

# Mapping the Technological Capabilities of Local Floriculture Firms in Kenya

Sameer A. Azizi,

Dept. of Social Sciences and Business, Roskilde University Denmark

&

Francis Mulangu,

Millennium Challenge Corporation, Washington D.C., USA



# Background

How do African-owned firms learn and build their technological capabilities in order to enter and remain competitive in new export sectors?

*What capabilities do locally-owned firms in the Kenyan floriculture industry have?*

	<b>Garment</b>	<b>Floriculture</b>
<b>Foreign direct investment driven</b>	Madagascar	Kenya
<b>Industrial policy driven</b>	Ethiopia	Ethiopia

# Theoretical background

Structural transformation is necessary for sustained poverty reduction in low-income economies:

- ‘Renewed’ interest in industrial policies that focus on external AND internal constraints → focus on technological capabilities and GVCs
- IP is sector specific, and so are TCs → we need to measure and assess TCs of local firms in export-oriented industries
- Local firms in the floriculture industry in Kenya

(for more see Whitfield et al. 2018 – session 3.2)

# Floriculture industry in Kenya

- Floriculture a bi-product of horticulture export
- Export volumes increased since 1988
- +60 countries and is the biggest exporter of rose cut flowers to the European Union (EU)
- Third highest export earner in Kenya, after tea and tourism
- 1.1% of GDP from the floriculture industry in 2016
- Employs approximately 500,000 people, and affects over 2 million livelihoods
- Approximately 197 firms operating – 85-90% local firms

(Sources: Kenya Flower Council, 2018; Kenya National Bureau of Statistics, 2018)

# What are technological capabilities?

- TC = *the technical, managerial and organizational skills that allow firms to utilize equipment and technical information efficiently* (Lall 1996: 28-29)
- The GVC focus →... to achieve the level of productivity required to be internationally competitive
- If technology were simply a matter of information or buying equipment, competitiveness would be relatively easy to achieve (Bell and Pavitt 1995: 74)
  - Technology is both codified and tacit knowledge, it is the latter that makes ‘catching up difficult’
  - They are firm specific, a form of institutional knowledge → synergy greater than the sum of individual skills and knowledge of employees
  - Think of it as the ‘software’ that makes the ‘hardware’ function

# TC Matrix for Floriculture

Develop matrix of capabilities needed for local firm to enter, remain competitive and upgrade based on global requirements

(1) Product and production process	(2) Linkages	(3) Investment	(4) End-market
<ul style="list-style-type: none"><li>• # of varieties</li><li>• # of export days per week</li><li>• internal reject rate %</li><li>• labour turnover rate</li><li>• in-house propagation</li></ul>	<ul style="list-style-type: none"><li>• linkage with other firms</li><li>• linkage with public institutions</li></ul>	<ul style="list-style-type: none"><li>• Irrigation type</li><li>• Greenhouse type</li><li>• Fertigation system</li></ul>	<ul style="list-style-type: none"><li>• # of end markets by regions</li><li>• # of buyers in direct sale/auction direct</li><li>• relation with buyer</li><li>• marketing</li></ul>

# Data collection and analysis

Measure what capabilities locally-owned firms actually have?

- Conducted the local firm survey with 18 firms
  - Face-to-face interviews
  - Use of secondary data
  - Total 6 field work trips to Kenya
- Score (Low: 1, Medium: 2, High: 3) on each indicator

Firms	Owner ship	Location	Est. date	Cultivated land size (ha)	# of varieties	# of workers	Main end market
Firm 1	Black	Kitale	1996	36	18	600	Dutch auction
Firm 2	Black	Thika	1990	17	8	500	Sub-contracting
Firm 3	Black	Ravine/Nakuru	1997	60	40	1200	Direct Sales
Firm 4	Black	Nanyuki	1983	6	4	230	Dutch auction
Firm 5	Black	Thika	2002	9,5	Rose (5), Summer (2)	230	Sub-contracting
Firm 6	Black	Nakuru	1992	120	3	390	Dutch auction
Firm 7	White	Timau	2002	18 + 4	Rose (10), Summer (2)	361	Dutch auction
Firm 8	White	Timau	2007	18,5	54	330	Direct Sales
Firm 9	White	Limuru	1997	14	3	100	Dutch auction
Firm 10	Asian	Limuru	1982	55	12	400	Direct Sales
Firm 11	Asian	Nakuru	2011	95	34	600	Dutch auction
Firm 12	Asian	Nanyuki	2013	16 + 14	11	530	Dutch auction
Firm 13	White	Athi River	1987	55	40	450	Direct Sales
Firm 14	Black	Limuru	2013	30	12	155	Direct Sales
Firm 15	Black	Kitale	2005	25	10	100	Sub-contracting
Firm 16	White	Kitale	1993	34	15	504	Direct Sales
Firm 17	Black	Athi River	2006	60	21	350	Dutch auction
Firm 18	White	Nanyuki	1995	25	76	700	Direct Sales

**Table 1 – Local firm overview**



# Findings - type of local firms

<b>Firm Type</b>	<b>Characteristics</b>
Subcontracting firms	Growers of summer flowers with production techniques that require limited capital investments and land
Dutch Auction Firms	Produce high-value flowers (mainly roses) for the auction produced by capital-intensive production facilities and involve a series of specialized capabilities.
Direct Sales firms	Produce a variety of high-value flowers (mainly roses Europe, Asia, the Middle East and the United States. Some operate in niche markets of high-quality roses others focus on supermarket chains and wholesalers.

Firms / Capabilities	Ownership	(1) Product and production process					(2) Linkages			(3) Investment				(4) End-market					Sum score	Aggregate score	Total Assessment
		# of varieties	# of export days per week	Internal reject rate %	Labour turnover rate	In-house propagation	Sum score	Linkage with other firms	Linkage with other institutions	Sum score	Irrigation type	Greenhouse type	Fertigation system	Sum score	# of end markets by regions	# of buyers in direct sale/auction direct	Relation with buyer	Marketing			
Firm 1	Black	2	3	1	3	2	11 M	3	1	4 H	3	1	3	7 M	1	1	2	1	5 L	MHML	Med
Firm 2	Black	1	1	3	3	1	9 L	1	1	2 L	2	1	3	6 M	1	1	1	2	5 L	LLML	Low-Med
Firm 3	Black	3	3	1	3	2	12 H	2	1	3 M	3	3	3	9 H	3	3	3	2	11 H	HMHH	Med-High
Firm 4	Black	1	1	1	3	2	8 L	1	1	2 L	3	2	2	7 M	1	1	3	1	6 L	LLML	Low-Med
Firm 5	Black	1	2	2	3	2	10 M	1	1	2 L	2	1	2	5 L	1	1	3	1	6 L	MLLL	Low
Firm 6	Black	1	2	1	1	2	7 L	2	1	3 M	3	1	2	6 M	1	3	3	2	9 M	LMMM	Med
Firm 7	White	2	3	3	3	1	12 H	1	2	3 M	3	3	3	9 H	1	1	3	2	7 L	HMHL	Med-High
Firm 8	White	3	3	1	3	1	11 M	1	1	2 L	3	3	3	9 H	1	3	3	3	10 H	MLHH	Med-High
Firm 9	White	1	3	2	3	2	11 M	1	1	2 L	2	1	1	4 L	1	2	3	2	8 M	MLLM	Low-Med
Firm 10	Asian	2	3	2	3	2	12 H	1	2	3 M	2	2	1	5 L	3	2	3	2	10 H	HMLH	Med
Firm 11	Asian	3	3	3	3	1	13 H	1	1	2 L	3	1	3	7 M	2	3	3	3	11 H	HLMH	Med
Firm 12	Asian	2	3	3	3	2	13 H	1	1	2 L	3	3	3	9 H	1	1	3	1	6 L	HLHL	Med
Firm 13	White	3	3	3	3	2	14 H	2	1	3 M	3	3	3	9 H	2	2	3	3	10 H	HMHH	High
Firm 14	Black	2	2	3	3	2	12 H	3	1	4 H	2	1	1	4 L	2	2	3	1	8 M	HLLM	Med-High
Firm 15	Black	2	2	1	3	2	10 M	2	1	3 M	2	1	1	4 L	1	1	3	1	6 L	MMLL	Med
Firm 16	White	2	2	2	3	1	10 M	3	1	4 H	3	2	2	7 M	1	3	2	3	9 M	MHMM	Med-High
Firm 17	Black	2	2	2	2	1	9 L	1	1	2 L	3	3	3	9 H	1	1	1	3	6 L	LLHL	Low-Med
Firm 18	White	3	3	2	3	1	12 H	3	1	4 H	3	2	2	7 M	3	3	3	3	12 H	HHMH	High

**Table 3 - Technological Capability scores of Local Firms in the Kenyan Floriculture**

# Summary of findings

---

<b>Capabilities</b>	<b>Type 1 firms</b>	<b>Type 2 firms</b>	<b>Type 3 firms</b>
<b>End-market</b>	N/A	Medium	High
<b>Product and production process</b>	Low	High	High
<b>Linkages</b>	Low	Medium	Medium
<b>Investment</b>	Low	High	High

---

Table 2: Overview of firm types and average capabilities

# Tentative conclusion and contribution

- Identification of the three firm type – important empirical insight
- Development and assessment of the TC matrix specifically for the industry – conceptual contribution
- Calls for more studies on how and why firms build TC

# Selected Working Papers

- CAE Working Paper 2017: 1, **What is required for African-owned firms to enter new exports sectors? Conceptualizing technological capabilities within global value chains**, Cornelia Staritz and Lindsay Whitfield with Ayelech Tiruwha Melese and Francis Mulangu.
- CAE Working Paper 2017:2, **Ethiopian-owned firms in the floriculture global value chain: With what capabilities?**, Ayelech Tiruwha Melese
- CAE Working Paper 2017:3, **Made in Ethiopia: The Emergence and Evolution of the Ethiopian Apparel Export Sector**, Cornelia Staritz and Lindsay Whitfield
- CAE Working Paper 2018:1 **Local Firm Capabilities and Industrialization through Global Value Chains: Methodological innovations in measuring technological capabilities**, Lindsay Whitfield, Cornelia Staritz, Ayelech Tiruwha Melese and Sameer Azizi
- CAE Working Paper 2018:2 **Local Firms in the Ethiopian Apparel Export Sector: Building Technological Capabilities to Enter Global Value Chains**, Cornelia Staritz and Lindsay Whitfield
- CAE Working Paper 2018:3 **Local Firms in Madagascar's Apparel Export Sector: Technological Capabilities and Participation in Global Value Chains**, Cornelia Staritz and Lindsay Whitfield
- CAE Working Paper 2018:4, **Mapping the Technological Capabilities of Local Floriculture Firms in Kenya** , Sameer Azizi and Francis Mulangu

<https://typo3.ruc.dk/institutter/ise/forskning/store-projekter/africap/publications/>