

ROLE OF THE COLLEGE OF BUSINESS EDUCATION (CBE) IN THE FAST GROWING BUSINESS IN THE ENERGY AND MINERAL SECTOR IN TANZANIA

George Sylvester Oging, Assistant Lecturer, Department of Information Communication and Technology (ICT), College of Business Education, Bibi Titi Mohammed Road, P. O. Box 1968, Dar es Salaam, Tanzania, Mobile: +255 753 717343
E-mail: george.oging@y7mail.com

ABSTRACT

The energy and mineral sector is now being viewed as one of the major players in Tanzania's economic development. While extensive explorations of oil, natural gas and various types of valuable minerals are ongoing in the upstream operations as well as business in the downstream processes, the apparent deficiency in the national expertise due to the infancy of the industry suggests undertaking of the necessary actions to address it in order for the country to benefit tangibly from the endowed natural resources. The objective of this paper is to view the CBE present capacity and then assess its capacity building needs in order to address the national expertise needs for the industry downstream operations of transportation, distribution and marketing. The College can competently play the role given the relevant diversification of its curriculum disciplines. After analysis of the diversification programme and the requisite needs for the capacity building process, subsequent procedure will entail development of suitable training programme by the college to address the major activities in the fields of transportation, distribution and marketing. Suitable curricula and competent teaching staff will have to be developed. The College will therefore be enabled to produce experts relevant to the needs of the growing business in the energy and mineral sector annually starting with National Technical Award Levels 7&8. Enhanced business practices in the energy and mineral sector will have implications for the national micro and macro-economic development. Business development in the energy sector is both technical and capital intensive and may have implications for the theory. Collaboration with the relevant parties will greatly improve all implications.

Key words: *The fast Growing Business in the Energy and Mineral Sector in Tanzania*

INTRODUCTION

The Energy and Mineral Sector is comprised of two sub-sectors, namely the Energy sub-sector and the Mineral sub-sector, therefore adopted as the Ministry of Energy and Minerals (MEM). On the other hand, there are corporate bodies and companies administered under the sub-sectors. Among them are the Tanzania Petroleum Development Corporation (TPDC) and Tanzania National Electricity Supply Company (TANESCO) Limited which fall under the Energy sub-sector and the State Mining Corporation (STAMICO) in the Mineral Sector. While TPDC is responsible for development of the

petroleum industry in the country, TANESCO on the other hand is responsible for production, supply/distribution and marketing of electricity countrywide and STAMICO is responsible for mineral development in the country.

TPDC allocates oil and gas exploration blocks onshore (terrestrial areas) and offshore (transition zones/aquatic areas) to prospective exploration companies under a 'Production Sharing Agreement' (PSA) system in which the cost-benefit analysis is agreeable by the parties. The recent National Gas Policy (2015) clearly underlines the role of the energy sector in the national socio-economic development efforts with consideration of our natural gas resources. Exploration work is ongoing and quite a number of big foreign companies have been licensed to prospect for oil/gas in various potential areas as presented in the Tanzania Petroleum Development Corporation (TPDC) exploration activity map (2014) and in the recent years a substantial amount of natural gas discoveries has been made onshore and offshore locations in Tanzania, totalling 57.25 trillion cubic feet (MEM, March, 14th 2016-official announcement). While the exploration work continues, the Government aspiration to ensure the nation adequate and sustainable electricity power supply and industrial prosperity prompted the undertaking of the ambitious gas pipeline project from Mtwara and Songo Songo to Dar-es-Salaam which has been carried out very successfully as a major activity of the industry. Therefore, an amount of the already explored natural gas is now being used for electricity generation and other industrial operations.

TANESCO on the other hand, has embarked on a big project of rural electrification through the Rural Energy Agency (REA) Program. The objective in this endeavor is to ensure as many as possible of rural areas are connected to electricity in phases to cover the whole country in order to contribute to the government vision of driving Tanzania to the middle-class industrialized countries by 2025. In this regard therefore, electricity power generation must be increased tremendously and the first hand possibility can be seen in the use of natural gas to supplement the hydro-power generation.

As regards to the Mineral-sub-sector, there are already established potential areas of valuable minerals of various types all over the country. Establishment of mineral resources and reserves is an expert procedure which involves office work (literature review for related previous work, re-interpretation and evaluation of the data), field visits to verify the field status, planning of exploration work (regional exploration and detailed exploration), drilling, laboratory analysis and feasibility report. These establishments are mapped and prospectors (individuals/companies) / (small scale/large scale) apply for the relevant licenses and upon acceptance they are allocated exploration areas in different blocks/regions. STAMICO oversees the allocation of the exploration areas/blocks, provision of the relevant licenses and other development activities. Extraction process for the large scale operators is more mechanized as compares with the small-scale miners operation which is highly labor-intensive.

The main challenge we see as regards to the fast growing business in this sector, is the national capability to cope with the development pace in terms of technical competence and local participation. Oil, gas and mineral resources exploration and production are technical and capital intensive and given the understanding that the Sector is relatively new, it is logic enough to believe that technical capacity will be lacking. On the other hand, considering heavy investments involved in the exploration activities, it becomes apparent that local companies cannot participate in the business equally and competently if they are not enhanced technically and financially.

Capacity Building

The present government effort to develop capacity is essentially based on the various fields of activities in the sector/industrial development, each of which requires different disciplines of skills. While relevant expertise in relation to the growing exploration industries in Tanzania has generally been considered within the major disciplines of Engineering, Geosciences, Commercial, Legal and Regulatory, we can also look at the sector needs from the point of view of the major fields of its activities. At the upstream we consider “Exploration,” and thus, view the main fields as seismic surveys (onshore and offshore areas), seismic data processing and interpretation, drilling (onshore and offshore areas), production and petroleum processing in consideration of oil and natural gas in the energy sub-sector. In the mineral sub-sector, the initial stage is establishment of resources and reserves which in addition to literature review and field visits for status check, involve technical processes of Geophysical survey comprising Electromagnetic, Radiometric and Induced Polarization, Geological mapping survey and sample collection, (Geochemical survey) by collecting rock, soil and stream sediment samples, Gridding, Drilling and laboratory analysis. Next, is the commercial extraction of the established resources and reserves and subsequent steps of sorting and partial processing. In the downstream, we consider “business/economics” in which the main fields include transportation, distribution and marketing.

A review of the technical operations in the different fields in comparison with the Energy and Mineral Sector establishment will give a clear insight into the capacity problem in relation to the fast growing business in the sector. An analysis of technical expertise requirement in each of the sections of the major fields of operation will on the other hand aid in developing capacity building programmes.

Subsequent to the establishment of the technical expertise requirement, the College of Business Education can to a great extent cater for the outlined challenges. The College is well placed to competently address the technical needs of the sector in the fields related to the industry business administration, distribution and supply chain and marketing. Presently, the College offers studies in Business Administration, Procurement and Supply Chain, Accountancy and Marketing from Levels 4 to 7. Given the necessary diversification, it can quickly advance to levels 7 and 8 especially considering the long experience in the related prospectus and curricula at the various levels.

The objectives of this paper is to analyze the activities involved in the natural resources exploration and production operations, required technical competences and subsequently evaluate the capability of the College of Business Education to contribute in addressing the technical needs of the fast growing business in the sector. Analysis of step by step exploration processes of the natural resources up to the marketing stage shows that it involve various activities each of which, in many cases require standalone technical knowledge competence.

The knowledge obtained through the above mentioned analysis will enlighten the CBE administration and prompt the same to work on diversification of the college skills and subsequently prepare suitable curricula/programs, well designed to articulate with the needs of the fast growing business in the Energy and Mineral Sector technical competence requirements. When this is achieved, relevant training programs will be conducted to produce local experts for addressing the expertise deficiency.

Conceptually, the curriculum may be considered to incorporate various 'Modules' that include Management Principals, Organizational Behavior, Quantitative Techniques, Marketing Management, Petroleum and Mineral resources Economics, Operational Materials Management, Human resources management, Business Policy and Strategic Management, Supply Chain Management, Petroleum and Mineral resources Laws and Regulations, Petroleum and Mineral Resources Accounting, Petroleum Policy, Mineral Policy, Contract Management, Production Sharing Contracts/Agreements, Petroleum Finance, Mineral Resources Finance, Exploration and Extraction Management and finally Dissertation.

Exploration Processes

As mentioned earlier, exploration of oil, gas and mineral resources step by step up to the production and marketing stages involves a variety of activities. Here we can look at the key ones. With regard to oil and natural gas industry, the major technical activities start with seismic survey which is the method of investigating sub-surface structures, particularly as related to exploration of natural resources and deposits (petroleum and natural gas)-Sheriff R.E and Geldart L.P. (1982). Upon positive indication of potential hydrocarbon reserves after data interpretation, the next step is drilling which may result in hydrocarbon exploration/presence or a dry well. Drilling processes are well elaborated in Sereda H.G.; Solovev E. M. (1988). Completion of the drilling operation is followed by either well testing or well abandonment as elaborated below:

In the event of a well discovering hydrocarbon that warrant a testing programme, the well is temporarily abandoned and the rig removed from the location. All procedural and precaution arrangements will be put in place and testing carried out by well experienced experts.

If a hydrocarbon bearing formation is not found or if the structure is not commercially viable, the well will be plugged and abandoned. The well is plugged with mechanical and/or cement plugs, which effectively seal the wellbore. The well head equipment is then removed and the drilling rig is stripped down for transportation.

In the case of discovery and successful well testing, processing may be carried out at the source, particularly where substantial quantities warranting establishment of a processing plant has been explored. Where a number of potential wells exist in a common geographical location, one processing plant may serve their processing needs depending on the capacity and then distribution and marketing may be carried out where applicable pre-requisites have been established. Another alternative is development of transportation system (pipeline) and transportation to a more suitable distant area where processing, distribution and marketing can be done more economically locally and eventually export.

As for the minerals, to establish their presence and reserves/potential, various technical processes are undertaken, as described earlier under capacity building. Prospectors who apply for relevant licenses are allocated potential areas in different blocks. Extraction may be mechanized, particularly for the large scale but also labor intensive for the small scale operators. Following a successful mining and realization of the potential, the products are sorted, cleaned/partially processed and prepared for transportation and marketing. In most cases, in real commercial operations markets are pre-determined

Technical needs gap analysis

The preceding analysis of the exploration and production operations reflects quite a number of sections and activities that require various technical/professional knowledge/curricula. Most important disciplines include: Environmental and Social Impact Assessment (ESIA), Geology, Seismic survey, Health safety and Environment (HSE), Medicine, the Mechanics for (Drilling rigs, Hydrocarbon processing plants, Well testing equipment), Administration and Transportation. There is no an “all encompassing programme” of technical/professional training that caters for the needed expertise in those disciplines. Examination of the national situation in terms of requirement can be analyzed based on the above listed pre-requisites of the industry operations:

Environmental Impact Assessment: EIA is a mandatory requirement in mineral, oil and gas projects. This requirement is adhered-to in accordance with the Environmental Impact Assessment and Audit regulations, 2005-G.N. No. 349 of 2005. The University of Lands and Architectural designs offers degree courses in Environmental sciences and EIA is one of the major subjects. Those who graduate there can carry out EIA studies and produce good reports given good field experience. The National Environment Management Council (NEMC) has a fairly good number of registered individuals and firms-‘Environmental Experts’ of different disciplines; ref. Government Gazette (ISSN 0856-0323

No.13 of 1st April, 2011 and ISSN 0856-0323 of 5th April, 2013) and these can sufficiently address the need in the industry as of now.

Sub-terranean structures-formation and geology: The Ministry of Energy and Minerals (MEM) and Tanzania Petroleum Development Corporation (TPDC) have very limited capacity to cope with the development pace given the understanding that they are the key players. Their numbers as according to their establishments are: MEM-Petroleum Geologists 10 and Petroleum Geochemists 2; TPDC-Petroleum geologists 15, Petroleum Geophysicists 13 and Petroleum Geochemists 6. The case is much better in the Mineral sub-Sector because it has a well established Department of Geology in the University of Dar-es-Salaam, which consequently has addressed the deficiency better than in the former.

Medical: Generally, we do not have sufficient doctors of different specialties in Tanzania hospitals. Therefore, needs in this regard, for the fast developing industrial operations cannot be addressed simultaneously by the doctors now saving in the hospitals. Therefore, a special provision may be required to cater for it

Drilling, Drilling rigs, processing plants and well testing equipment: The specialties identified in the Ministry of Energy and Minerals and TPDC are multi-disciplinary. Given this understanding and consideration of the indicated strength, these components can be addressed by the same in overseeing the operations only. If full employment needs are felt, a special training programme may be conducted according to the requirement.

Administration: Considering the need for good and clear articulation with the foreign investors/operators in the business deals and evaluations, consideration of high level of oral English proficiency and other international languages may be the main concern more than the numbers.

Transportation and marketing: Pipe lines for gas and oil and trucks/wagons are considered in this case and expertise in their establishment and operation is not locally adequate. Marketing goes along with transportation and distribution channels. Minerals have not much problem in transportation and marketing because in most cases they are not bulky and as said earlier, export markets are in most cases known.

Apart from CBE which is well placed to address the technical needs in the downstream activities of the developing business in the Energy and Mineral Sector, there are other institutions which can also cater for the same needs as well as those of the upstream activities as analyzed in the discussion below:

RESULTS AND DISCUSSION

We have seen the technical needs in the various industrial operations in relation to the developing business in the Energy and Mineral Sector as well as a general outline of deficiencies. When considering staffing in the various sections, the question of professionalism will feature in prominently. Sufficient expertise will need to be developed in the major seismic survey fields, seismic data interpretation, seismic data processing, drilling, production and petroleum processing at the upstream; transportation, distribution and marketing at the downstream. On the other hand, in the Mineral sector, Geophysical survey-Electromagnetic, Radiometric and Induced Polarization, Geological mapping survey and sample collection, (Geochemical survey) by collecting rocks, soil and stream sediment samples, Gridding, Drilling and laboratory analysis are important technical needs in the upstream operations; while sorting, partial processing, handling and marketing are essential in the downstream .

It has also been realized through this analysis that some of the Tanzania universities, including those of Dar-es-Salaam and Dodoma offer studies to some levels in some of the major disciplines listed above (Engineering, Geosciences, Commercial, Legal and Regulatory), but they do not wholly address the anticipated development needs of the growing industry in the major fields. Besides, practical experience may be lacking or inadequate if at all. Actions supporting capacity building in the relevant higher education institutions in the country to address the capacity needs of the growing business in the Energy and Mineral Sector at the upstream and downstream sections of operations will involve diversification and improvement of their curricula/syllabuses. The Colleges e.g. College of Business Education (CBE), Dar-es-Salaam Institute of Technology (DIT), Institute of Finance Management (IFM), Arusha Technical College and Tanzania Institute of Accountancy (TIA) are better placed to address the development needs given the necessary diversification of skills and improvement of curricula.

The capacity building approach will be two-fold; first of all, developing a programme to address the professional and technical needs of the higher learning institution in relation to the afore-mentioned fields of operation and secondly production of the required experts at various operations/development levels. Developing such expertise will entail identifying the relevant disciplines and preparing comprehensive curricula covering the various fields in relation to the promotion of the developing business in the Sector. The task will require in-depth expert review and scrutiny for which collaboration with other experienced parties may be sought from within and outside the country.

For effective capacity building at the College of Business Education in relation to the growing business in the Energy and Mineral sector, the major pre-requisites that must be developed or established include, but not limited to suitable curricula, qualified teaching staff of different

disciplines, relevant and adequate pedagogical material, infrastructure facilities, well organized industrial attachment for students' practical experience and establishment of adequate and sustainable funding source.

As noted earlier, oil and gas industry in particular is relatively new in Tanzania; and although notable developments have been realized recently, it has mainly been through foreign parties and companies. As for minerals, small scale mining has been ongoing for a long time but without much contribution to the individuals or the nation. National expertise to cope with the developments is deficient and there is great need to improve capacity. In this regard therefore, addressing the requirements for establishment of the proposed study fields and sustainably carrying out effective capacity building in the promotion of the sector needs will entail close collaboration with other parties possessing the correct expertise.

Even though there are a few experts who have had some knowledge in these intended new fields of study, they may not be able to form a core team solely competent enough to prepare comprehensive curricula for the various disciplines. This is the situation that calls for collaborative effort in getting the relevant expertise to prepare the correct and comprehensive curricula in areas with deficiency. There are Universities abroad that offer such studies and also related industries which are operational where experience may be copied. The approach may be collaborative and interactive so that there will be interactions with all relevant parties for data and information gathering/sharing and discussions. There may also be visiting arrangements and/or on-line communications. To start with, there will be provision for overview of the existing related curricula to see how best they can be improved or new ones developed to suit the needs of the industry, sector, institution or match with international standards.

A programme will be developed in collaboration with related partner Universities outside the country that offer such studies competently so that we can develop adequate number of graduates at MSc. and PhD levels. Programmes can be developed with practical experience from abroad and within the country. It may be within this exchange programme also that even best practices for "Public Awareness Development Process" concerning the industry may be adopted from experience for effective application in order to avoid unnecessary conflicts in the operations.

Local and foreign related industries and companies will be identified and a streamlined programme of 'university-company/industry' arrangement that may warrant attachment of students for industrial and practical training will be established. In case the local industries are inadequate/unsuitable arrangements may be made for short term attachments in related industries abroad. The licensed and operational related companies will also be requested to accommodate the attachment programme. Undoubtedly, as the sector business develops further, the number of associated industries will also increase and therefore ensure more room for practical attachment locally. Two approaches may be

adopted to solicit funding for the various activities described above. The first one will be from related international organizations/agencies including the European Development Fund and others. The second will be loans from local Financial Institutions.

CONCLUSION AND RECOMMENDATIONS

Conclusion

Although the first impression of this paper features more on needs and approaches for developing technical/professional capacities in the College of Business Education so that it can cater for the needs of the fast growing business in the Energy and Mineral Sector, the overall message of the text goes further as it enlightens planners and education authorities on the need for preparedness to effectively benefit from the opportunities that come with the development and utilization of our endowed natural resources. It is without debate that enhanced degree of local capabilities to participate effectively in the development and utilization of our natural resources will have implications for micro and macro-economic developments. In the micro-economic consideration, employment of locals, local business prosperity and local taxes contribute to the households' incomes development as well as improvement in the provision of the essential public services. On the other hand, export earnings of foreign currency, royalties and other state taxes contribute to the macro-economic development.

In the preceding descriptions under different sub-headings, we note from capacity building sub-section the major technical components that need to be developed in consideration of the sector business operations in the industrial upstream and downstream operations. Besides, a review of the exploration process has provided a description of step by step approach to the natural resources exploration and production, leading to the final level of marketing. This analysis has also identified and indicated the technical fields that need to be addressed for effective participation in the fast growing business in the Energy and Mineral Sector of Tanzania.

On the other hand, a brief overview of the technical needs gap identified some key fields pertinent to the exploration and production of the natural resources. These included Environmental and Social Impact Assessment (ESIA), the mechanics of the exploration and production plants, machinery and equipment. Analysis has indicated deficiency in the sector technical needs particularly in terms of quantity. Although the actual need for addressing the fast growing business in the Energy and Mineral Sector is yet to be established, the identified strength in the sector is small compared to the extent to which the sector industries are developing. It is interestingly noted however that most of the technical/professional competencies noted in the sector establishment and TPDC are multi-disciplinary and therefore can be applied to address needs at various relevant fields. In the marketing component, the main concern is seen to be transport system more the availability of markets. For oil/gas for example, relevant logistics and facilities are important in order to send the product to the desired

market/use destinations. The case of minerals as said earlier is not that much complicated except where sorting is done elsewhere.

Considering the preceding description, it can be concluded that in addition to the College of Business Education (CBE) which is our concern, there are also other institutions including the Institute of Finance Management (IFM) and Tanzania Institute of Accountancy (TIA) that can play a role in capacity building in relation to the downstream activities covering the areas of distribution and marketing given the necessary diversification. On the other hand, the Dar-es-Salaam Institute of Technology (DIT) and Arusha Technical College can address the areas relevant to the upstream operations. Diversification and effective capacity building in the CBE and the other Institutions of Higher Education that offer studies relevant to the Energy and Mineral Sector industrial business development will have implication for sustainable provision of experts of various categories for the operations. Enhanced capacity in the industry operations will on the other hand have implications for sector policy on development planning and operations.

It has been said earlier that exploration and production in the energy and mineral sector is highly capital intensive. Therefore development of the necessary capacity in the industry operations will have implications on the industrial development because with sufficient technical know-how capital investments can be sourced from development banks through preparation and presentation of good technical development plans.

More specifically, enhanced capacity in the developing sector business can be seen from the perspectives of employment opportunities and economic development. As mentioned earlier, in the micro-economic consideration, increased employment opportunities will lead to better income and improved socio-economic condition at the individual and household levels. On the other hand, employment of local personnel will reduce costs of the initial and operational investments which is advantageous to the government and consequently contribute to the needed boost in the national economy. Besides, exports will earn the country the much needed foreign currency, while payments of royalties and other taxes will enhance the national capacity to more adequately provide the necessary services

Furthermore, when adequate and relevant expertise is developed at the national level, it is expected that good and equitable contracts will be signed and the government will benefit from wise and profitable investments. Although exploration and production of the natural resources are both capital and technical intensive, in situations where good enabling policies and technical know-how exist, local companies can always be enhanced to participate successfully in the business operations. Therefore, development of the necessary expertise can be considered as the primary need for local business companies' participation in the business developments and operations

Recommendations

Considering the government ambition to transform Tanzania from the present state of development to the mid-class industrialized countries level, it is not a choice, but a must that efforts should be enhanced to increase technical capacity in the sector's fast growing business so that we can benefit substantially in the endowed natural resources. It is therefore recommended that local technical capacity building in the fields related to the sector's industrial development and operations be initiated and implemented forthwith.

There may be different approaches for developing the technical capacity and one of the recommendation would be developing a programme to address the professional and technical needs of the higher learning institution in relation to the afore-mentioned fields of operation in the downstream section and secondly production of the required experts at various operations/development levels. Developing such expertise will entail identifying the relevant disciplines and preparing comprehensive curricula covering the various fields in relation to the promotion of the fast growing sector business. The task will require in-depth expert review and collaboration with other experienced institutions. Therefore suitable Curricula, Qualified teaching staff of different disciplines, infrastructure and facilities, well organized industrial attachment for students' practical experience and establishment of adequate and sustainable funding sources are the main considerations..

REFERENCES

- CBE, (2012/13): Prospectus.
- Sereda H.G.; Solovev E. M. (1988): Oil and Gas Well Drilling.
- Sheriff R.E and Geldart L.P. (1982): History, Theory and Data Acquisition: (*Exploration Seismology Volume I*) pp. 253.
- URT, (2013): The Gas Policy.
- URT (2003): The National Energy Policy.
- URT (2004): The National Environmental Act.
- URT, (2015): The Petroleum Act.
- URT: (2005): The Environmental (Registration of Environmental Experts): *Regulations, 2005 – G.N. No. 348 of 2005 and The Environmental Impact Assessment and Audit Regulations 2005 – G.N. No. 249 of 2005.*
- URT, (2011): List of Environmental Experts. *Government Gazette No 13 ISSN 0856-0323;*
- URT, (2013): List of Environmental Experts-*Government Gazette No 13 ISSN 0856-0323;*