Local Content and Technological Capability Building in the Oil and Gas Sector: Evidence from Latin America and Lessons for Tanzania

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Presentation Outline

- Background
- Sources of Information
- Conceptual Framework
- Empirical Evidence
- Conclusion & Recommendation

Background

- Local content is increasingly adopted by the resources rich countries as a strategy with potential benefit to the national economy. In the oil & gas sector, for example, people have much expectation in the local content participation for the well being of population.
- In Tanzania, available findings indicate that the exploration phase has found out 55.08TCF of gas by 2014 placing Tanzania among the leading countries in Africa in terms of natural resources.
- However, Tanzania experiences lack of adequate development of local content. It is estimated that only 5-15% of local content participate in the oil & gas sector (Apson 2013, pp 7-11).

Background – ctn …

- Government efforts: a regulatory framework is in place for local content development & efficient mgt of oil & gas where TPDC, a national oil company, was given authority to regulate the development of the sector's upstream activities.
- Stakeholders joined government efforts by providing trainings, conferences & exhibitions, Petroleum related degree courses (CoET, UDOM, NMAIST, Aberdeen); skills development programs in oil & gas (e.g. VETA)
- ELLA program & Study tour to Ecuador are opportunities for contributing to the effectiveness of the Tanzanian local content development .
- This paper is on lessons derived from this study tour focusing on technological capabilities in the oil & gas sector.

Sources of information for the paper

- Data Sources: Secondary & primary
  - ELLA programme & Study tour to Ecuador; Various reports
- LA has an experience in LCD in oil & gas: countries went through similar opportunities & challenges for LCD.
- Norway had already developed an industrial economy & stable institutions capable of designing, adopting & enforcing local content policies which were easily transferrable & produced benefits for other economic sectors (Aoun & Mathieu 2015; Heum, 2008).

Local content development & TCB: A Conceptual construct

- **a) Local content**: Tanzanian context: “the added value brought to the country in the activities of the oil & gas industry in the URT through the participation & development of local businesses through national labour, technology, goods, services, capital & research capabilities” (URT 2014). A skilled workforce & a local competitive supplie
- ELLA program 2016: “the extent to which the output of the extractive industry sector generates further benefits to the economy beyond the direct contribution of its value-added, through links to other sectors”.
- **b) Local content framework**: policies, legislations and contracts .
- LCF considers sustainability of production, enhancement of development beyond revenues & avoidance of resource curse (Juan & Marcela 2016: 6).

Conceptual construct – ctn …

- **c) Local content Strategies**
- **d) Local content outcomes**: the level of outcomes depends on the countries priorities & factors for LCF implementation
- Factors for local content development:
  - a) Commitment to implement LCF
  - b) Business environment (Regulations, infrastructure, adequate workforce, work ethics, access to financing, public health facilities, capacity to innovate, level of taxes, political stability …. (WEF/GCR)
  - c) Establishment of enterprises centres
  - d) Technological capabilities of the local content

Conceptual construct – ctn …

- Nature of the oil & gas value chain is highly specialised. It requires standards in terms of skills & knowledge, goods & services. That shapes local firms to engage in the **value addition activities,** where technological capability building (TCB) is key in the process.
- *TCB entails a process of* ***accumulating & developing resources*** *needed to generate & manage technical changes (Bell & Pavit 1995; Figueiredo 2001).* Resources: knowledge, skills, experience, structure & linkages, organisational systems.
- The process moves from the undertaking of **simple & routine innovative activities** (activities of low level technological capabilities) to the ability of performing **more efficient innovative activities** of higher level

Empirical Evidence

Political Dimensions influencing TCB

- Government commitment to influence technical, economic, social changes, & improve business environment.
- E.g. The National Energy Agenda 2016-2040 with emphasis on Energy Efficiency (associated with technology improvement; strengthening innovation eco-system)
- Establishment of the Ministry of Knowledge & Human Talent (MCCTH) – coordinates policies among ministries, meetings & discussions around knowledge community & development; transformation of oil & gas industry, research & technology
- Establishment of a national committee for quality assurance with mandate to discuss quality policies.

Production of oil & gas in Latin America

Country	Oil and Gas Exportations / Total exportations	Thousand barrels daily (2015)	Proved reserves in thousand million barrels	R/P ratio in years
Venezuela	98%	2.719	298,3	< 100
Bolivia	55%	10	10,5	13,9
México	13%	2.588	11,1	11,5
Colombia	67%	1.008	2,4	6,3
Ecuador	57%	543	8	40,4
Argentina	5%	637	2,3	10,2
Brazil	9%	2.527	16,2	14,1

Source: BP 2016; WTO 2015; World Bank 2015

Political Dimensions – ctn…

- Ecuador has been good at implementation:
- Monitoring & seeing through on implementation, enforcement of laws.
- Strengthening institutions that allowed to build infrastructure for oil & gas industry

Technological dimensions

- Value addition activities, competitiveness & sustainability of local firms in the market places
- Ecuador focused on Energy Efficiency (EE): an approach used to run the oil & gas by reducing energy losses. It therefore involves adoption of more efficient technologies - equipment and production processes (Diesendorf 2007).
- This implies an industrialization of the sector

Technological dimensions – ctn…

THE STATE OF ECUADOR HAS EMPOWERED A
SINGLE NATIONAL ENTITY TO EXECUTE THE OGE&EE PROGRAM

FLARE
(before OGE&EE Project)

FLARE
(after OGE&EE Project)

Source: OGE&EE (2016)

Technological dimensions – ctn …

- Gas flaring causes environmental, health and other effects. According to Ajugwo (2013), gas flaring causes soil depletion that affects agricultural activities; it causes climate change by emission of carbon dioxide, which is known as the main greenhouse gas. Gas flaring also leads to pollution and revenue losses. This process needs efficient processes.
- For example, according to Ajugwo's estimations, Nigeria losses around $2.5 billion annually due to the failure to deal with gas flaring.

In addition to environ. & health benefit, Economic benefits shows that:

- For every 100 MW developed through the OGE&EE Project the State avoids importing up to 73,000,000 gallons of diesel per year which, at a price of 2.5 $/gal, represents over US $ 183,500,000 per year.

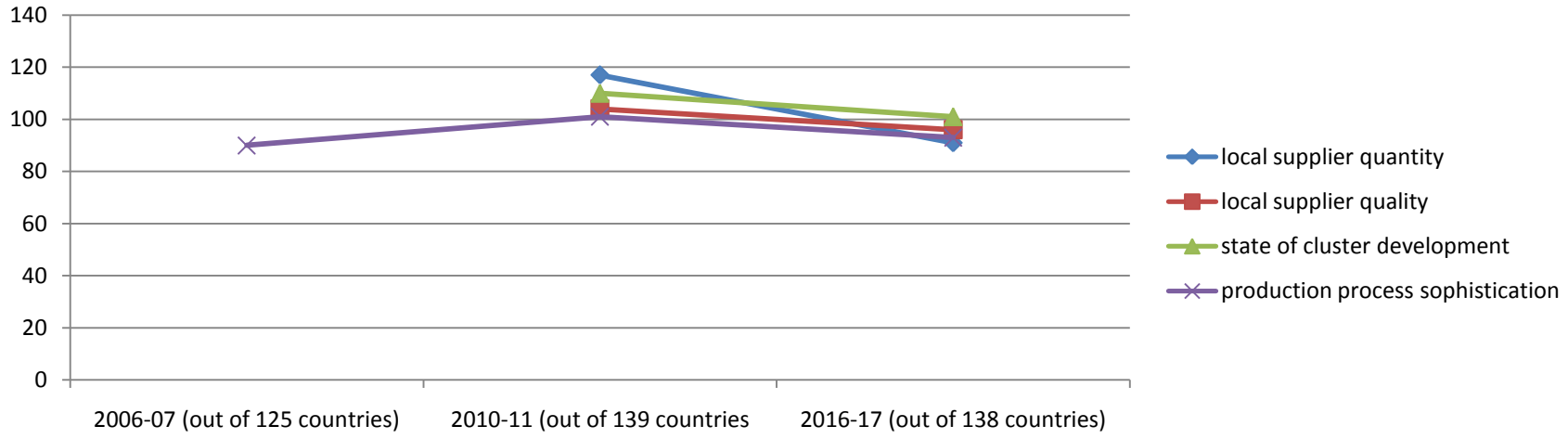
- **The Energy Efficiency results obtained through the OGE&EE Project equals a net increase of 30,000 BOE/day to the State.**

Source: OGE&EE (2016)

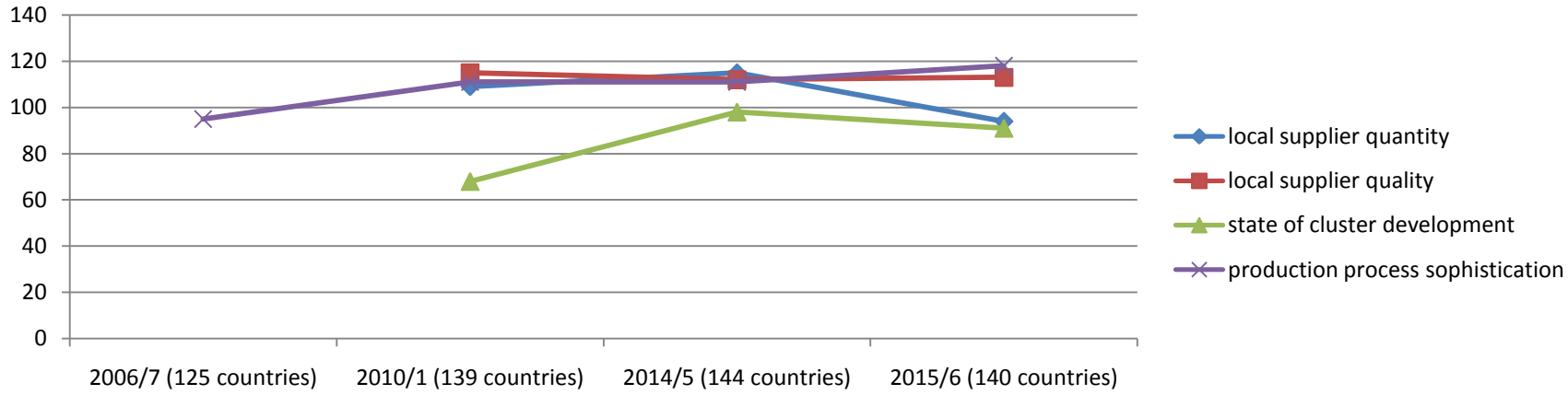
Technological dimensions – ctn …

- The OGE&EE project puts emphasis on local suppliers to lead in the installation of imported equipment. The aim is to value the importance of a productive diversification through backward & forward linkages with the local actors

Ecuador - Business sophistication



Tanzania - Business Sophistication



Source: WEF - compiled Global Competitiveness Reports

Collaboration dimensions

- Collaboration at both national & regional levels
- Collaboration with R&D, Universities, technology providers
- Petrobras &COPPE (the Post-Graduate & Engineering Research Institute of the Federal University of Rio de Janeiro) helped to accumulate and develop design knowledge & design tools related to offshore structures (Djeflat, A, p8).
- The OGE & EE Project does not have R&D centre. It works with various technology companies. The OGE & EE Project provides designs (existence of internal capacities)
- Collaboration with government: Ecuador subsidizes companies to access international certification.
- Challenges: lack of demand. So, IOCs were asked to procure locally

Collaboration – ctn …

- Regional cooperation: specialization so as to decrease technology import & promote local suppliers
- Regional standards set & a coordinated regional procurement system established

Financing for TCB

- TCB involves cost – funding
- Tanzanian Government allocate funds for ST&I. E.g. 0.22% of GDP (2005); 0.43% (2007) & 0.4% in 2008/9 (NEPAD ASTII study). There is a promise of 1% of GDP.
- Sources of funding: 51% foreign donors; 32% R&D institutions; 14.14% government; & 4.4% local donors (Madikizela 2013)

Table XX: Scarce total expenditure on R&D as % of GDP

PAÍS	% DEL PIB	AÑO	FUENTE
Israel	4,21	2013	OECD
Finlandia	3,32	2013	OECD
Suecia	3,3	2013	OECD
Estados Unidos	2,81	2012	OECD
Reino Unido	1,63	2013	OECD
Brasil	1,23	2012	RICYT
Argentina	0,58	2012	RICYT
Ecuador	0,74	2014	SENESCYT
Chile	0,35	2012	RICYT
Uruguay	0,24	2012	RICYT
Colombia	0,21	2012	RICYT
OECD	2,39	2013	OECD
América Latina	0,74	2012	RICYT

Source: Ingenios (2016)

Financing ctn….

- The OGE & EE project gets large funding from technology companies. Own payment is made based on actual performance – “no cure no pay”. Confidence in negotiations matters.
- Brazil : Beyond government expenditure of 1.23% of GDP on R&D (as seen in the table), policies require IOCs operating in Brazil to invest 1% of their gross revenues in R&D (Global local content council 2015).
- This amount supports local R&D centres & develop competences of local suppliers.

Financing – ctn …

- Local suppliers development:
- 97,000 people – technicians, engineers & other professional trained under the PROMINP 2003 in Brazil
- Sebrae : Registration of micro & small enterprises increased from 14,000 to 19,000 since 2004 in Brazil
- Petrobras considers local suppliers for materials such as local riser manufacturers

Source: OFFSHORE ENERGY (2017)

Financing – ctn …

- There is another important example on funding for TCB of local suppliers (although coming from Angola).
- **Financing from IOCs was possible due to the establishment of enterprises centres in Angola (CAE).**
- In 2002, Chevron in collaboration with the Spanish International Cooperation Agency for Development (AECID) led in funding the establishment of the Angola Enterprise Programme (AEP).
- The programme aimed at (1) developing the capacity of local SMES & (2) creating business environment that could provide reliable & quality products and services (Mushemeza and Okiira 2016: 23).

Conclusion & Recommendations

- Strategies for LCD in the oil & gas sector in Latin America provide an evidence of the experience that Tanzania should take as lesson.
- The aspects of technological capabilities are important, built through the association of political, technological & financial dimensions
- These dimensions require particular consideration in the process of developing local content.
- Therefore the Government and private sector should incorporate those elements in their regulatory framework in order to result into a competitive & sustainable oil & gas industry.

Thank you for your attention!

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