian-owned firms that have Cintas as their sole buyer, but relations have just started due to Cintas' recent come back to Ethiopia. It wants higher volumes but existing suppliers face capacity constraints. In contrast to Champro, Cintas typically sources through a middleman via Hong Kong. SUG came later and now has 3 Ethiopian-owned firms that work with them. SUG also demands higher volumes and would prefer to work only with one supplier, but firms face capacity constraints.

These three US buyers work with CMT suppliers, but SUG is currently helping one local firm to move into full package/FOB production.⁸ There are other buyers supplying the US market that source from Ethiopia. They include AGI Apparel, which is a Pakistani firm

⁸ Standard Textiles, a US workwear and made-up textiles company, also came to Ethiopia but left as it demanded full package production.

that serves as an intermediate buyer for the US market, and another intermediary buyer that sources for Leeds and also Trimark. Several local firms tried to produce for AGI, but it did not work due to late delivery times. Now only one of the local firms is producing for AGI on a FOB basis.

Table 2 Overview of Local Apparel Firms Exporting in June 2016

Firm	Year started exporting	Garment/integrated	Export market share	Main products	Main end markets	Function in GVC
A-FIRM	2009-10	Integrated made up	70%	Yarn, fabric, made up textiles: bed sheets, towel, duvet, pillow covers	Italy and Switzerland (EU)	FOB-textile (made-up)
C-FIRM	2007	Integrated garment	60-80%	Knit: ladies tops, leggings, polo shirts; Woven: trousers	US & EU, particularly UK and Germany	FOB-textile, some CMT
B-FIRM	2015	Integrated made up	5%	Yarn, greige fabric, made up textiles: bed sheets, duvet covers	Norway (made-up textiles), Italy (grey fabric), China (yarn)	FOB-textile (made-up)
J-FIRM	2005 (tbc)	Integrated garment	10-20%	Polo shirts, t-shirts (80%); woven bed sheets (20%)	US & EU, particularly Germany and UK	FOB-textile (made-up), FOB, CMT subcontracting
E-FIRM	2011	Integrated garment	20%	T-shirts	EU	FOB, some with own textile
I-FIRM	2008 subcontract, 2014 direct export	Garment	100%	T-shirts, leggings, dresses	US & EU	FOB
F-FIRM	2006	Garment	80%	Sportswear: baseball pants, polo shirts	US	CMT
G-FIRM	2000 (before registered as KTF)	Garment	100%	Sportswear: baseball, basketball, US football, soccer tops and bottoms	US	CMT
K-FIRM	2003 subcontract, 2010 direct export	Garment	70%	Chefwear	US	CMT
N-FIRM	2007 subcontract, 2015 direct export	Garment	40-50%	Basketball pants	US	CMT
L-FIRM	2007	Garment	60%	Polo shirts	US	CMT
M-FIRM	2016	Garment	10%	Healthcare uniforms	US	CMT
D-FIRM	2008 textile, subcontract, 2013 direct export	Garment	80-90%	T-shirts, polo shirts	US & EU	CMT (US), FOB (EU)
H-FIRM	2014	Garment	30%	Sportswear shorts; t-shirts, jackets, blouses	US & UK	CMT (UK), FOB (US)

Source: Compiled by authors from firm survey data.

Measuring technological capabilities of Ethiopian-owned exporting apparel firms

The questionnaire administered to the 14 local exporting firms aimed to capture information on the categories of capabilities of the apparel sector technological capabilities matrix in order to assess local firms' capabilities. We have scored these firms on the function they perform within the apparel GVC as well as on indicators of four categories of capabilities: product, production process, end-market and linkages. We omitted the investment category in the scoring exercise because the firms gave very similar responses to the indicators of investment capabilities used in the questionnaire, but their responses are discussed in the next section, which provides a broader analysis of the firms' technological capability scores. In the scoring exercise, we also took end-market out of linkages and made it a separate scoring category, and also gave product and production process equal weight. The technological capabilities required in the apparel GVC vary depending on the specific function within the global value chain that local firms are providing; hence, we gave function a separate score.

Of the many indicators we included in the matrix and the questionnaire, we selected only a few indicators for the scoring exercise, in order to make it effective and comparable among the firms. The selection of indicators was based on two factors: relevance of indicators to capture specific capabilities and availability of consistent data on indicators in the firm survey. Hence, some indicators could not be included in the scoring exercise because of limited availability of comparable data across all of the surveyed firms.

The selected indicators for product, production process, end-market and linkages categories include both quantitative and qualitative survey questions. In this way, indicators are not biased towards what can be counted. For qualitative questions, the firm is scored based on a subjective assessment of the firm's performance using the answers provided by the interviewee. Where possible, the direct response of the interviewee is used but crosschecked with other responses in the questionnaire to confirm the validity. Furthermore, we tried to balance indicators that measure quantity with indicators that measure quality within each category of capabilities. This is most important for the product and end market categories. For end market capabilities, the number of buyers is a quantity-related indicator that is combined with stability of buyer relationships in order to also capture the quality or depth of these relationships. For product capabilities, the variety of products is a quantity-related indicator that is combined with complexity of products.

Table 3 presents the technological capabilities scores of the 14 local exporting firms. Given that there are at least two indicators for each of the four categories of capabilities, we made a sum score for each category, which is then turned into a low, medium or high assessment. We created an aggregate score for overall technological capabilities, but

present it in two ways in order to present an overall assessment as well as to keep the emphasis on the individual components and show variation across the capabilities within a given firm. Therefore, the two final columns in Table 3 present the aggregate score first as a list of low, medium or high on function, product, production, end-market and linkages capabilities, and then as an overall score of low, low-medium, medium or mixed (where the scores fluctuate significantly across capabilities). We did not analyze the data in a way that presents an overall numerical composite score, because it is more useful to keep the individual sum scores, as they indicate more about a firm's capability building. The exact method of scoring is explained below in the context of each indicator used in scoring. A summary of the scoring method on each indicator is contained in Box 1. Note that in Tables 2 and 3, the names of the firms have been anonymized.

Function

We scored the firms based on the functions that are carried out by firms in Ethiopia, and this means CMT, FOB and FOB-textile. We included CMT-subcontracting in the scoring scale, such that CMT-subcontracting scores 1, CMT scores 2, FOB scores 3 and FOB-textile scores 4. Some local firms carry out more than one function, as indicated in Table 2. Therefore, we scored a firm based on the dominant function. If a firm carries out two or more functions of equal importance, the scores were averaged, resulting in a score less than a whole integer. In the overall score on function, we assessed scores of 1 or 2 as low, since there were no local firms that are engaged purely in sub-contracting and thus no reason to differentiate in the scoring; a score of 3 is medium; and a score of 4 is high.

Product

Product capabilities capture the complexity of products, the variety of products, fulfilling volume requirements, and dealing with volume flexibility. For firms with direct buyer relationships and particularly FOB firms, it also includes pattern/sample making based on buyers' design and specifications and fulfilling sampling lead times. We chose two indicators: complexity of main product and variety of products. Fulfilling volume requirements and dealing with volume flexibility is partly captured through these two indicators; the latter particularly in being able to produce different types of products as well as for different buyers and end markets with different volume requirements (see below). We did not include an indicator measuring pattern/sample making-related capabilities, as this is strongly linked to different functions that firms pursue in apparel GVCs and hence is already captured in the indicator on function.

Product Indicator 1: Complexity of products. The main products of local firms were assessed as basic, intermediate or complex. Basic products include made-up textiles, t-shirts, tank tops, leggings, trousers, chef wear, and healthcare uniforms. Intermediate products may include polo shirts, sportswear bottoms and tops, ladies tops and blouses, and jackets depending on unit prices. None of the local firms surveyed were producing complex products. Importantly, the type of product alone cannot be directly related to

complexity as there can be, for example, polo shirts that are simple and polo shirts that are intermediate. Thus, the assessment required triangulating type of products with unit prices and wherever possible also being able to see the actual products during the interview. We took what firms reported in the survey as the complexity of their main product or products, and then checked it against what they reported as their main product(s) as well as the average unit price of the main product(s). In some cases, we changed the scoring to reflect the outcome of this triangulation. If firms exported more than one main product, we did the scoring for each of them and then calculated the average score.

Product Indicator 2: Variety of products. The number of different products that a firm exports is assumed to indicate a firm's ability in dealing with more types of products, which requires specific knowledge about each product and skills to manage different product requirements at the same time. This is also linked to buyers' preference for firms that can produce a variety of products, because it would allow the buyer to source different products from one firm. This argument is not that relevant in countries where many firms are readily available to supply different types of products, but in Ethiopia where there are few firms, it is important. If a buyer has established satisfactory relationships with a supplier firm, it often aims for sourcing more products from the same firm. In these cases, being able to supply a variety of products ensures stability in buyer relationships. Product variety also reduces risk, as the supplier firm does not put all its effort into one product and finding buyers for only this product. Hence, it gives supplier firms more flexibility and involves less risk.

There is no global industry standard on variety of products, so we ranked the variety of products according to the survey replies of local firms, where five export products were the highest number given by any firm. Very similar products were counted as one product. The step from one to two products is particularly important as this requires already managing different requirements. Therefore, we assessed firms with only 1 export product as low, 2 or 3 export products as medium, and 4 or 5 export products as high. We did not differentiate between woven and knit products but only in product types, which may involve variation between or among knit and woven products. This is because we do not see production of knit and woven products as more relevant for product variety than different types of products (within knit or woven) from a capability and competitiveness point of view.

Production process

Production capabilities capture controlling production costs, quality, reliability and flexibility, labor productivity and training, and compliance with safety, labor and environmental standards. Our four indicators capture this: labor productivity (costs), not on time delivery (reliability), internal reject rate (quality) and certificates (fulfilling standards). We do not directly cover working capital or inventories, lead or throughput

time, labor turnover and absenteeism rates, and training expenditure for reasons explained below. Investing in new products and processes is crucial and can be seen in R&D expenditures, but none of the local firms in the survey indicated that they spend on R&D.

Working capital or inventory (inputs, work in progress, finished goods) is an important proxy for cost control at manufacturers. For CMT firms that are not in charge of input sourcing, only work in progress inventory is important. Most of the local firms in the survey did not know what their inventory levels were, which already says something about their capabilities related to cost control, and gave rather ad hoc estimates. Furthermore, inventory levels are not comparable across CMT and FOB firms, so we did not include inventory as an indicator for production process capabilities.

Lead time captures the speed at which a firm accepts a customer order and converts this to a delivered product. This includes lead times outside the production process (e.g. such as design and product development, inputs production, input transport, final product transport) and the manufacturing throughput time. The responses on lead time outside of production were very consistent among the local firms surveyed that engaged in FOB (and thus were in charge of input sourcing), while responses on throughput time varied across the firms or was often not known. It is difficult to compare throughput time as this depends on many factors, most importantly type of product and productivity. Therefore, throughput time is partly captured in our labor productivity measure as well as the not on time delivery indicator. Furthermore, the issue of lead time is quite different for FOB firms, which struggle with issues related to external conditions that increase lead times, compared to CMT firms that are not responsible for lead time outside of production.

Labor turnover and absenteeism rates as well as training expenditures are also not directly included in the scoring. The effective use of human resources is important for all dimensions of competitiveness. First, if human resources are managed effectively, generating worker commitment and stability, it can be seen in low labor turnover and absenteeism rates. However, data on labor turnover was very similar among most local firms. Reported rates of labor turnover were generally high among all firms, indicating that it is an industry-wide problem. It is a general country problem arising in the early stages of industrialization in a largely agrarian economy, in which a working class accustomed to the rhythm and tasks of jobs in factories is in the process of being formed.⁹ According to survey responses, managers indicated that workers will leave one factory for another in response to small improvements in wages and working conditions. There is also an important correlation between labor turnover and labor productivity, as managing labor turnover is an important prerequisite to increasing productivity. Many survey respondents noted that they could raise their productivity level, but then labor turnover resulted in falling levels of productivity and starting over with training new

⁹ The fact that working classes have to be formed is often overlooked in more technical economic analyses, but is an essential process in capitalist economic transformation. The best scholarship making this point in relation to the origin of industrial capitalism in Great Britain is E.P. Thompson's *The making of the English working class* (London: Penguin Books, 1980).

employees.

Second, if human resources are developed by investing in employees, it can be seen in training expenditures. However, local firms could not report their expenditure on training in the same way, if at all, which made it difficult to get reliable and comparable data among the surveyed firms. Local firms did provide training, but it was often on-the-job training focused on initial learning of basic operator skills, which was carried out in-house (and thus not counted as training expenditure), or firms sent their workers to TIDI for generally free of charge training. Local firms also used foreign experts with experience in the apparel global value chain, who came from important supplier countries such as Bangladesh, Sri Lanka, or Pakistan, to train their workers as well as middle management staff. These expatriates were initially funded through a scheme at TIDI with support from donor agencies, and continue to be funded by such schemes but also increasingly by the local firms themselves.

In sum, labor turnover, absenteeism, and training expenditure all influence labor productivity, so we decided to take labor productivity as a key indicator. It is also relatively easier to capture comparable data on labor productivity, as most local firms had participated in a study with TIDI that measured their productivity, or knew their level of productivity against the international standard for other reasons.

Production Indicator 1: Labor productivity. Labor productivity is measured in terms of how long it takes a firm to make its main product(s) in relation to the international standard, which is based on the standard allowed minute (SAM). The SAM of a product varies according to the work content or to number of operations, length of seams, fabric types, stitching accuracy needed, sewing technology to be used, and so on. The SAM is then compared to the time needed by an operator or a production line in a given firm.¹⁰ Firms were scored using the international standard of benchmarking with China, where we defined low as below 60% of the international standard, medium as 60 to 75%, and high as above 75%. A problem with scoring productivity is that it varies considerably within firms as the result of low volumes, changing products and styles frequently, and changing buyers. Hence, we asked firms to provide an average. The two made-up textile firms did not have productivity data for their products, because they had not conducted time studies and benchmarking.

Production Indicator 2: Not on time delivery to buyers. On time delivery captures the percentage of products delivered on-time and in-full to customers with no defects and

¹⁰ For example, an operator was doing an operation of SAM 0.50 minutes. In an 8 hours shift day she produces 400 pieces. So according to the efficiency calculating formula, that operator's overall efficiency is as follows $(400 \times 0.50) / (8 \times 60) \times 100\% = 200/480 \times 100\% = 41.67\%$. This calculation can be replicated for a whole production line and factory. See <http://guidingmetrics.com/content/key-apparel-industry-metrics/>.

with the right documentation. On time delivery is a big issue for all local firms as the result of conditions in Ethiopia that are exogenous to the firms, such as access to inputs within the country, access to foreign exchange, distance to port, and options for transportation. Meeting the delivery deadlines set by buyers is a particularly large challenge for FOB firms that are in charge of and responsible for input sourcing, in contrast to CMT firms where buyers are responsible. FOB firms rely on access to foreign exchange with which to purchase inputs, reliable delivery of inputs and the quality of inputs supplied, in order to supply the finished products to buyers on time. Hence, all FOB firms scored worse on this indicator. If local firms are late on delivery, or later than a maximum amount of days past the delivery deadline that the buyer allows, then buyers generally reject the order and local firms lose the payment, and even lose the buyer. Not on time delivery was scored in terms of often, sometimes and hardly ever, and measured in terms of not on time deliveries as a percentage of all deliveries. Taking into account the global industry standards as well as the overall experience of the Ethiopian apparel industry, ‘often’ was defined as 5% and above, ‘sometimes’ as between 2 and 4%, and ‘hardly ever’ as 1% and below.

Production Indicator 3: Internal reject rate. There is a difference between customer return rates and internal reject, rework and scrap rates. Customer returns reveal quality satisfaction of buyers but offer an insufficient indication of internal quality performance. Firms may have poor internal production systems, but provide quality products by following stringent checks at the end of the processes; this system is costly. Firms need to reduce their internal reject rates in the final checking station in order to provide sustainable and efficient quality performance. Hence, the lower the internal reject rate is the better the firm’s ability in maximizing quality and efficiency. The internal reject rate was measured as the share of internally rejected products. These products can then be reworked, if possible, or scrapped. For scoring, we considered the global industry standards as well as the overall experience of the Ethiopian apparel industry. We scored a 5% and above reject rate as ‘often’ reject, between 2 and 4% as ‘sometimes’ reject, and 1% and below as ‘hardly ever’ reject.

Production Indicator 4: Certificates for standards. Certification indicates production processes or products that meet an international business standard. There are different certificates regarding quality management systems, labor and safety standards, and environmental standards. ISO 9001 is the most common certification for quality management systems, and it is administered by accreditation and certification bodies that conduct independent audits. Certification to these ISO standards does not guarantee any quality of end products; rather, it certifies that formalized processes are being applied. On the social compliance side, the most important certificates are WRAP for US buyers, and BSCI for EU buyers. Environmental compliance is only important for textile firms or vertically integrated firms. The most important ones include ISO 14001 (environmental

management systems) and Ecotex. Some global buyers have strict Codes of Conduct that are equivalent to international certificates. Therefore, for firms supplying these buyers, we also took into account these Codes of Conduct in the scoring.

Certification is expensive; it involves paying for accreditation and annual maintenance of the certification, as well as paying for the services of a consultant to help the firm initially to meet the certification requirements. Therefore, the number of certificates that a firm has can be correlated with a firm's financial position. Firms that have relatively easy access to finance are more likely to have certificates, and in some cases government or third party support (such as donor agency support funds) may help to finance the certification process. We scored a firm low if it had no certificates, medium if it had a quality management certificate (ISO 9000), and high if it had a quality management certificate and at least one of the social compliance or environmental compliance certificates.

End markets

The end market capability category refers to the overall capabilities of firms to meet the specifications of buyers in different markets, their ability to establish stable relations with buyers, and their market knowledge and promotion skills. Hence, this category captures managing relationships with buyers (communication, account management, negotiations, audits), managing buyer and end market diversification, and market intelligence gathering. We focused on buyer relationships, including their numbers as well as the stability of the relationships.

End market Indicator 1: Number and dominance of buyers. It is assumed that the higher the number of direct buyers that the firm has, the higher the capability of the firm. Having more buyers reduces risk, allows a better bargaining position, and shows that the firm is able to manage more buyer relationships. We scored a firm low if it depended on one buyer, medium if it depended on two buyers, and high if it had 3 or more buyers. If a firm had more buyers but depended largely on one or two buyers for most of its exports, then we scored this as 1 or 2 buyer(s) respectively.

We did not include end markets as a separate indicator as this correlates with buyers. With the exception of one European buyer that also sells to the US (H&M), all other buyers and intermediaries sourcing from local firms sold either to the US or to the EU. Further, differences in these end markets and hence different sourcing requirements of related buyers exist for Ethiopian-owned firms but are not as pronounced as in other supplier countries (see Morris et al. 2016). This is the case because the typical large volume US buyers are not sourcing from Ethiopian-owned firms, but only a few US workwear and sportswear buyers that also accept lower volumes even though they complain about capacity constraints (see above). Volumes are, however, generally still larger for US buyers. In some other areas, there are differences between EU and US buyers, particularly

in terms of EU buyers being stricter in demanding FOB production with some US buyers even preferring CMT, as well as the use of different types of standards and certificates. Hence, serving different end markets requires firms to deal with buyers coming from different country backgrounds and related specifications and standards. Clearly, this does not apply to firms that supply one buyer that sells in both the US and EU, such as H&M, but rather for local firms having distinct buyers from different end markets. Another pragmatic reason for not including end markets as a separate indicator was the need to balance between quantity and quality indicators, in order to give the qualitative buyer stability indicator the same weight as the quantity-related measure. Having two quantity indicators would have downplayed the quality of the buyer relationships.

End market Indicator 2: Stability of buyers. In the survey, firms were asked to rate their relations with their main direct buyers as stable, somewhat stable or ad-hoc. If they rated their relations as ‘stable’ or ‘somewhat stable’, then they were asked with how many of the buyers they worked for more than a year. We further asked if firms had lost buyers in the past, and if so, how many. Thus, we could cross-check what firms reported in the survey in terms of describing their relationships with buyers with what they reported as their main buyers and history with buyers. In some cases, we changed a firm’s scoring on buyer stability to reflect the outcome of this triangulation of responses. Hence, a subjective assessment was applied in reaching a final score of low (unstable/ad hoc), medium (somewhat stable), or high (stable).

Linkages

The linkages category captures links with other apparel firms (horizontal) and links with input suppliers and service providers (vertical), as well as relationships to important institutional actors such as the industry association (Ethiopian Textile and Garment Manufacturers Association, ETGAMA), the public agency responsible for the sector (Ethiopian Textile Industry Development Institute, TIDI), public universities providing industry-specific education or research and development, and other government provided services. We selected three indicators that match these three types of linkages – links with other apparel firms, links with input and service providers, and links with public sector institutions. The scoring on each of these indicators is based on several qualitative questions and the overall score is based on our subjective assessment.

We included holding executive positions at ETGAMA in the indicator on links with public sector institutions rather than in the indicator on links with other apparel firms, because we cannot assume that having executive positions at the industry association necessarily means stronger links with other firms. In least developed countries, the primary role of industry associations initially is to engage with government officials and civil servants, and not to increase linkages between firms through sharing knowledge, collective marketing schemes and so on. This was also shown through the survey responses regarding the benefits for their firm of being a member of ETGAMA and

through additional information collected from interviews that revealed that the purpose of ETGAMA is largely to have a collective voice in discussions with the government and donor agencies, or other third party support. It is strong in this regard, but weak in terms of creating linkages among firms.

Linkages Indicator 1: Links with other apparel firms. This indicator assesses direct interaction and cooperation between a local firm and other local and foreign apparel firms (including subcontracting relations) as well as participation in collaborative schemes. Four questions in the survey were used to score a firm on this indicator. First, firms were asked about their principal sources of information and given a list of possible answers, which included local firms and foreign firms as choices. Second, firms were asked if they participated in any kinds of collaborative schemes (formal or informal) with other firms. If they said yes, then firms were asked to list the type of activities or schemes in which they participated. Third, firms were asked how often they sought knowledge or advice from other firms (not very often, sometimes, very often). Fourth, we asked firms if they sub-contract a part of their production to other firms, and also whether they did any sub-contracting for other firms. Based on the survey responses, we made a subjective assessment as to whether a firm had low, medium or high links with other apparel firms.

Linkages Indicator 2: Links with input and service suppliers. This indicator assesses the relationships firms have with local input suppliers including direct raw material inputs such as fabric and yarn, trim and accessories (such as buttons, zippers, thread, elastic, labels, hangers), and capital equipment and machinery parts, as well as non-essential inputs such as packaging. The last category also includes broad services applicable to a range of industries such as transportation, logistics, catering, IT, construction, cleaning, security, human resource and training. Such linkages are important as they show that firms have relationships along the value chain and capabilities to engage and deal with the different providers required for apparel production.

Clearly, this indicator depends importantly on if such input and service providers exist at all in Ethiopia, which is limited in some areas, and also if firms are CMT or FOB suppliers, and in the case of the latter, to what extent the buyers stipulate the input suppliers that firms have to use. For CMT firms, all of the inputs are sourced by the buyer, generally from abroad, and sent to the supplier firm. For FOB firms, we asked from where they sourced inputs and whether their buyers nominated input suppliers. We also asked what percentage of their inputs were sourced locally, which types of inputs, and whether this could be extended or not. For FOB-textile firms, we asked where they sourced their yarn, if they did not have spinning facilities, and if they did, what percentage of cotton was sourced locally. For all firms, we asked whether firms purchased business services or support services such as embroidery, printing and dyeing or whether they provided such services in-house. We also asked about their relations with transport and logistics service providers. Based on the survey responses, we made a subjective assessment as to

whether a firm had low, medium or high links with local input and service suppliers.

Linkages Indicator 3: Links with public sector institutions. This indicator assesses a firm's capabilities to link and interact with public sector institutions, which is relevant for the sustainability of firms in terms being able to react to policy changes or influence policies and being able to access and take advantage of various public support programs. This also captures how pro-actively and strategically firms use support programs to improve their performance and ensure learning and capability building. But it also shows how effective and useful firms see the activities of the government in terms of furthering the sector and how these interventions could be improved.

We asked several questions related to public sector linkages. First, we asked if the firm had relationships with any public-sector institutions, and if so, to list which ones and to indicate how strong the links were. We also asked if the government provided support services to the textile and apparel industry, and if so to list the services and to indicate whether the firm had participated in and benefited from those services. We further specifically asked whether the firm interacted with any education or public research institute. Finally, we asked about the firm's ability to access investment and working capital, and if it had accessed such finance through state-owned banks at special rates. More generally, we asked about publicly provided services such as customs clearance, and we asked about the firm's access to foreign exchange, given that the foreign exchange market is not liberalized in Ethiopia. The responses to these questions provided broader insight into government-business relations, and whether firms were actively engaged in discussions with the government to improve public institutions and regulations that influence firms' performance. As discussed above, we also included in the scoring for this indicator if firms held executive positions at ETGAMA. Based on the survey responses, we made a subjective assessment as to whether a firm had low, medium or high links with public sector institutions.

Table 3 Ethiopian-owned Apparel Firms Technological Capabilities Scores

Firm	Function	Product			Production					End-market			Linkages				AGGREGATE SCORE	
		Complexity of main products	Variety of products	Sum score*	Labor productivity	Not on time delivery	Internal reject rate	Certificates	Sum Score**	Nr. & dominance of buyers	Stability of buyer relations	Sum Score*	Links with other firms	Links with local suppliers	Link with public sector institutions	Sum Score***		
A-FIRM	3.5 H	1	1	2 L	2	1	2	3	8 M	3	3	6 H	2	2	3	7 M	HLMHM	MIXED
B-FIRM	3.5 H	1	1	2 L	X	X	X	3	X ¹¹ L	1	2	3 L	1	2	3	6 M	HLLLM	MIXED
C-FIRM	3.5 H	1.5	3	4.5 M	2	1	2	3	8 M	3	3	6 H	1	2	3	6 M	HMMHM	MED
D-FIRM	2.5 M	1.5	2	4 M	2	3	2	2	9 M	3	3	6 H	2	1	2	5 L	MMMHL	MED
E-FIRM	3.5 H	1	1	2 L	1	2	2	2	7 M	2	2	4 M	2	2	2	6 M	HLMMM	MED
F-FIRM	2 L	2	2	4 M	2	2	2	1	7 ¹² M	1	3	4 M	1	1	2	4 L	LMMML	MED-LOW
G-FIRM	2 L	2	2	4 M	2	2	2	1	7 M	1	3	4 M	1	1	2	4 L	LMMML	MED-LOW
H-FIRM	2.5 M	2	3	5 M	1	1	1	1	4 L	2	3	5 M	1	1	2	4 L	MMLML	MED-LOW
I-FIRM	3 M	1	2	3 L	1	2	2	2	7 M	1	2	3 L	1	2	2	5 L	MLMLL	LOW
J-FIRM	3 M	1	2	3 L	1	1	1	3	6 L	2	1	3 L	1	2	2	5 L	MLLLL	LOW
K-FIRM	2 L	1	1.5	2.5 L	1	3	1	3	8 M	1	2	3 L	1	1	2	4 L	LLMLL	LOW
L-FIRM	2 L	1.5	1	2.5 L	1	3	1	2	7 M	1	1	2 L	2	1	2	5 L	LLMLL	LOW
M-FIRM	2 L	1	1	2 L	1	X	2	2	6-8 L/M	1	1	2 L	1	1	2	4 L	LLLLL/ LLMLL	LOW
N-FIRM	2 L	2	1	2.5 L	1	X	1	1	4-6 L	1	1	2 L	1	1	2	4 L	LLLLL	LOW

¹¹ We lacked survey responses on production. Based on the information we know about this firm, we made an assessment.

¹² Production scores for this firm were slightly adapted from interview answers to include our own assessment. Not on time delivery scores were uncertain as inconsistent with other firms' reported figures.

Box 1: Key for Scoring of Indicators of Technological Capabilities

Functions: CMT-Subcontracting=1, CMT=2, FOB=3, FOB-Textile (meaning with own fabric)=4.

Low= 1-2, Medium= 3, High= 4.

Complexity of products: Basic=1, Intermediate= 2, Complex=3.

Variety of products: Low (1 product)= 1, Medium (2 or 3 products)= 2, High (4 to 5 products)= 3.

Labor productivity: Low (below 60%)= 1, Medium (60 to 75%)= 2, High (above 75%)= 3.

Not on time delivery: Often (5% and above)=1, Sometimes (between 2 and 4%)= 2, Hardly ever (1% and below)= 3.

Internal reject rate: Often (5% and above)=1, Sometimes (between 2 and 4%)= 2, Hardly ever (1% and below)= 3.

Certificates: Low (no certificates)=1, Medium (1 certificate)= 2, High (2 certificates and more)= 3.

Number and dominance of buyers: Low (dependent on 1 buyer)= 1, Medium (dependent on 2 buyers)= 2, High (3 or more buyers)= 3.

Stability of buyers: Low (unstable/ad hoc)= 1, Medium (somewhat stable)= 2, High (stable)= 3.

Links with other apparel firms: Low= 1, Medium= 2, High= 3.

Links with local input/service suppliers: Low= 1, Medium= 2, High= 3.

Links with public sector institutions: Low= 1, Medium= 2, High= 3.

*Sum Score key for Product and End-Market: Low= 2-3, Medium= 4-5, High= 6.

**Sum Score key for Production: Low= 4-6, Medium= 7-9, High= 10-12.

***Sum Score key for Linkages: Low= 3-5, Medium= 6-7, High= 8-9.

Analyzing the capabilities of Ethiopian-owned firms

The technological capabilities scores of the 14 local exporting firms presented in Table 3 show that a majority of the firms have low capabilities. A-Firm and B-Firm have mixed scores, which results from their score on function as FOB-textile and thus High, but they only produce made-up textiles, such as bedsheets and towels, and their scores on other capabilities are also lower. Notably, there is significant variation in the production and end-market capabilities between the two firms, which is likely due to the fact that B-Firm only just began trying to export made-up textiles while A-firm has exported since 2009.

Of the 12 other firms, 50% score an overall Low, 25% score Medium-Low and the remaining 25% score Medium. Two out of three of the firms that scored an overall Medium are vertically integrated firms producing apparel on a FOB basis, some of which are produced with their own fabric. However, being vertically integrated did not ensure higher scores on other capabilities. The third firm scoring Medium is engaged in both CMT and FOB but scored comparatively high on most other capabilities. Of the three firms that scored Medium-Low, one is engaged in both CMT and FOB. The other two Medium-Low firms are CMT firms, which have built higher capabilities than the other four CMT firms that scored an overall Low. I-Firm and J-Firm, the other two firms with an overall Low score, were engaged in FOB, but struggle more than the other FOB firms to build the capabilities required for that function. It is useful to analyze the performance of the local firms in each category of capabilities, before discussing some of the overall findings regarding firms' capabilities based on the survey results. To interpret these findings it is also important to identify different firm trajectories, which is done below.

Let us start with investment capabilities, which were not presented in the scoring due to lack of variation but which are very indicative about the firms' trajectories in learning and the evolution of the export apparel industry. The survey questions focused on *initial* investment capabilities, and thus do not capture much about later investments, which many firms were undertaking at the time of the survey. Six of the local firms in the survey were among the firms that benefited from the government's industrial policy in the mid-2000s to support local investors to enter apparel exports through investment loans from the Development Bank of Ethiopia (see Staritz and Whitfield 2017b). The survey revealed that none of them had previous experience in managing a factory or in textile and apparel production in particular. From interviews with other firms that benefited from these DBE loans, but were not among the exporting firms at the time of the survey, this statement applies generally to all of the local firms that received loans in the mid-2000s. Most of these early local export-oriented investors did a feasibility study, as it was required for the DBE loan, but it turns out that the feasibility studies were all written by the same local consultancy firm, were basically the same, and thus all misunderstood the availability of

local inputs and the nature of the apparel global value chain.¹³ As a result, these firms were not prepared for what was required, and neither was the DBE or the Ministry of Industry, which we think explains why a large portion of the early investors did not survive. The firms that survived did so because they built relations with one buyer early on and maintained that relationship, often offering sub-contracting opportunities to other local firms.

None of the other firms had carried out a feasibility study prior to investment. The state-owned vertically integrated textile firms had accumulated experience in the sector, but mostly in textile production, and Almeda (EFFORT firm) was established in the latter half of the 1990s primarily as a textile firm and only later increased the apparel component. The remaining firms entered apparel exports either by sub-contracting for existing local firms or Ayka Addis, the first and largest foreign (Turkish) firm exporting apparel, or using knowledge built up through producing apparel for the domestic market. For example, D-Firm and E-Firm started in apparel through sub-contracting, while H-Firm drew on its experience in the domestic market.

All initial local investors had problems with accessing managerial expertise and skilled labor in the apparel export sector, as none existed in Ethiopia at that time. Only after 2010, with the establishment of TIDI, the government agency in the sector, did local firms began to use expatriate staff to share knowledge and train workers, through schemes that subsidized the cost of bringing foreign experts from abroad. Since then, TIDI has also offered training for new workers that many firms have used.

In terms of product capabilities, most of the firms produce basic products or intermediary products that are more sophisticated versions of the basic products they produce, such as polo shirts and sportswear. Only H-Firm produces intermediate products such as women's blouses and outdoor jackets, which results from the type of products demanded by one of the firm's buyers. In general, firms' buyers determine what they produce, and thus variation in complexity is explained by variation in buyers. However, firms that have been producing basic products successfully for the same buyer for several years are often asked to begin producing more complex products gradually. Some had challenges in fulfilling these requests as producing more complex products led to low productivity and these firms hence prefer to focus on a few basic products. Half of the firms specialize in one type of product, while the other half of the firms have diversified into two or more types of products. The variety of products is not related to whether a firm is producing basic or intermediate products, but again largely determined by the buyers' demands and by the number of buyers. In the case of E-Firm, however, it is determined by the firm's strategy

¹³ The feasibility studies by the local consultancy assumed that the fabric produced by local textile mills was good for exports, and more generally that raw material inputs were available locally. Thus, the local investors did not realize that they would have to import all inputs for export apparel production, and few seem to have understood the nature of CMT and FOB production.

to specialize in t-shirts produced with its own fabric and thus the firm recently shifted to buyers whose demands fit with their strategy.

In terms of production capabilities, all firms struggle with labor productivity due to high labor turnover, as discussed earlier, but also due to the limited supply of local experienced managers and supervisors, lack of sophisticated systems to incentivize increased worker productivity, and poor monitoring and supervision. Firms were in the process of applying for certifications which would help improve management systems (ISO) and safety (BSCI/WRAP), but certification does not necessarily mean high productivity, as indicated by J-Firm and K-Firm, which have many certificates but struggle with labor and management systems. In the absence of local managers with experience in the sector, this experience has to be imported by hiring expatriates. The expatriates are needed not only to improve the production, management and labor systems, but also to share how they do what they do (their tacit knowledge) with local management and supervision staff. Despite generally low labor productivity across the firms, there is some variation, which is not due to geographic location, but rather to different supervision and performance incentive schemes, indicating that some firms have learned and put in place better systems than other firms. The four apparel firms with medium labor productivity were better able to manage labor turnover and had labor retention strategies in place; however, of these four firms, the scores of two of them were at the lower end of the spectrum, indicating that they were still struggling.

The performance on internal reject rate is better than on labor productivity, with more firms scoring medium than low. In general, the quality of the products has improved, but the speed at which products are produced is slow relative to international standards. Productivity is important for competitiveness and profitability, especially for CMT firms, where the labor-intensive assembly process is the only place where efficiency gains can be made. Low labor productivity does not seem to affect not on time delivery, which is not much of an issue for CMT firms but a major constraint facing FOB firms, which have lost buyers or had orders rejected due to missing the delivery date. Not on time delivery for FOB firms is primarily a function of delays in accessing foreign exchange with which to buy inputs, inexperience and lack of trust relations with input suppliers abroad, and slow and unreliable transport and logistics systems. Recently the Development Bank of Ethiopia created new financial instruments for local exporting firms in an attempt to solve the problem of slow access to foreign exchange for importing inputs for export orders, which hopefully will solve part of the problem. But the other half of the problem remains the absence of input sourcing experience within the FOB firms and the need to build up relations with input suppliers abroad (as long as there are no local input providers) in terms of availability, quality, price and delivery time. There is a shortage of locals with export merchandising experience, although there are now some degrees in export merchandising offered in Ethiopian universities. Therefore, local firms have to hire expatriates to transfer this knowledge to local staff, as well as use those expatriates'

existing networks and contacts with input supplier firms in China, India and Pakistan. In general, the firms that scored an overall Low on production capabilities do not have enough management level staff, and sometimes owners try to run everything.

Local firms' end market capabilities, which also include marketing capabilities since the indicators focus on number of buyers and stability of buyers, vary considerably. Half of the firms scored Low, while the other half scored Medium or High. Six out of seven of the local firms that scored Low on end market capabilities did so because they were dependent on one buyer and had unstable or only somewhat stable relationships with this buyer. The outlier firm, J-Firm, scored Low because although it had more than one buyer, it had very unstable buyer relationships due to its inability to deliver on time *and* meet quality parameters. Of the four firms that scored Medium in end market capabilities, two firms, F-Firm and G-Firm, have only one buyer, but scored Medium due to their long stability with this buyer. The other two firms, E-Firm and H-Firm, had two buyers and stable or somewhat stable relationships. Three firms scored High as they had two or more buyers as well as stable relationships with these buyers. The six local firms that had stable relationships with buyers generally had quite specific buyers. They had either one US sportswear buyer who has been in Ethiopia for a long time or an US workwear buyer. These buyers accept lower volumes, have comparatively low delivery time standards and tend to help suppliers to meet their requirements and standards. The same is true for another US workwear buyer; however, relationships with local firms are only somewhat stable or unstable, which is probably related to the only recent come back of this firm to Ethiopia. The other firms with stable relationships had five EU retail buyers that seem to be more attached to Ethiopia as a sourcing location. However, the most prominent of these retailers, which also has opened a sourcing office in Addis Ababa, has struggled to find and develop suitable local suppliers and stopped relationships with one of its local firm suppliers after we conducted the survey.

In terms of linkages capabilities, the local firms generally perform poorly, with 10 firms scoring Low and 4 firms scoring Medium. Of the 4 firms that scored Medium, 3 did so because they had high links with public sector institutions as a result of being a state-owned firm or being the current chairman of ETGAMA. The fourth firm scored Medium due to medium scores on all three indicators, including linkages with other firms, where most firms scored low.

In general, there were limited linkages among local firms, and between local and foreign firms. Survey responses indicated that ETGAMA, the industry association, was good at lobbying and liaising with the government, but no respondent mentioned that they used it as a platform for sharing and working together. Some respondents explicitly said that the industry association was limited in this regard and that local firms were not working together. Based on survey responses, we could see that there were small groups of local firms that have closer relations to each other, and that these groups had emerged from

earlier relations where existing local firms helped new firms learn as they entered the industry. Respondents mentioned limited links with foreign firms, and when foreign firms were mentioned, it was mostly as suppliers of yarn or fabric. The Turkish firm Ayka Addis was the only firm mentioned in terms of sub-contracting to local firms. However, foreign firms in apparel exports entered Ethiopia only recently, especially with the establishment of the Bole Lemi industrial park that opened in 2015/16 and several others industrial parks opening in 2017 and 2018 (see Staritz and Whitfield 2017b). Hence, there may be more opportunities for subcontracting in the future, but the business model of transnational producers that dominate recent foreign investments and their global production and sourcing networks makes this also questionable. ETGAMA cannot facilitate linkages between local firms and foreign firms, because foreign firms are not members of the association.

Local firms also showed limited linkages with local suppliers. This is predominantly because there are not many local suppliers of export quality fabrics, trims and accessories. The firms that scored Medium on this indicator were typically vertically integrated firms that sourced cotton or yarn locally, although I-Firm was able to source some export quality fabric locally through relations developed with Ayka Addis.

Linkages with public institutions were generally Medium, because all local firms interact with and benefit from the services provided by TIDI and the Development Bank of Ethiopia. For example, all of the firms responded that they benefited from the TIDI scheme offering financial support to hire expatriates, and probably found it to be the most useful service currently offered. Some respondents mentioned that the government subsidized the cost of getting ISO certification and the cost of participation in international trade fairs. In addition, many respondents mentioned that they had accessed their initial buyer and/or current buyers through the Ministry of Industry, which had given their contacts to prospective buyers. Furthermore, the executive members of ETGAMA play an active role in liaising with TIDI, DBE and government officials in the Ministry of Industry, and have been instrumental in developing solutions to challenges that exporting firms face that result from factors exogenous to the firms, such as import duty schemes, letters of credit and foreign exchange access.

However, most respondents mentioned that TIDI and DBE are still learning, themselves, about the sector. Therefore, although TIDI offers good services and has state-of-art facilities for training, it is not making the most of these services because it has limited knowledge. For example, TIDI arranges expatriates for the local firms, but does not necessarily get good ones because TIDI staff do not know what qualities to look for in applications. As a result, many local firms are now undertaking this process themselves: finding and hiring expatriates to come to Ethiopia, but it is expensive and time consuming. In other words, some local firms have 'outgrown' TIDI, whose services no longer meet their needs and thus reached the limits to which they can benefit from strong linkages.

Additionally, many respondents commented that DBE staff do not understand the apparel and textile sector, and thus do not understand and evaluate their proposals for investment and expansion financing fairly and quickly. This could also be the result of DBE taking a more cautious stance on investment in the sector due to the outstanding debts of the initial local investors, which for many of them had to be rescheduled due to poor performance in the first five years. In sum, linkages to public institutions such as TIDI and DBE have been important in achieving changes in policy and financial instruments, but there is a limit to learning that can result from these linkages if these public institutions are not also learning at the same time.

Most local firms have linkages with public education facilities, most importantly Bahir Dar University and the vocational training schools. Graduates from Bahir Dar University were present in most firms at the management level, even though there are complaints about their training not being practical enough. The biggest issues were mentioned with regard to vocational schools, which were criticized for using outdated machines and technologies and hence producing graduates that did not have the skills required for working in export production.

There is a trend towards vertical integration, at least for local firms that aim to move to FOB production and particularly for firms that already have knitting facilities that produce fabric used in apparel sold on the domestic market, but need to invest in better machines in order to produce knitted fabric of export quality. Vertical integration seems to help local firms survive and become competitive, especially in the context of Ethiopia where factors exogenous to the firms result in delays to receive inputs, combined with firms' lack of experience and relations with input suppliers in Asian countries. For some firms it seems easier to produce their own knit fabric for t-shirts and polo shirts, especially given the history of textile production in the country and thus the presence of experts in textile production and machinery, than to build up the capabilities required to source inputs from all over the world and being dependent on long and unreliable lead times related to local transportation and logistics infrastructure. Global input sourcing capabilities include having large orders and thus importing high enough volumes to be able to negotiate on price; putting in place systems to meticulously check the quality of inputs and build a reputation with input suppliers so that they do not send poor quality fabric and accessories; and linking input sourcing with skills in export merchandising. Because many Ethiopian-owned firms are producing basic products, the option of producing pure cotton products using their own textiles is feasible, particularly in the EU market where exports are concentrated in knit products. Given that there are currently only a few local firms with spinning and knitting facilities, they can access cotton locally and import when necessary. Firms with only knitting facilities are able to buy cotton yarn from other local spinning and textile companies. The US market prefers fabric made from cotton-polyester blends or pure polyester, which makes vertical integration more difficult given the unavailability of polyester fiber and textiles in Ethiopia. But some local firms

that want to broaden their market opportunities also with US buyers are investing in facilities that can handle such blends, and import polyester yarn.

To interpret the capabilities of local firms and understand their development and related challenges, it makes sense to identify certain trajectories among Ethiopian-owned firms. Based on the overall survey results and the broader picture of the apparel sector in Ethiopia presented in this paper and in Staritz and Whitfield (2017b), we identified four trajectories among local firms.

The first trajectory includes firms that started in textile production for the domestic market, are vertically integrated and produce now for the domestic market and export markets. This includes the two remaining state-owned firms, one privatised state-owned firm that was in textile production, and the firms that are a part of MIDROC and EFFORT diversified business groups. The second trajectory includes apparel firms that started producing for the domestic market and then shifted into exporting, or are in the process of shifting and trying to export. This shift was motivated by government incentives, access to foreign exchange and/or 'to learn' through export production. However, most of these firms remain focused on the domestic market. The third trajectory includes firms that started out exporting apparel, although most of them also produce for the domestic market. These firms are still more oriented to the export market. This trajectory can be divided into CMT and FOB firms. The former focus on process improvements and some also on increasing product complexity while remaining CMT suppliers, and the latter focus on upgrading to FOB or improving competitiveness in FOB with most also aiming to upgrade to FOB-textile. Hence, FOB firms generally are already pursuing vertical integration or aim for vertical integration into textile in the future. The fourth category includes firms that started exporting apparel but left the export market and began producing for the domestic market. Some of these firms still aim to export in the future, while others remain focused on the domestic market. Hence, this is the category of firms that failed to export. Even though these firms are not part of the survey scoring, we still identify this group as it is important to learn from this trajectory.

Mapping capabilities and competitiveness

We now compare the technological capabilities patterns discussed above with competitiveness indicators to see whether there is a relationship between the two. As competitiveness indicators we use the firm's export share over total local firms' exports, the compound annual growth rate (CAGR) of the firm's exports in the past 3 to 5 years, and the firms' financial result (profit, break even or loss).¹⁴ We have firm-level export

¹⁴ We would like to include export value per worker as another competitiveness measure, but we do not yet have consistent employment data across all local firms for a given time period.

data from TIDI for the past 11 years – from 2004/05 to 2014/15. We calculated export value and share of total apparel exports as well as the CAGR for the last five (2011/11-2014/15) and last three (2012/13-2014/15) years. A problem with this measure is that it only goes until 2014/15 and thus does not correspond with our interview data that was gathered in June 2016, which is the end of the year in the Ethiopian calendar. So, some firms might have just started exporting in the year 2015/16 or may have experienced changes in their exports, either increasing or decreasing them. We still use this data as firms' responses to their current total export values are not consistent and reliable. But this time lag has to be taken into account. Another competitiveness measure we use is if firms made a profit, a loss or broke even, which we derived from the survey data. This is a rough indicator and depends on firms' responses.

The competitiveness indicators are reported in Table 4, together with the technological capabilities scores. Generally, the local firms with the larger export shares have higher technological capabilities scores but there are three exceptions: one firm scoring Medium that only started exporting more recently and thus has a low export share, and two firms scoring Low that have exported for some time on a FOB basis and thus have a higher export share but are both struggling. All other firms that scored Low have export shares far below 1%, and firms with Low-Medium and Medium scores have higher export shares. The two firms with mixed technological capabilities scores have high export shares given their size. Generally, exports are concentrated among three firms. The two firms with mixed capabilities scores, and exporting made-up textiles, accounted for 34.2% and 15% of exports, and the private firm with the highest score accounted for 28.5% of exports. These three firms together accounted for nearly 80% of total local firms' apparel and made-up textiles exports. Other larger players include one more firm with a Medium score and two firms with Low-Medium scores, accounting for 5.9%, 5.2% and 3.9% of exports respectively.

For the three firms with Medium technological capabilities scores, the competitiveness measures confirm stability or growth of exports, as exports show a stable or positive trend in the past years. For one firm there is no data reported on profits or losses; for the other two firms, one firm reported profits and one firm reported losses. The three firms with Low-Medium scores also show stable or positive export development. Their profit/loss indicators are also mixed, showing one firm with profits, one with break even and one with losses. For the six firms with Low scores, two firms show positive export developments while four firms show negative export developments. They all report either break even (two firms) or losses (four firms). In sum, with the exception of the two firms scoring Low and still showing positive export developments, all other firms that have Low technological capabilities scores also have negative export developments, while firms with Low-Medium and Medium scores have stable or positive export developments. On the profit/loss indicator, the outcomes are less consistent. We can only see that no firm with a Low score reports profits. The two firms with Mixed scores show stable and

positive exports trends, but both firms report losses, with one indicating that losses alternate with break even.

The above rough comparison of technological capabilities scores and competitiveness indicators shows that there is some relationship, but it also highlights the complexity of this relationship and that firms may not necessarily need to build all capabilities or even should not build all capabilities to be competitive. Rather they need to make strategic choices to develop selective capabilities depending on the specific buyer and end market context and their trajectories. Hence, assessing technological capabilities needs to take place in combination with assessing competitiveness outcomes and the specific trajectories of firms in order to understand which capability building strategy makes sense and is sustainable or not.

Table 4 Technological Capabilities Aggregate Scores and Competitiveness Indicators

Firm	TC Aggregate Score	TC Result	Firms' export share (2014/15)	Export CAGR*	Profit/Break even/Loss	Trajectory
A-FIRM	HLMHM	MIXED	34,1%	stable	break even/loss	1
B-FIRM	HLLLM	MIXED	15,0%	positive	loss	1
C-FIRM	HMMHM	MED	28,5%	stable	X	3b
D-FIRM	MMMHL	MED	5,9%	positive	profit	3b
E-FIRM	HLMMM	MED	0,4%	positive	loss	1
F-FIRM	LMMML	MED-LOW	5,2%	positive	break even	3a
G-FIRM	LMMML	MED-LOW	3,9%	stable	profit	3a
H-FIRM	MMLML	MED-LOW	1,0%	positive	loss	2
I-FIRM	MLLLL	LOW	2,4%	positive	break even	3b
J-FIRM	MLLLL	LOW	2,0%	negative	loss	1
K-FIRM	LLMLL	LOW	0,4%	positive	break even	3a
L-FIRM	LLMLL	LOW	0,3%	negative	loss	3a
M-FIRM	LLLLL/ LLMLL	LOW	0,0%	negative	loss	2
N-FIRM	LLLLL	LOW	0,3%	negative	loss	3a

Conclusion

Of the 48 Ethiopian-owned apparel and textile firms, only 14 firms were exporting apparel or made-up textiles in June 2016 when we conducted the survey. Generally, locally-owned firms have comparatively low technological capabilities despite important diversity among the 14 firms. Apart from the two firms with Mixed scores, which results from being FOB-textile but exporting made-up textiles and having also low capabilities in other categories, of the 12 other firms, 50% score an overall Low, 25% score Medium-Low and the remaining 25% score Medium. Two out of three of the firms with Medium scores are vertically integrated firms producing apparel on a FOB basis, some of which are produced with their own fabric. The third firm scoring Medium is engaged in both CMT and FOB but scored comparatively high on most other capabilities. Of the three firms that scored Medium-Low, one firm is engaged in both CMT and FOB and the other two are CMT firms that have built higher capabilities on other categories. The six firms with Low scores include four CMT firms that scored also low on other capabilities and two firms engaged in FOB that are struggling more than the other FOB firms to build the capabilities required for that function. In sum, there are FOB and CMT firms with comparatively higher capabilities, including stable relationships with buyers; and there are FOB and CMT firms that are struggling in developing the capabilities most important for their specific function, which also have more unstable buyer relationships.

Generally, there is a trend towards FOB and particularly vertical integration to FOB-textile, particularly in the knit segment and for firms working with EU buyers. For these firms this is seen as a way to become competitive given the context of Ethiopia where factors exogenous to the firms result in delays to receive inputs, combined with firms' lack of experience with global inputs sourcing. This allows using an advantage of Ethiopia, which is the existence of a history of local textile and cotton production, but requires updating machinery and technology in textiles to be able to fulfill buyers' fabric requirements, which is expensive. But there is another group of local firms that are not focusing on building capabilities to functionally upgrade to FOB or FOB-textile, but on production and product capabilities while remaining CMT suppliers. Such a strategy seems to be possible and sustainable with certain buyers that prefer CMT as well as understand the context of Ethiopia, particularly in terms of meeting delivery times. A few US sportswear and workwear buyers sourcing quite standard products with longer delivery and lead times fit this type of buyer and have had stable relationships with some local firms.

Despite these different trajectories, all firms are struggling to meet export requirements. On the production capability side, the biggest challenges for most firms has been productivity and not on time delivery, related to factors endogenous and exogenous to firms, while internal reject rates have been manageable. On product capabilities, most firms produce basic products, which is largely seen as necessary at this stage as otherwise

productivity will decrease even more. However, in the future some firms have plans to move to more intermediate and also complex products, but this will also depend on the type of buyers. For firms that have stable relationships with buyers, buyers tend to help their suppliers, particularly through giving feedback during their quality control checks; however, buyers generally do not support firms further. Linkages with public sector institutions are important in Ethiopia given the pro-active industrial policy and related schemes, including support in capability building and learning through funding benchmarking studies and expatriates and offering training for workers. However, linkages among firms that can play an important role in learning are very minimal, and the industry association is not effective in furthering such linkages. This leaves a potentially important learning channel for local firms unused.

Learning is a costly process and takes time, and thus many local firms are experiencing losses or just break even in their export business due to their low productivity (*vis-à-vis* international standards) combined with low prices set by buyers. The Ethiopian government sees this and has offered loans through the Development Bank of Ethiopia that allow for grace periods, but most importantly straddling the domestic and export market plays an important role in this regard. With the exception of two local exporting firms, all other local firms produce apparel for the domestic market while they are learning how to meet the cost, quality and delivery standards of export markets. Therefore, local firms use the domestic market as a means to subsidize the cost of learning to compete. Firms that are part of diversified businesses also seem to fund losses in apparel exporting through their other business activities. But the domestic market is more important than just supporting exports, as most firms have strategies for the domestic market, including branded product lines, and also use what they learn in exporting in terms of productivity, quality and design for their domestic market business.

As profits are higher in the protected domestic market, the question is why local firms export at all. The survey results indicate that local firms export in order to get access to foreign exchange, but also to be able to access government incentives in terms of finance, expatriates and training, and to increase their knowledge on production processes and product design and reach international best practices (i.e. in order ‘to learn’). Some local firms also predict that the domestic market will not be protected forever, and thus they must increase their capabilities to international standards in order to be able to compete in a liberalized domestic market at some future date.

This paper presented and assessed the technological capabilities of locally-owned export firms in Ethiopia’s textile and apparel sector, and identified trajectories and related challenges in building capabilities. The next step is to understand and explain what drives capability building and hence why some firms decide to and are more successful in building certain capabilities and others not. This is the focus of the next part of the AfriCap research project, where we are conducting in-depth firm histories with a

strategically selected sample of the locally owned firms based on the trajectories discussed in this paper.

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Annex Apparel Sector Local Firm Survey Questionnaire

PART I: FIRM PROFILE

Name of firm																	
Address (industrial zone) Website																	
Name of interviewee Job title Duration of employment																	
Ownership structure/nationality	<ul style="list-style-type: none"> a) Indigenous (ethnicity) b) Indigenous-diaspora (lived outside the country for an extended period of time) c) Diaspora (may not have citizenship, but lives their permanently) d) Joint venture (specify equity distribution and management control) e) State-owned f) Party-owned 																
Date of establishment Date of production/export																	
Number of factories & locations																	
<i>Number of employees Development (10 years)</i>																	
Functions today? Has the firm taken up or dropped functions in the last 10 years? Does firm aim to change functions? If yes, explain?	<ul style="list-style-type: none"> a) CMT-subcontracting b) CMT-direct buyer c) Full package/FOB d) ODM e) Textile (knit or woven) f) Produce for the domestic market (production, design, retail) 																
What is produced in the firm? Name main products.																	
Percentage of production that is exported? Which products?	Export: Domestic:																
Export destinations (%)	<ul style="list-style-type: none"> a) Europe b) USA c) South Africa d) Other 																
<i>Total annual turnover, production & exports (USD, volume & value) Development (10 years)</i>	<table style="width: 100%; border: none;"> <tr> <td style="width: 33%;"></td> <td style="width: 33%; text-align: center;">Turnover:</td> <td style="width: 33%; text-align: center;">Production:</td> <td style="width: 33%; text-align: center;">Exports:</td> </tr> <tr> <td></td> <td style="text-align: center;">Today:</td> <td></td> <td></td> </tr> <tr> <td></td> <td style="text-align: center;">5 years ago:</td> <td></td> <td></td> </tr> <tr> <td></td> <td style="text-align: center;">10 years ago:</td> <td></td> <td></td> </tr> </table>		Turnover:	Production:	Exports:		Today:				5 years ago:				10 years ago:		
	Turnover:	Production:	Exports:														
	Today:																
	5 years ago:																
	10 years ago:																

PART II: INVESTMENT

Was a feasibility study carried out before the initial investment?	a) No b) Yes By whom?
Had the owner/GM experience in the sector or in business?	a) No b) Yes Explain:
How did the firm get managerial expertise and skilled labour in the beginning?	a) Buy it from abroad (foreigners). From where? b) Employ nationals with previous work experience in apparel. From which firms? a) Trained workers and/or managers
How were main products selected?	b) Just following what other firms do c) Producing what buyers demand d) Conducted analysis/market research
How was the investment finance raised? How was working capital raised?	a) Foreign bank b) State development bank c) Locally owned private bank d) Equity/venture capital
How did the firm get its first buyer?	<i>CMT-sub:</i> How did the firm access domestic first-tier supplier? <i>Others:</i> How did the firm access/establish contact to export buyers?
How much info did you have & analysis did you conduct before initial investment?	a) Little b) Medium c) High

PART III: END MARKET

Who are main buyers? How many? Which respective end markets?	Main buyers: Main end markets:
How stable are your relationships with your top 3 buyers?	a) Stable b) Somewhat stable c) Ad hoc
Does the firm have a direct contact to buyers?	a) No b) Yes
IF YES Does firm aim to enter/extend direct contacts? What are main challenges?	a) No b) Yes How?
IF NO Who are the intermediaries? How many? Share of top 3?	
Have end markets diversified?	a) No b) Yes, but passive c) Yes, proactive

Is the firm aiming to enter new markets?	a) No b) Yes How?
Have buyers/intermediaries diversified?	a) No b) Yes, but passive c) Yes, proactive
Is the firm searching for new buyers/intermediaries?	a) No b) Yes Explain? Main challenges?
Have you lost or dropped buyers?	a) No b) Yes Why?
Has the firm engaged in market intelligence and market & buyer research?	a) No b) Yes Info from where? How?
What are minimum requirements from buyers? Which functions? Which standards?	
If firm has more buyers, have they different requirements? What are challenges to fulfill them?	
Have demands & capabilities expected from buyers increased in the last 10 years? How do you deal with this? What are main challenges in fulfilling buyers' demands/capabilities?	a) No b) Yes
Have buyers supported or blocked developing new or deepening existing capabilities?	a) No b) Yes How?
How does communication with buyers/intermediaries take place?	
Does firm negotiate with buyers/intermediaries?	a) No b) Yes How? On what issues?
What does the firm do to keep buyers?	
What are the payment terms with buyers? Differences with buyers?	a) CMT b) FOB What are main challenges in selling FOB? a) Access to working capital b) Letter of credit c) Buyers' payment terms

	d) Others
How much working capital is tied up in sourced inputs, storage, production and waiting for payment?	Per month (?)
Does the firm have a pricing department? How long is the pricing lead time?	a) No b) Yes
Who is in charge of/organizes logistics?	a) Buyer b) Firm Challenges?
DOMESTIC MARKET	
Does the firm also sell to domestic market?	a) No b) Yes What are main buyers/sales channels?
Which functions & capabilities does the firm provide in the domestic market? How changed (10 years)?	
What are advantages & challenges of working in export & domestic market?	

PART IV: PRODUCT

Describe the main products & portfolio?	a) Basic b) Intermediate c) Complex
Unit price of main products (in real term)? Average unit price (in real term)? Development (10 years)?	
Do these products differ per end market & buyer?	a) No b) Yes Explain:
Have you introduced new and/or more complex and/or shorter lead times products?	a) No b) Yes
Have any products been dropped?	a) No b) Yes Which ones? Why?
Has the variety of products increased?	a) No b) Yes Why?
What is the average order size range for main products?	Average:

What is the minimum and maximum order size range you can produce?	Min: Max:
Do you face challenges regarding seasonality?	a) No b) Yes How do you deal with this?
Does firm want to change product portfolio?	a) No b) Yes How? Motivations? a) Higher prices b) Less risk c) Less seasonality/flexibility d) Satisfy buyer e) Access to new buyers/markets f) Other
Do you have finishing equipment?	a) No b) Yes Which?
Does the firm have a pattern/sample making department?	a) No b) Yes What is the average sampling lead time?
How is functional division of work between buyer and firm related to design & product development?	
How is own design for export markets developed? How do you learn about design & product development?	
Number of designers employed (with/without formal degree)?	Number: Number with formal degree:
Does the firm have Computer-Aided Design equipment?	a) No b) Yes
Share of own designed & developed exports?	
Do you promote your products?	a) No b) Yes How?
Attendance of international fashion shows per year and location(s)?	Per year: Locations: Outcomes:
Has the firm invested in product development & design improvements?	a) No b) Yes Explain:
R&D expenditures in design & product development?	R&D % of payroll:

DOMESTIC MARKET	
Which product development & design capabilities does the firm have for the domestic market?	
How is own design for domestic market developed?	
TEXTILE	
Has the firm developed textile production?	a) No b) Yes Explain:
What types of products? <i>Has the firm increased variety and/or complexity of products in the last 10 years?</i>	a) Yarn or fabric b) Knit or woven Variety of products: Complexity of products: a) No b) Yes Explain:
What types of extra activities?	a) Laundry b) Dyeing
Does the firm have its own laboratory for chemical tests?	a) No b) Yes
Share of textile used in own apparel production? Domestic market or export? Share sold to other firms? Share exported directly?	
What are main challenges in textile production for export (direct/indirect)? Is the type of product and quality aligned to export markets? Do buyers support or block use of own textile?	

PART V: PRODUCTION

EFFICIENCY & PRODUCTIVITY	
<i>Annual profit before tax</i>	
<i>Labour productivity Development (10 years)</i>	Output per employee:

Unit cost of production of main product (raw material cost, labor cost, overhead costs) & market price	Unit costs: Market price:
<i>How much working capital is tied up per months?</i>	
Work in progress inventory	Days:
Total inventory	Days:
Not on time deliveries as a % of all deliveries	
Not in full deliveries as a % of all deliveries	
Lead time (from receiving an order to delivery)	
Throughput time within factory (from receipt of raw materials to finished product)	
MACHINERY & PRODUCTION PROCESS	
Which machines are used? Age of machinery? Up to date machinery?	
Which cutting equipment does firm have?	a) By hand b) Automated
Total machinery & technology investment in last 10 years? Top 3 areas?	
Has the factory invested in new production processes or new work practices in last 10 years & last year?	a) No b) Yes Explain:
Has firm undertaken R&D to solve production related technological/productivity problems?	a) No b) Yes Explain:
Does the firm have an R&D department?	a) No b) Yes Since when? What does it do?
LABOUR MANAGEMENT	
Share of management, technicians, administrative staff, supervisors & machinists (%)? Respective educational background?	
Share of expatriate workers? In which positions? Development (10 years)?	

Have locals increased their share in management, technical jobs, supervisors?	a) No b) Yes
How are workers hired?	
Labour turnover? Absenteeism?	Average per year: Average per year: Average per year:
Does the firm have a labour retention strategy?	a) No b) Yes What is it?
How are workers paid? Are there any bonuses/benefits for workers?	a) Time-based b) Piece rates c) Time and productivity based d) Discretionary (with bonuses and fines) e) Other:
Is training regularly offered to workers?	a) No b) Yes Which type? Provided internally or externally?
Expenditures on training as % of payroll	
Development in last 10 years?	
Can the factory be more productive?	a) No b) Yes What changes would you make? a) No ideas b) Standard ideas c) Proactive, strategic ideas
QUALITY CONTROL	
Average internal reject, scrap and rework rate (per unit of production/order)	
Development (10 years)?	
Average buyers' return rate (per order) & development (10 years)?	
Are quality management systems in place?	a) No b) Yes Which?
At what stages of the production process is quality checked? Any changes in last 10 years?	a) End b) Multi-stage
How do buyers control quality?	

Can the factory improve its quality?	a) No b) Yes What changes would you make? a) No ideas b) Standard ideas c) Proactive, strategic ideas
COMPLIANCE	
Compliance with safety & labour standards? <i>Share of unsatisfactory buyer or public audits?</i> What were main issues? Do buyers support you?	a) No b) Yes Which standards?
Compliance with environmental standards? <i>Share of unsatisfactory buyer or public audits?</i> What were main issues? Do buyers support you?	a) No b) Yes Which standards?

PART VI: SUPPLY CHAIN LINKAGES

Where does firm get information from on markets, buyers, products, technology, production, etc.?	a) Local firms b) Foreign firms c) Buyers d) Hired consultants e) Industry association f) Relevant ministry/public institution g) Other:
Is the firm a member of an industry association?	a) No b) Yes Which? How often does it meet? Main benefits for your firm?
Does the firm participate in collaborative schemes or informally with other firms? If so, what kind of schemes (training, input sourcing, etc.)?	a) Limited links with other firms b) Medium links c) Close networks
How often does the firm seek knowledge or advice from other firms on how to improve production and marketing?	a) Not very often b) Sometimes c) Very often Which firms?
FULL PACKAGE FIRMS	
From where does firm source inputs?	a) Local b) Imports
What % of local inputs used? Can this be extended? Why not?	Fabrics Yarn Buttons Zippers Labels

	Dyes Packaging
From where are imported inputs sourced?	Specify countries:
Do buyers nominate input suppliers?	a) No b) Yes
What are the main challenges in managing input sourcing?	
Supplier lead times?	
Return rates to suppliers?	
Production lost to inputs unavailability/not in time/in full delivery? Development (10 years)?	
Does the firm have an input sourcing department?	a) No b) Yes Since when? How many employees? Which formal degrees?
Are local providers used for support services? Or is it provided in-house?	Embroidery a) In-house b) Local supplier Washing a) In-house b) Local supplier Dyeing a) In-house b) Local supplier Other:
Are business services sourced?	a) No b) Yes From whom?
Does the firm sub-contract a part of the production?	a) No b) Yes Which parts? To whom? Why? a) Specialization b) Capacity c) Low value products Other?

PART VII: LOGISTICS, FINANCE & SUPPORT

Does the firm have relationships with external public & private institutions? Which are most important institutions?	a) Limited links with institutions b) Medium links c) Close networks
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<p>Does the government (Ministry of Industry, industry-specific agencies) provide support services to the sector? Does your firm participate in those services?</p>	<p>a) No b) Yes What kind of support services? a) No b) Yes Which? Are they useful?</p>
<p>Does the firm have access to sufficient investment and working capital? What is the interest rate? Does the firm access finance through state-owned banks at special rates?</p>	<p>a) Yes How? b) No Why not?</p>
<p>Does the firm have access to foreign exchange?</p>	<p>a) No b) Yes How?</p>
<p>How effective are customs clearance services?</p>	<p>a) Very effective b) Effective c) Not very effective Why?</p>
<p>Does the firm interact with any education or research institute?</p>	<p>a) No b) Yes Which ones? How?</p>
<p>Does the firm buy management, technical or administrative/IT consulting services?</p>	<p>a) No b) Yes Which areas? From whom? a) Foreign firms b) Domestic firms How often?</p>

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- the nature, pace and outcomes of capitalist transformation processes unfolding across the African continent;
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- linkages between the regulation of economic transactions and state formation in African countries.



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