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Evidence and lessons  
from Latin America

# STIPRO Policy Brief

Science, Technology and Innovation Policy Research Organisation

No. 1, 2017

## LOCAL CONTENT AND TECHNOLOGICAL CAPABILITY BUILDING IN THE OIL AND GAS SECTOR: EVIDENCE FROM LATIN AMERICA AND LESSONS FOR TANZANIA

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### Introduction

Local content is increasingly adopted by the resources rich countries as a strategy with potential benefit to the national economy. Local content as defined in the Tanzanian local content policy 2014 is “the added value brought to the country in the activities of the oil and gas industry through the participation and development of local businesses through national labour, technology, goods, services, capital, and research capabilities” (URT, 2014). Thus, local content serves as an intervention to ensure that the majority of a competent workforce as well as other inputs and services required at each stage of oil and gas value chain are largely locally supplied.

Following the recent discovery of a huge amount of gas – about 55.08 Trillion Cubic Feet – there has been a lot of expectation that poverty in Tanzania will radically be reduced; but this is only possible if there is an adequate participation of local inputs in the development of gas and oil business. However, unfortunately, Tanzania currently lacks adequate participation of local content in the sector. It is estimated that only 5-15% of local content participate in the oil and gas sector (Apson, 2013, pp 7-11).

As a response to such a situation, the Tanzanian Government has put in place a regulatory framework in order to ensure the development of local content and efficient management of oil and gas (URT, 2015; 2014; 2013; 2003). The government has further given the Tanzania Petroleum Development Corporation (TPDC) - a national oil company - authority to regulate the development of the sector’s upstream activities. Other stakeholders join hands by providing training, organising conferences and exhibitions. Some stakeholders have provided scholarships for petroleum related degree courses at various higher learning institutions in the country such as the College of Engineering and Technology (CoET), University of Dodoma (UDOM), Nelson Mandela African Institute of Science and Technology (NMAIST). Scholarships were also provided for students attending such courses at universities abroad; one such case being the Aberdeen University in the United Kingdom. The Vocational Education and Training Authority (VETA) also organizes other skills development programs in oil and gas.

In support to the development of local content for oil and gas sectors in poor countries, the Evidence and Lessons from Latin America (ELLA) program organized a platform whereby activities such as online modules on local content development and a study tour to Ecuador were conducted, and a researcher from the Science, Technology and innovation Policy Research Organization (STIPRO) participated. This platform provided yet another opportunity for fine-tuning the Tanzanian local content development strategy. This policy brief reflects on the lessons derived from this program, focusing mainly on technological capabilities.

### Conceptual Construct

The conceptual framework for analyzing the lessons is based on key concepts of local content development (LCD) such as local content, framework and outcomes. Local content can be achieved within a framework of local policies, legislations and contracts for oil and gas sector (Mushemezi and Okiira 2016). The design of local content framework in the oil and gas sector takes into account issues regarding production sustainability, enhancement of

The Science, Technology and Innovation Policy Research Organisation (STIPRO) is an independent think tank engaged in policy research in Science, Technology and Innovation (ST&I) in Tanzania with a view to contributing to the resolution of the contemporary and complex issues in ST&I for the purpose of informing ST&I policies in the country.

development beyond revenues and avoidance of resource curse, that resource rich countries mostly experience (Herrera and Morales, 2016: 6). To avoid the curse therefore, the said framework must enforce the creation of conditions for expanding the benefits of the oil and gas sector into other areas of the economy; in other words strategies must involve successful development of local content, which include local employment, skills development and participation of local companies in oil and gas value chain, including input suppliers.

Depending on countries priorities, the emphasis of local content is more on the level of requirement for local workforce and competitive local supplies. Effective implementation of such strategies has often led to varied local content outcomes in countries.

However, the extent of outcomes depends on several factors such as the level of the government commitment to implement local content framework, improvement of the business environment, establishment of enterprises centres and technological capabilities of local suppliers. The nature of the oil and gas value chain is highly specialized; it requires standards in goods and services, which require specialised skills and knowledge, and technological capability building (TCB) is key in the process. TCB entails a process of accumulating and developing resources needed to generate and manage technical changes (Bell and Pavit 1995; Figueiredo, 2001). Resources in this case imply knowledge, skills, technology, experience, structure and linkages as well as organisational systems. The process of TCB moves from the undertaking of basic and routine innovative activities (activities of low level technological capabilities) to the ability of performing more efficient and higher level's innovative activities.

### **Key Lessons derived from the ELLA Program**

When lessons from the ELLA program were analyzed in the light of the above conceptual framework, the following key points could be derived:

#### ***Political dimensions: Government commitment matters***

The relative success of Ecuador in the development of its oil and gas sector can be attributed to the government's commitment in influencing technical, economic, and social changes; and in improving the business environment. For example, the National Energy Efficiency Agenda 2016 -2040 was put in place with emphasis on energy efficiency and strengthening of the innovation eco-system. The energy efficiency was adopted in Latin America as an approach to run the oil and gas by reducing energy losses and environmental pollution. Through a programme known as the Optimización Generación Eléctrica and Eficiencia Energética (OGE&EE) at the Petroamazonas, which is the state-owned oil company, Ecuador supported the reduction of gas flaring, which caused several negative side effects, such as, soil depletion, pollution, and climate change by emission of carbon dioxide. The process also promoted efficient use of energy and therefore increased productivity of the industry. Tanzania can learn from the approach by investing more in efficient technologies, which facilitate increase in industrial productivity and reduction of environmental pollution.

#### ***Management of production and use of knowledge is extremely important***

With regard to knowledge management system, Ecuador has established a Ministry of Knowledge and Human Talent (MCCTH). The MCCTH does not have a direct mandate of a ministry but acts as a public observatory within the state. The ministry is responsible for coordinating policies among ministries, meetings and discussions around the creation and development of a knowledge community as well as the transformation of the oil and gas industry, research and technology. Furthermore, the government has put in place a national committee for quality assurance that discusses quality policies. The committee involves different stakeholders such as the institutes that deal with the control of sanitary measures, i.e. phyto-sanitary, hydrocarbon, and energy efficiency. The committee complies with the World Trade Organisation (WTO) regulations and uses technical standards for introducing institutional changes. Tanzania should put in place an agency for knowledge management, at least for gas and oil sector as part of its local content development.

#### ***Collaboration at national and regional levels is important***

Collaboration at national and regional levels enables actors to learn from each other and fuel resources needed for local technological capabilities. The collaboration is especially important for stakeholders, such as, policy makers, both public and private sectors, R&D organisations, companies and Universities to facilitate the generation and diffusion of knowledge, technology and innovation. In Latin America, the collaboration happened at both country and regional levels. In Brazil, for example, frequent interactions between COPPE (the post-Graduate and Engineering Research Institute of the Federal University of Rio de Janeiro) and Petrobras - the national oil company, helped Petrobras climb the technological capability ladder to the extent that they can now design tools related to offshore structures (Djeflat, 2016: 8).

Another lesson comes from sharing capacities between national companies and technology providers. The OGE&EE project built first own internal capabilities in designs, which were later used by R&D centres for technology development. This is important because such a collaboration and division of labour help produce appropriate technologies needed in the national companies.

At the regional level, Latin America decided to go for product specialisation in their countries in order to reduce technology import and promote local suppliers of technologies. These measures increased the regional market access through putting in place the regional standardization and establishment of a coordinated regional procurement system. The measures helped to build and develop capabilities of the actors in the region. Likewise, Tanzania should forge similar collaboration both within the country and in the region – with countries that are also developing their oil and gas sectors.

### ***Financing of technological capabilities is important***

A well thought out strategy for financing the building of technological capabilities of local suppliers is important for successful local content development. The strategy helps stimulate knowledge creation, innovation, and patenting. Brazil is a good example in terms of financing for technological capabilities of local content. The Brazilian government allocates a remarkable budget of 1.27% of GDP for Research and Development (R&D) activities (Ingenios, 2016). In addition, there is a policy that requires the International Oil Companies (IOCs) to allocate 1% of their gross revenues to support local R&D centres and develop competences of local suppliers (Global Local Content Council, 2015 cited in Herrera and Morales 2016). As a result, about 97,000 Brazilians, which included technicians, engineers and other professionals, were trained under the PROMINP 2003 programme. The number of local suppliers has also increased dramatically since 2004, from a registration of 14,000 to 19,000.

Another case for consideration is the OGE &EE project from Ecuador. The project gets large funding from technology companies. On its own, it pays small amounts of shares based on the results of the actual performance test, which is in accordance to its policy of “no cure no pay” (Berend van den Gerg, 2016). This mode of payment requires enterprises to build own capabilities to negotiate business terms with other actors.

Tanzania can learn some lessons from the above cases, first, the share of the budget on R&D activities reflects the level of consideration for ST&I issues that include TCB of local suppliers and industries. The Government of Tanzania committed itself to allocate 1% of GDP for ST&I issues. This was well appreciated because it showed the government’s recognition of the importance of promoting ST&I. However, in reality, available data indicates that the government provides only about 0.4% of the GDP (NEPAD ASTII study). Reflecting on the total national budget of 17,798.1 billion Tanzanian Shillings for the fiscal year 2016/17 (URT, 2017: 7), it is obvious that the budget allocated for ST&I activities is still below target of reaching critical mass. The Brazilian case should therefore be reflected upon when considering additional sources of funding for promoting technological capabilities of local suppliers. Based on that, the Tanzanian government should put in place policies that help explore and exploit additional sources of funding. For instance, IOCs operating in the country should, therefore, be considered to be among the sources of funding. At the micro-economic level, firms need to build own capabilities in negotiation and resource mobilisation.

### **Conclusion and Recommendations**

Local content development has been widely adopted by resource rich countries as a strategy for participation which is beneficial to the local population. This will only be possible if technological capabilities are built within national companies and suppliers of goods and services for their efficiency, competitiveness and sustainability. Based on the evidence and lessons derived from Latin America, it is concluded that,

- The Government is advised to commit itself in designing policies that will push for the adoption of more efficient technologies. These are essential for efficient energy production and helpful for industrial productivity;
- The Government is advised to establish an Agency that will be mandated with managing knowledge production and use for the development of the sector. The main objective will be to forge collaboration among stakeholders involved in the oil and gas sector, hence creating synergy that will fuel resources needed for technological capabilities;
- The Government is advised to review the national budget allocated for ST&I activities in the country and consider achieving the promise made of allocating of 1% of the GDP for ST&I issues, and in addition to consider other sources of funding for technological capability building, such as IOCs;
- The private sector is advised to initiate internal resource mobilization strategies that particularly target financing local enterprises for technological capability building.

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This brief was developed as part of the [ELLA Program](#). ELLA, which stands for Evidence and Lessons from Latin America, is a south-south knowledge and exchange program that mixes research, exchange and learning to inspire development policies and practices that are grounded in evidence about what works in varied country contexts. The program has been designed and is coordinated by [Practical Action Consulting \(PAC\) Latin America](#), in line with the objectives agreed with the funder, the [UK Department for International Development \(DFID\), UK Aid](#). The [Institute for Development Studies \(IDS\), Sussex University, UK](#), supports on research design, methods and outputs. For other ELLA publications and knowledge products got to [ella.practicalaction.org](http://ella.practicalaction.org).



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