

# PROPOSED INTERVENTIONS FOR THE TECHNICAL INDUSTRIAL AND VOCATIONAL ENTERPRISE TRAINING (TIVET) SECTOR IN KENYA

**Maina Maringa**

Technical University of Kenya

P. O. Box 52428-00200, Nairobi, KENYA

[maina\\_maringa@yahoo.com](mailto:maina_maringa@yahoo.com)

---

## ABSTRACT

*This paper presents a brief overview of TIVET in Kenya (history and present), the laws governing TIVET, and its structure and challenges today. A robust review of various relevant concepts that are in use in TVET is presented and solutions to identified shortcomings of the Kenyan TIVET system proposed. The Develop a Curriculum, (DACUM) and the Systematic Curriculum and Instructional Development (SCID) methods of developing demand led and competency based occupational profiles and arising curricula are recommended for adoption in the country's TIVET system. It is further recommended that On-Job-Training is introduced in addition to the creation of strong linkages with industry in order to increase relevance to and absorption of TIVET graduates in industry. The paper touches on the issues of specification and sourcing of equipment and identifies possible source markets. More study is recommended in order to obtain a complete and comprehensive assessment of TIVET in the country.*

**Keywords:** Policy Framework, Curricula, Specifications, Equipment, TIVET Structure

---

## 1 BACKGROUND

The enrolment figures in Early Childhood Development and Education (ECDE) centres in the country stood at 1,204,606 in 2003, in primary schools at 7.2 million in 2004 up from 891,533 in 1963, in secondary schools at 850,000 in 2004 up from 30,000 in 1963, and in both public and private universities at 72,000 in 2003 up from 3443 in 1970. The 14 Public and 8 private Teacher Training Institutions recorded enrolment figures of 15,708 and 3,108, respectively, both modest figures compared to the high figures of those not continuing with mainstream education at the end of both primary at secondary school education.

Of the over 600,000 students enrolled in primary school in Kenya in 2006, only 350,000 progressed on to secondary school, and 20,000 eventually got to university, while the enrolment figures in TIVET institutions in the country stood at 71,167 in 2006 and 76,516 in 2007 (Nyerere, 2009).

The Kenyan Technical Industrial and Vocational Education Training (TIVET) system has experienced several changes in its structure over the years as a result of political, social and economic forces notably; the conversion of the then Government Trade Schools to Technical Secondary Schools in 1964, the establishment of Harambee Institutes of Technology in the 1970's, and the introduction of vocational subjects in Primary and Secondary Schools in the 1980's (Ngerechi, 2003; Atchoarena and Delluc, 2002), all which have served to expand the TIVET sector of education. The introduction of the vocational subjects of in Primary and Secondary Schools interestingly was done well ahead of the recommendations of the UNESCO International Workshop on Technical and Vocational Education for Rural Development Delivery Patterns held Ottawa, Canada in September of 1996, to integrate TVET subjects into all primary and secondary school curricula for all students (Black, 1997).

Atchoarena and Delluc (2002) observed that the TIVET subjects of art, art and crafts, home science, business education, agriculture and music offered in Kenyan primary school are not intended to grow specialists but rather to create awareness and thus grow a positive attitude to the addressed trade areas. The TIVET subjects of home science, art and design, agriculture, metalwork, woodwork, building construction, power mechanics, electricity, drawing and design, accounting, commerce, economics, typing with office practice, and aviation technology, were offered in Kenyan secondary schools and students given opportunity to specialise in an area of their choice in the final year of their secondary school education. Ghana, Senegal and Swaziland are other countries in Africa in which some vocational content has also been introduced both at primary and secondary school education, in order to better prepare students who do not continue beyond either primary or Secondary School for the job market.

With over 3891 secondary schools in 2004, up from 151 in 1963, the academic school system has seen a comparatively greater expansion compared to that of the TIVET system which is comprised of:

- 4 national polytechnics with a total enrolment of 9,000 students. Two of these polytechnics have recently been converted into degree offering university polytechnic colleges,
- 16 institutes of technology and 19 technical training institutes [15 and 23, respectively, according to Atchoarena and Delluc (2002)], catering for about 13,000 students,
- 1 Technical Teachers' Training College,
- 600 youth polytechnics [650 according to Atchoarena and Delluc (2002)], catering for about 40,000 students of which only 350 receive assistance from Government in the form of staff and grants for equipment and facilities, while the rest are community funded and managed, and
- Close to 1,000 privately operated commercial colleges offering courses in computers and non-technical areas of training.

(Nyerere, 2009; Wanjala, 1995)

TIVET in the country presently is characterised by multiple providers, the majority of which fall under MOEST (TIVET at primary and secondary schools, national polytechnics, technical training institutes), while the rest are to be found in for instance the Ministry of Labour and Human Resource Development (institutes of technology, youth polytechnics, and industrial training centres), the Ministries of Industry, Water, Communication, Health, Tourism, and Agriculture. Other TIVET providers include private TIVET providers, as well as government parastatal with institutions such as the Railway Training Centre of the former Kenya Railways, the Kenya Power and Lighting training school, and the National Youth Service Engineering Institute (Ngerechi, 2003; Nyerere, 2009; Wanjala, 1995; Atchoarena and Delluc, 2002). Delivery of standardised curricula and certification in this environment is a serious challenge, as evidenced by the observation by Ngerechi (2003) that in cases where local curricula is not available, some private TIVET providers have resorted to foreign curricula, that were in most cases of questionable standard. This situation is compounded further by the plethora of duplicating legal instruments that have been developed over the years to govern TIVET, including:

- The Constitution of Kenya,
  - The Education Act (Cap 211),
  - The Industrial Training Act (Cap 237),
  - The Higher Education Loans Board Act (Cap 213),
  - The Kenya National Examinations Council Act (Cap 225),
  - The Local Government Act (Cap 265),
  - The Teachers Service Commission Act (Cap 212),
  - The Universities Act (Cap 210B),
  - The Master Plan on Education and Training (1997 – 2010).
- (Ngerechi, 2003; Wanjala, 1995; Atchoarena and Delluc, 2002)

The Industrial Training Act (Cap 237) for instance governs industrial training by:

- Spelling out the management, duties and responsibilities of the Directorate of Industrial Training and its 11 Training Committees,
- Determining levels of training levies and their mode of payment and disbursement,
- Defining training schemes and the procedures of administration and for awarding certificates, and,
- Establishing the rules and certification procedures for trade tests.

The Education Act (Cap 211) establishes and empowers the Kenya Institute of Education (KIE) to develop curricula, and further through its management council comprising of TIVET stakeholders, brings in industry into the curricula development process (Ngerechi, 2003; Wanjala, 1995; Atchoarena and Delluc, 2002).

It is clear from the foregoing that it is necessary to bring TIVET under one umbrella with the authority to harmonise content, delivery, examination certification accreditation, levying, as well as standardising equipment and workshops. The 1970 – 1971 commission of inquiry highlighted the need for training to be managed under one umbrella body (Ngerechi, 2003), a goal that is now about to be achieved with the expected ascension of the draft bill for the formation of a regulating authority for TIVET by Government.

Nyerere (2009) highlighted the aims and purpose of TIVET in Kenya, as stated in the Kenya Education Sector Support Program (KESSP) 2005-2010 to be:

1. Involvement of stakeholders in the development of a national skills training strategy.
2. Establishment of mechanisms and appropriate incentives to promote private sector investments in the development of TIVET for increased access.
3. Provision of loans and bursaries to enhance access to TIVET taking special account to marginalized groups, such as female students and the physically challenged.
4. Establishment of a national coordinating body, the Technical, Industrial, Vocational and Entrepreneurship Training Authority (TIVETA) for TIVET institutions in order to provide relevant programmes and effective management and governance.
5. Mobilization of resources to rehabilitate facilities in public TIVET institutions to ensure quality training.

The objectives of TIVET in Kenya as outlined by Ngerechi (2003) are:

1. Development of appropriate skills at all levels through practical training and work experience.
2. Provision of adequate skilled manpower at all levels of the economy.
3. Active and continuous transfer of technology through collaborative approach between TIVET institutions and the relevant industries.
4. Promotion of dignity of labour and more particularly manual work.

5. Provision of increased training opportunities for the increasing school leavers.
6. Provision of continuous upgrading of skills and knowledge at the pace and ability of the trainees.
7. Provision of a dynamic curriculum responsive to the manpower need of a dynamic economy.

## **2 STRUCTURE OF TIVET IN THE COUNTRY**

Technical education in Kenya today still aggregates itself into the three areas of formal, informal and non-formal. Formal TIVET is one where training is undertaken in established mainstream institutions with clearly rationalised qualifications based on set syllabi, training routines and procedures. Informal TIVET on the other hand occurs at the work place all the time and is used to translate TIVET skills into quantifiable and relevant job performance abilities, while non-formal training does not have specific qualification targets based on standard curricula, rather just focusing in transferring some form of skill, and is to be found predominantly in youth polytechnics. The Government manpower survey of 1972 showed about 80% of the skilled workers to have no formal training beyond primary school, having acquired their skills on the job (Wanjala, 1995).

Ngerechi in 2003 and separately Atchoarena and Delluc (2002), observed that TIVET in Kenya was offered at the following four Levels:

- Artisan level, single trade, two year training in youth polytechnics, as well as on-the-job training in the formal and informal (Jua Kali apprentices) sectors;
- Craft level multi-skill, three year training in technical training institutes (TTIs), institutes of technology (ITs), and Parastatals training institutes, into which artisans are able join;
- Technician level in National Polytechnics (NPs) and a few selected TTIs and ITs, into which craftsmen and secondary school leavers may join in;
- Technologist in National Polytechnics and Universities.

Ngerechi (2003) observed that the present education system provided opportunity for one to reach the level of technologist using one of at least six alternative routes. Nyerere (2009) in Figure 1, sourced from the Ministry of Education document of 2005, showed that provision had been made by Government for a through path for TIVET till the level of Technical Doctorates.

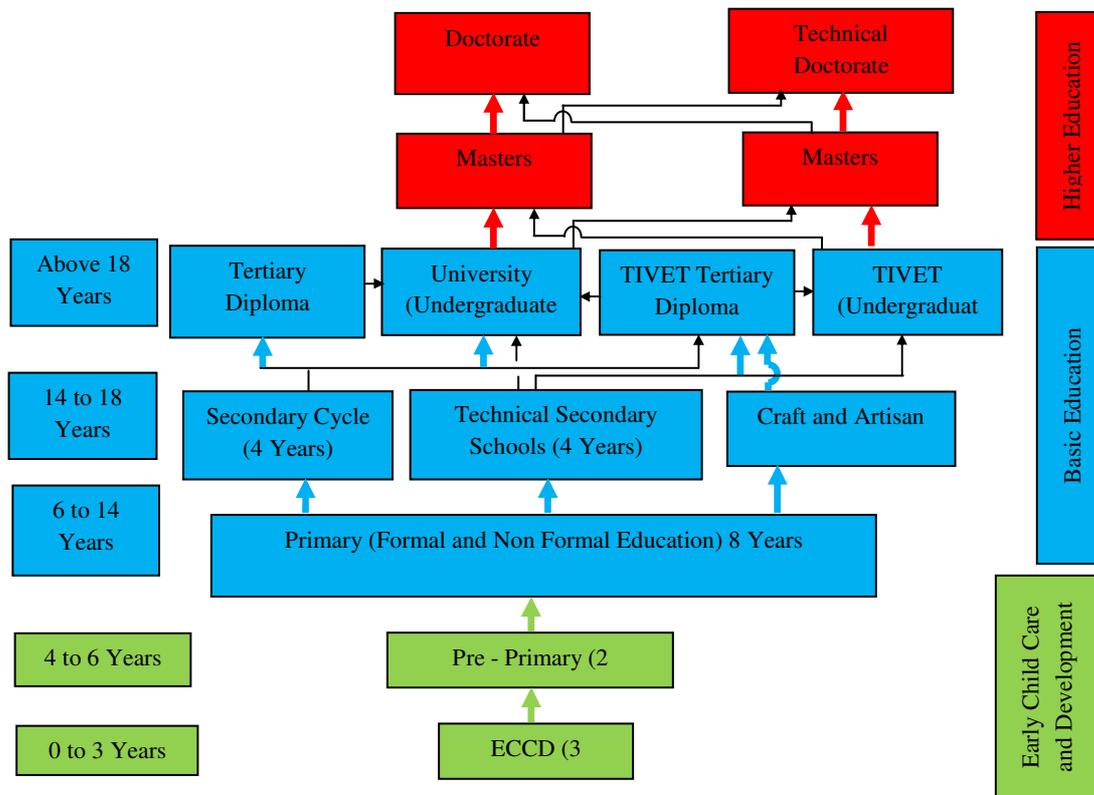


Figure 1: The Structure of the Kenyan Education System [Nyeree (2009)]

### 3 CHALLENGES OF TIVET IN KENYA

The supply side challenges of TIVET as reported by Nyerere (2009) and separately by Ngerechi (2003) include:

- **The terminal nature of TIVET.** This has acted as a severe de-motivation for proponent students of TIVET whose career progression has been limited at a very early stage; at the level of higher diploma or higher national diploma. The effect has been an inability to enter the job market at high levels compared to those pursuing none TIVET studies and stalling of careers once employed.
- **The lack of sufficient training places in TIVET institutions particularly in rural/marginalized areas.** This is a funding constraint requiring novel solutions to increase access without necessarily creating a multiplicity of TIVET institutions.
- **Relevancy of TIVET syllabi to the labour market needs.** Lack of relevance of TIVET syllabi leads to unemployment of its graduates, acts as a disincentive to

proponent students of the system, and serves to defeat the primary purpose TIVET; that of growing practical and employable skills in students.

- **The absence of a legal framework to regulate TIVET.** This creates disharmony in both the processes and standards of training in the country and requires urgent attention.
- **Funding constraints.** Funding of TVET is a challenge the world over as seen from the 2008 figures of 0.2% of GDP funding for TVET, 4.3% of GDP for Early childhood, primary and secondary education, and 1.3% of GDP for traditional tertiary education in the member nations of the Organisation for Economic Co-operation and Development (OECD) (Puckett et al., 2012).

Palmer et al. (2007) noted that since the adoption Millennium Development Goals in the year 2000, donor funding has primarily focused on primary school education and gender parity, with an attendant loss of focus on Post Basic Education and Training (PBET). Donor funding to TVET has also seen a dramatic decline from the early 1990s (Atchoarena and Delluc, 2002). Palmer et al. (2007) observed that while the rates of return to education have traditionally been known to be higher at primary education level, recent studies do show higher rates of return at secondary school level. The nature of modern economies with high demands for skills and technical knowledge, call for education and trainability beyond primary school level as the emphasis shifts from primary school education for the job market to primary school education for higher levels of training and employment (Palmer et al., 2007). Clearly PBET is of significance and must be given support in order to ensure the availability of a well trained and skilled manpower, able to cope with the demands of the present day technology driven economies. Government therefore needs to put aside more funds and should also negotiate with development partners for more funds to be directed to PBET.

- **Shortage of adequately trained TIVET trainers.** The shift in focus by the Kenya Technical Teachers Institute (KTTC) from its core mandate during formation (that of TIVET Teachers Training) to becoming a competitor with TIVET institutions in the offering of formal TIVET is a contributor to this problem.
- **Poorly equipped workshops.** TIVET by its nature is practical and cannot be effectively offered without well equipped training facilities. The high cost of good equipment is of course a challenge due to budgetary constraints but one that demands ingenuity to be addressed.
- **Negative social image of TIVET.** Puckett et al. (2012) observed that TVET was regarded in most countries as being inferior to general academic education, second tier and a destination for students with lesser academic abilities and lower aspirations. This perception they noted creates a negative feedback loop that that in turn limits investment in TVET institutions thus sustaining existing skills gaps and unemployment. Atchoarena and Delluc (2002) pointed to the prevalent attitude that TIVET institutions are the destination for failures in the general education system, as one that needed

change. The recalcitrant attitudinal problem of social esteem in the country (Palmer et al., 2007; Atchoarena and Delluc, 2002), which despite its long existence, having initially gained ground on the basis of poor sell by the colonial government in the form of an adaptive education system, still persists and needs to be tackled if TIVET is to fulfil its critical role in the development of the nation.

- **Creating and firming up industrial linkages with TIVET institutions.** This is necessary in order to ensure the TIVET systems is primarily demand-driven and this way increase absorption of TIVET graduates into the job market. It is also a way of increasing funding of TIVET by industry.
- **Increasing relevance of TIVET to industry.** This is necessary in order to ensure employability of the graduates of TIVET in industry and this way serve to attract more students into the TIVET system.
- **Funding and Demand.** Focusing funding on identified areas of need in the job market is a quick way of ensuring value for TIVET trainees and therefore creation of demand.

The demand side of TIVET challenges as reported by Nyerere (2009) and separately by Ngerechi (2003) include:

- **The low number of jobs available in the formal sector.** This is a most serious challenge as it acts as a disincentive to future TIVET trainees. Atchoarena and Delluc (2002) observed that the steep and continuous increase in the volume of labour force from about 6 million in the 1970s to about 14 million in the 1990s, was accompanied by a gradual decline in the percentage of jobs in the agricultural sector of the country from 86 down to 80, over the over the same period. The corresponding and consistent rise in the percentage of jobs in the service sector and industries, of 9 to 13 and 5 to 7, respectively, over the same period however made up a very small fraction of the total number of jobs in the country.
- **Inadequate involvement of the private sector in TIVET,** particularly in curricula development and financing of TIVET. This is a serious shortcoming as it leads to supply-led TIVET that may or may not have relevance to the needs of industry and the arising lack of employment of TIVET graduates by industry.

#### 4 OVERCOMING THE CHALLENGES OF TIVET IN KENYA

The supply side challenges of TIVET highlighted in the preceding section may be addressed in the order that they have been identified as outlined below.

- **The terminal nature of TIVET** is best addressed by establishing a parallel system of education for TIVET that facilitates those in TIVET to progress right through up to

Higher Degrees, as is the case of academic education. It should be recognised that TIVET by its nature lays more emphasis on creating and strengthening of skills, in addition to imparting knowledge, whereas academic engineering training for instance lays a greater emphasis on imparting knowledge and the means towards creating knowledge. The market niches at start for these two paths are therefore completely different though complementary. In the field, skills and knowledge are intertwined in that the application of well developed skills forms the basis for identification of the limitations of technology based on existing knowledge, and therefore creates impetus for the improvement of technology and advancement of knowledge.

- **The lack of sufficient training places in TIVET institutions particularly in rural/marginalized areas** may be addressed by setting up centres of excellence in well selected locations in the country that ensure good spatial distribution in order to guarantee equity of access. Moreover, a TIVET authority should be established in order to ensure the existence of an integrated TIVET system, as well as optimisation of the training resources in the centres of excellence through sharing of training facilities and other resources.
- **Relevancy of TIVET syllabus to the labour market needs** can be ensured by setting up a demand-led, competency-based curricula development system. This system ensures that industry is involved in the development of curricula, thus guaranteeing that the graduates of TIVET have industry relevant skills. Demand-led, competency-based methods of developing curricula are very key in ensuring the establishment of industry relevant TIVET systems, and are therefore discussed in detail in the next section of this paper.
- **The absence of a legal framework to regulate TIVET** is expected to be addressed by the draft bill for the formation of a TIVET regulating authority that is currently awaiting ascension by government. The body will be responsible for all aspects of TIVET including accreditation, quality control, curriculum development, supporting the creation and sustenance of linkages with industry, training of instructors, as well as sourcing for and provision of funding to the TIVET institutions. The regulating authority is expected to improve the function of TIVET, and therefore the skills of its graduates, while at the same time guaranteeing industry the graduation of students with known skills and knowledge.
- **Funding constraints** should be addressed upon enactment of the draft bill for the formation of a TIVET regulating authority in the country, as Government will find it much easier to finance TIVET based on a national strategic plan for TIVET, which is easily prepared within this framework. It will also be possible for the body to direct donor funding and funds from the private sector in accordance with clear priorities tied to clear outcomes. Moreover, the centres of excellence if well set up with industrial parks / incubation centres, entrepreneurial centres, production units, and research centres, should with time be able to generate sizable incomes to finance TIVET. These alternatives to levying school fees are all the more important given the fact that despite a gradual increase in the nation's Gross Domestic Product (GDP) over the years, the per

capital income of people in the nation has actually experienced a decline (Atchoarena and Delluc, 2002).

The training levy/grant system and the voucher system used in Mauritius (Coowar, 1998) are worth exploring to see what lessons Kenya can learn from it.

The 2/3 and 1/2 national share provision of TVET in Mali and Senegal, respectively, should be studied in order to see how the models adopted in these two countries can be adopted to encourage a greater participation of private TVET providers in the TIVET market in Kenya, particularly given the fact that fees in private TVET/TIVET institutions in the two countries are comparable to fees in public TVET/TIVET institutions. Moreover the students in private TVET/TIVET institutions in the two countries perform better on the average than students in public TVET/TIVET institutions. It is important to note there that though termed private the institutions in Mali are heavily dependent on schools fees paid for the students by the state. The private TVET providers are also stronger in services than industrial fields, the latter which is the largely offered public TVET institutions (Atchoarena and Esquieu, 2002).

- **Shortage of adequately trained TIVET trainers** can be addressed first by reviewing the present shift in focus by the Kenya Technical Teachers Institute (KTTC) from TIVET Teachers Training to becoming a competitor with TIVET institutions in the offering of formal TIVET. Its capability and capacity would also need to be reviewed and a capacity building plan put in place if necessary to ensure that all trainers possess adequate industrial experience in the respective fields that they offer training. The requirement for technical trainers to have up to date industrial competence and know how may be addressed either through regular attachment to industries with modern practices in their respective areas of speciality, or through arrangements with industry to avail their competent technical staff to work with the technical trainers in training within the technical training institutes. The existing training in pedagogy should be reviewed continuously and a section dealing with curriculum development studies introduced in the institute. These two initiatives will ensure best practices in training and delivery of up to date well structured training.
- **Poorly equipped workshops.** With the enactment of the draft bill for the formation of a TIVET regulating authority in the country, the arising strategic plan should be able to clearly identify the requirements of equipment for TIVET in the country, with clear priorities and a sharing arrangement between institutions or clear identification of areas of priority for various TIVET centres, for which funds can be sourced from Government, donors and the private sector; as was proposed in Rwanda through the Integrated Technical and Vocational Education Training System.
- **Negative social image of TIVET** may be addressed by championing a production based remuneration structure, within which industries with their focus on production would most likely place a higher premium on tangible hands on skills or occupation relevant competencies as referred to by Ahmad et al. (2012), than on unproven

deliverables. The higher salary premiums placed on hands-on well developed TIVET skills will inevitably raise the social profile of TIVET with time. Competitiveness in modern industry is based on both the efficiency of production and quality of products, with emphasis on ingenuity and innovation at work, which in turn demands graduates of TIVET that are skilled, knowledgeable, and innovative. While TIVET is regarded as the means towards enhancing competitiveness in the global world economy by supporting and creating industry, constrained formal employment with its weak growth, acts as a disincentive to proponent TIVET graduates (Palmer et al., 2007; Riley, 1999). The prevalent attitude that TIVET institutions are the destination for failures in the general education system (Atchoarena and Dellluc, 2002), can be addressed by creating good linkages with industry that therefore ensure relevance of training and consequent rapid pick up of TIVET graduates (Majumdar, 2008). Majumdar (2008) also noted that close interaction between education institutions and industry/enterprise created platforms for showcasing best practices, latest technologies and their implementation as well as impact on industry. This when coupled with the production based remuneration structure mentioned above, is likely to make access to TIVET institutions competitive for all bright and capable students in the country, and therefore serve the expectations of the country in respect of industrial development well.

- **Creating and firming up industrial linkages with TIVET institutions.** It is necessary that efforts are directed towards attracting industry into TIVET institutions for purposes of ensuring industry-relevance of their training curricula, and in order to encourage industry to fund TIVET institutions, whilst at the same time providing places for apprenticeship training. Promotion of entrepreneurship training in this sector of education enhances the capacity of its graduates to effectively address the needs of society through development of enterprises that will have an automatic linkage with the parent TIVET institution, whilst at the same time raising the profile of the sector in society.
- **Increasing relevance of TIVET to industry.** The observations of Afenyadu et al. (1999) on the importance of understanding the role that learning-led competitiveness (LLC) can play in improving the competitiveness of enterprises in Africa, and the concurrent observations that education is necessary but not sufficient for the success of enterprises, that there is no evidence to justify the assertion that basic education has a significant impact on individual productivity and performance of enterprises, that higher levels of education are necessary together with good market conditions for enterprises to succeed, that training and skills upgrading is necessary for the development of sustainable livelihoods, that it is not clear whether enterprise training can develop the appropriate skills to access new high value markets and respond to important technological changes, are relevant here. Ahmad et al. (2012) observed that sustained industrial growth requires development of competitive abilities which they noted are anchored by industry relevant competencies of the workforce.

Clayton (2012) underscored the need for TVET trainers to be highly skilled and industry savvy in order to ensure imparting of skills that meet the needs of industry. They further observed that changing client demands, regulatory and technology changes

would continue to pose a challenge of relevance by TIVET to industry. Several means of ensuring currency of TIVET trainers to industry were indentified in their work including; continuing professional development, engagement with industry, attendance of seminars and conferences, product manufacture/vendor training, reading of industry magazines and newsletters, and networking. The shift from supply led time bound training to flexible, competency and demand led training was recommended as a strategy for increasing relevance of training for industrials and economic development in the national skills strategy, 2008 – 2013, of the Government of Pakistan (UNESCO, 2009). Moreover, recommendations were also made for the involvement of industry in the development of policy, standards and programs, and in the operations of TVET institutions, reliance on labour market developments, and occupational analysis, to the same end.

- **Funding and Demand.** The voucher mechanism introduced by the World Bank through its Micro and Small Enterprises Training and Technology Project aimed at stimulating demand for business development services, including training, technology, and specialised management and marketing consultations, is worth referencing in order to learn from its impact on the Jua Kali sector (Riley et al., 1999), which takes in a big portion of the primary school leavers in the country who enrol in it for informal enterprise training, and which despite the low pay and poor job security prevalent in it, has over the years recorded impressive growth with reported employment growth figures of 6.3% in 2006 and 6.1% in 2007, and which today absorbs about 70% of the 500,000 new entrants into the labour market annually (Nyerere, 2009; Atchoarena and Delluc, 2002).

One good way of promoting hands-on entrepreneurship training in TIVET is through the setting up of business incubators. Business incubators are already a focus of attention by Government which has over the years overseen the introduction of entrepreneurship education in TIVET institutions and establishment of small business centres through which entrepreneurs and educators could exchange experiences and bridge the knowledge gap of the latter (Wanjala, 1995). Nyerere (2009) notes that the African Development Bank did in 2008 set aside USD 37.2 million in support of this Government program in TIVET amongst other identified TIVET priorities. Setting up of industrial parks within TIVET institutions, and growth of a strong industrial based research and development culture within TIVET institutions that is strongly linked to industry and one that is also guided by the real needs of people, is a good way of raising the social value for TIVET as it demonstrates its relevance to society; as was proposed in the Integrated Technical and Vocational Education Training System of Rwanda. Government assistance should not however, be restricted to the formal setting of business incubators and industrial parks, but should also be spread to the Jua Kali sector in the form of financing and logistics wherever entrepreneurs with the will and whose products/services have the potential for improving the lives of those participating in the enterprise as encountered (UNEVOC, 1998).

The demand side challenges of TIVET highlighted in the preceding section may be addressed in the order that they have been identified as outlined below:

- **The low number of jobs available in the formal sector.** This challenge can only be addressed indirectly by the TIVET sector through the training of a competent and skilled workforce in sufficient numbers that is able to meet the requirements of industry. Moreover the sector is able to contribute towards the generation of jobs in the economy through entrepreneurship training and establishment of business parks and incubators.
- **Inadequate involvement of the private sector in TIVET, particularly in curricula development and financing of TIVET.** This is best addressed through the formation of skills councils drawing membership from TIVET institutions and industry, the latter which provides subject experts and members of validation panels to undertake occupational analysis and develop occupational skills standards, as was noted in the Asia-Pacific Economic Cooperation report of 2013. The inclusion of industry in skills councils works to increase demand side inputs in TIVET curricula. Demand and supply side inputs must however, always be balanced carefully in order to ensure the development of a broad knowledge base for the graduates of TIVET, while equipping them with skills at the same time.

## **5 DEMAND-LED, COMPETENCY-BASED, INDUSTRY-RELEVANT CURRICULA FOR TIVET IN KENYA**

The economy of Kenya is an industrialising one with a number of manufacturing and service industries, and a robust service sector that are all well established. In order to support continued growth of these industries it is necessary to ensure that the TIVET training institutions produce graduates with competencies that are relevant to the world of work. The acceptance and utility of TIVET graduates by the world of work can only be ensured by equipping them with industry-relevant skills and competencies. This can be achieved through combined investment in industry-relevant TIVET training equipment and use of methods of training that are based on curricula developed to address desired competencies and skills in TIVET graduates. To this end therefore, a curriculum development method that integrates industry with TIVET institutions, which is focused on industry-desired competencies and skills and the methods of mounting the training is necessary and forms the subject of discussion in this section.

### **5.1 Adaptation of the Curriculum Developing Entity in Kenya**

Because of the large number of TIVET institutions that lie in the hands of Government, it is able to easily regulate the TIVET curricula offered countrywide through its curricula development agency, The Kenya Institute of Education (KIE). The KIE acts as a secretariat to facilitate the development of curricula, though the formation of curricula development subcommittees comprising of TIVET stakeholders (Ngerechi, 2003). In principle therefore, the curricula developed at the KIE do take input from industry and any shortcomings in addressing the specific needs of industry present in the developed curricula would have to be

a result of the methods adopted in addressing these needs and not from lack of access to industry.

It is proposed here that a review of the existing curricula development entity in TIVET in the country, and its methods of curricula development be done, with the aim of adapting it thereafter into a well equipped demand-led and competency-based curricula development centre, capable of offering its services efficiently to TIVET and industry at large. Adaptation of this entity is crucial in ensuring the continued relevance of TIVET graduates to the changing requirements of present day industry, and is therefore principal in supporting the emergence of the nation as an industrial economy. In doing this, reference should be made to other existing systems such as the learner centred, competency based training Vocational Education Training (VET) system of Australia in which VET, as reported by Kaitange (2003), is offered in modules that are organised in packages with clearly specified industry requirements for assessment and qualification of the specific competencies expected to be developed in trainees. The Australian system is particularly instructive in its efforts to address globalisation, development of information and communication technologies, emergence of service and knowledge-based industries, and the change in the way work is carried out in today's enterprises.

The challenges of validity (social and economic coherency of different countries), as well as data collection methods and accuracy of data highlighted by Freeland (2000), should be taken into account while comparing different TVET systems in order to ensure that such comparisons are meaningful. Moreover, the curricula development entity once set up, should quickly form itself into a consultancy unit that will offer services to organisations in order to develop job descriptions, undertake job re-design, establish Standard Operating Procedures (SOP's), conduct performance evaluations, determine task value addition, control competence development, advice quality planning, undertake career planning and development, certify occupational competencies and other activities that may be supported by the two methods in organisations. This will not only be a good way of earning income for the curricula development unit but of maintaining the focus of industry on its abilities and services.

In addition to the foregoing, the curricula development entity should within itself form a TIVET research wing whose responsibility it will be to study local, regional and international trends and developments in TIVET in order to ensure that the Kenyan TIVET system remains at the forefront in implementing and developing novel approaches of delivering TIVET. Existing documentation on TIVET globally is plenty, in addition to which a plethora of TIVET systems exist in the world today. It is necessary to study all these in order to advice the Nation on the systems best suited to its needs, and further advice on the most efficient ways of adopting parts of these systems, into the Kenyan TIVET system. The research wing is particularly important in forward planning, as the Kenyan industry is presently too small and underdeveloped to be the sole basis of developing curricula. Forward planning of curricula in anticipation of changes in industry based on experiences from other developing and recently developed nations must be done.

## 5.2 Competency Based Training: Origin, Definition and Use

The origin of competence based education and training was traced to the United States of America in the 1920s, while the modern competence movement was traced to the late 1960s and early 1970s by Katherine Adams as reported by Mertens (1999). Brownie et al. (2011) traced the emergence of the concept of competence to the 1960s. The emergence and use of Competence Based Education (CBE) in the United States was traced by Stout and Smith (1986) to the 1970s. The Australian Government embraced Competency Based Training in 1990 as part of the training reform agenda geared towards increasing international competitiveness of the economy (Cornford, 2000).

The terms capability, role, standards, competence and competency are used interchangeably in literature on education and training and career frameworks, with the choice of descriptor been predicated on ideology, fashion or the desire to secure consensus, as was noted by Brownie et al. (2011). The word competence in Competence Based Education (CBE) has been misused and overused widely as observed by Stout and Smith (1986). Cornford (2000) noted the lack of agreement on a definition for Competency Based Training (CBT). Barman and Konwar (2011) observed that the words, “competence and competency” have been used interchangeably within the same articles in literature. The authors emphasised the need to understand the meaning of the word, “competence”, and further to distinguish between the words, “competence and competency”. They noted that the words, “competence (plural - competences)”, were used with reference to ability based on work task, whilst the words, “competency (plural -competencies)”, were used with reference to ability based on behaviour (Barman and Konwar, 2011). The authors further observed that competence and competency were work and person related concepts.

The related term, “labour competency”, is found to have a numerous number of definitions as seen in the report by Vargas (2004) where a total of 28 different definitions are given; 13 by experts, 9 by national standardisation and certification institutions, and 6 by vocational training institutions. A widely accepted definition emphasises that a labour competency is not a possibility but a proven ability to perform a specific labour activity successfully. Labour competency is categorised first into the ability, then personal attributes and finally a combination of the first two.

Barman and Konwar (2011) and separately by Ahmad et al. (2012) observed that, if specific competencies are not focused in curriculum design philosophies then the products of higher education would not be “work-ready” and therefore not readily acceptable by industry. They therefore proposed use of occupational specific competencies in curriculum design in order to reduce under employment and unemployment levels. Quoting the work of Shaw (1998). Shaw (1998) underscored the need to possess knowledge and skills, and further noted the move by professions away from paper and pencil testing to competency testing. Barman and Konwar (2011) and separately Shaw (1998) highlighted the focus of CBT on; competencies instead of objectives, outcomes instead of content, learner centred teaching, professional practice, and assessment based on competencies.

### 5.3 Labour Competencies and Competency Based Curricula

Labour competency is applied in the four stages of identification of competencies, standardisation of competencies, competency-based training and certification of competencies. Amongst the most frequently applied methods for identifying competencies include; Functional Analysis, Developing a Curriculum (DACUM), A Model (AMOD), and Systematic Curriculum and Instructional Development (SCID) (Vargas, 2004; Zúñiga, 2008; Fretwell et al., 2001). Other methods include the presently not very widely used Job/Task Analysis (Fretwell et al., 2001), Behaviourist Analysis and Constructive Analysis.

Functional analysis is a method that is used to identify the labour competencies by first identifying productive functions or services and thereafter identifying sub-functions needed to achieve the primary production function or services identified first (Vargas, 2004; Zúñiga, 2008; Fretwell et al., 2001). DACUM, which originated in Canada and was popularised in the United States of America, is a method that uses occupational analysis to develop competency based training curricula, assessment criteria and training needs through a process that identifies tasks and subtasks required to achieve an end product or service. Occupational analysis lends itself to a number of definitions as seen from the nine presented by Zúñiga, (2008), and is used to facilitate identification of occupational content and description of related competencies for purposes of rationalising recruitment, selection, promotion, remuneration, training, certification, and assessment (Fretwell et al., 2001).

Fretwell et al. (2001) noted that none of the three methods of Job/Task Analysis, Functional Analysis and DACUM, was superior to the other, but that each was applied according to considerations of context, resource constraint and desired outcomes. Functional Analysis and DACUM are similar in that both focus on processes, provide solutions/mechanism for training and do mapping to define performance requirements. The two methods differ in that whereas Functional Analysis focuses on the results required to fulfil certain purposes, DACUM zeroes on task required to achieve an end.

Fretwell et al. (2001) also observed that DACUM was a more straightforward and descriptive, bottom-up approach, whereas Functional Analysis was a more top-down, structured, technical, subjective and complex approach. AMOD (“A model”), a variant of DACUM, is identical to DACUM up to the completion of validated research charts on competencies. It is characterised by creating a strong relationship between the competencies and sub competencies defined in the DACUM map, the learning process and the assessment of learning, in logical sequences according to the level of complexity of competencies and their respective functions and tasks, in order to advice structuring of competency based curriculum. DACUM and AMOD offer dynamic and quick means of establishing competencies and training programmes (Vargas, 2004). SCID is used to identify and guide training actions, and is useful in developing self-learning material for students. In the method, tasks are broken down into steps, execution standards, equipment, tools and necessary material, and safety standards. Any decisions that the worker may have to make and information to guide such decisions, as well as mistakes made through wrong decisions are also part of the task details given in SCID (Vargas, 2004). It was noted in the Asia-Pacific Economic Cooperation report of 2013 that DACUM finds wide application in the USA and

Canada, Functional Analysis in the United Kingdom and Australia, and DESCUM (a derivative of DACUM that was developed in Malaysia) in Malaysia.

The **DACUM** and **SCID** methods combined are proposed here as two widely used efficient and effective methods of developing **Demand Led and Competency Based** occupational profiles and subsequently curricula, respectively, for adoption in the country. The methods are adaptable to the changing needs and circumstances of industry, and maximise participation by industry and therefore ownership of the curricula and graduates trained. The **DACUM/SCID** process ordinarily comprises of nine steps, of which the first three fall under DACUM while the other six fall under SCID. The steps falling under DACUM include; needs analysis (identifying job/occupational priorities), job/occupational analysis (identifying jobs and tasks through DACUM workshops priorities), task verification (obtaining task ratings on importance, difficulty and frequency). The steps falling under SCID include; task selection (selection of priority tasks for training curriculum development), task analysis (analysis of tasks to identify steps, knowledge, skills, attitude, safety, and performance criteria required), development of competency profiles (appropriate clustering of related tasks to form competencies), development of curriculum materials (development of learning guides and aids, job aids, visuals and handouts), beginning of training (classroom, laboratory, workshop, and On-Job-Training), competency & program assessment (development of outcome assessments, tests, certifications examinations, and the development of formative/summative program evaluation) WDA/SCE (2010).

#### **5.4 Challenges of Competency Based Training**

The challenges of CBT were noted by Shaw (1998) to include; increase in paper work, reorientation of focus on trainers and instructors and away from the trainees, and placing greater importance on testing and therefore creating possibilities of confusing minimum competencies with minimum skills. Barman and Konwar (2011) highlighted the challenges of implementing CBT of; alignment of learning outcomes with teaching and learning approaches and assessment, regulatory authorities, the rules and regulations of institutions, and ascertainment of data in order to ensure competencies were valid. Cornford (2000) highlighted the challenges faced by CBT in Australia of; lack of understanding of how it operates; its inadequate implementations; its suitability for some areas but not others; and its suitability for some subgroups in the community but not others. Dubois and Rothwell (2004) noted the challenges in CBT of; high requirements of time and resources to identify specific competencies, validate them and develop processes for training to achieve identified outcomes; pressure on individual learners to work towards achieving required competencies as individuals and not groups; and demand for building of actual and not abstract competencies

Shaw (1998) observed that the advantages of CBT included; increase of performance motivation, improvement of the thinking process, development of a positive attitude, sustenance of interest, and consistence performance by students. The author noted that CBT gives rise to more consistent instruction, focuses trainers on the skills expected to be achieved by students thus demanding more accountability by instructors, minimises variation in

teaching and incidences of transfer of improper methods of executing tasks to students, and provides documentation that assures stakeholders on the skills and competencies acquired by practitioners.

Dubois and Rothwell, (2004) noted the work environment training related advantages of CBT of the; introduction of a systematic approach to training design, its development and delivery, enhancement of the trainers creativity by providing a broader range of alternatives for competency building than training alone, provision of increased focus on objectives and clarifying performance expected outcomes, facilitation of learners to structure their learning activities in processes that are meaningful to them, helping in the identification of learning resources for learners in different settings, and structuring to meet the needs of learners.

## **5.5 On-Job-Training (OJT)**

The coupling of mainstream full-time TVET with informal industry or workplace-based TVET, in the form of On-Job-Training (OJT) and apprenticeship training in industry at Accredited Training Centres (ATCs), provides further opportunity for certified training and flexibility of training; as was proposed in the Integrated Technical and Vocational Education Training System. The emphasis on ATCs is important in order to avoid the normal problems attendant with unregulated OJT of; personalised performance standards and training material, incorrect instruction and lack of proper documentation hence lack of recognition (Shaw, 1998). A thorough analysis of OJT and its pros and cons is necessary prior to its adoption in the country, and the material in the ensuing sections serves to give an insight into the practice of OJT in various countries, and proposes its adoption in Kenya.

OJT allows trainees to accumulate experience and progress at their own pace based on competencies obtained in their respective areas of specialisation while continuing with work at their respective places of employment. It was noted in the Employment Security Department report (2011), that OJT has been in use since the 1960s, and is a hire-first training scheme. Kobes (2013) however, observed that OJT was as old as work.

One of the characteristics that distinguish OJT from other forms of training is its one to one pairing of trainee and trainer (Jacobs, 2010). Pareek (2011) defined OJT as employee training that took place in the work place while doing the actual job, using the actual tools, equipment and materials that employees would use in actual work upon completion, and was normally offered by a professional trainer or an experienced employee through a learning processes of participation, repetition, relevance, transference and feedback. Kobes (2013) while flagging the large volume of paper work required to access OJT funds in the United States as a disincentive, highlighted the concurrent advantages to employees of acquiring new skills while earning on the job, learning in hands-on environments, and access to opportunities for long term employment. He further highlighted the advantage of training providers gaining strategy to help people gain or improve their skills while building relationships with employers. In addition, the advantage of customised instructions at places of work offering OJT, which facilitated training of workers with skills that were good matches for their specific needs were noted by the author. Pareek (2011) underscored the

general reputation of OJT as being the most effective for vocational training with the advantages of being low cost, task based and well suited for small groups.

Jacobs (2010) observed that though unstructured OJT was characteristic in organisations, it was harmful to both the employer and employees. Pareek (2011) noted that unstructured OJT was characterised by the shortcoming of; inconsistency of standards and objectives as well as processes, lack of completeness in coverage, inadequate coverage of basic principles, and inculcation of bad work habits. Well designed OJT was observed by Kobes (2013) to be of value to both employer and employees, while Pareek (2011) proposed the adoption of Structured On-Job-Training (SOJT) as a way of addressing these shortcomings. Pareek (2011) noted that SOJT comprised of a pre-needs analysis that clearly identified required competencies, and good instructional design to develop processes of delivery, as well as quantitative and qualitative measurement criteria to determine the extent of achieving the desired goals. Jacobs (2010) observed that Structured OJT was training that has undergone adequate forethought and planning, and because of its proven efficiency and effectiveness is able to effectively respond to one of the most challenging issues for organisations; that of developing high levels of competence in employees through its knowhow.

Kobes (2013) recommended the following measures in order to fully realise the benefits of OJT; focus on ways of increasing career opportunities for low-skilled low-wage workers, reduction in bureaucratic processes and reporting requirements in order to encourage greater participation from manufacturing employees, ensuring that planning and execution led to programs that were focused on the quality and depth of training, incorporation of industry-recognised credentials in OJT programs while allowing employers flexibility in designing their own training, expansion of traditional OJT models beyond new hires to include incumbent entry-level workers, and support of employer training strategies and professional development for supervisors.

Jacobs (2010) observed that all persons in the work place irrespective of station go through OJT to one extent or another. Acknowledging that it was not possible to cover all aspects of work in programs run away from the workplace, Jacobs (2010) emphasised the peculiar niche of OJT in training; that of bridging the gap between learning and using what was learned. The author highlighted the findings of Carnevale and Gainer (1989) which stated that; 80-90% of an employee's knowledge will probably be learned through OJT, those organisations will spend three times more per employee for OJT than for Off-The-Job training even if there are no designated budget items for OJT, and up to one-third of an employee's first-year salary is devoted to OJT costs.

The Government of Ghana's report of 2006 noted the mismatch of skills needs between industry and the education training institutions. The report highlighted challenges to successful implementation of OJT for universities and polytechnics in the country of; lack of funds by both industry and institutions to support the program, few recognised industries where OJT programs could be conducted and lack of interest by industries to offer the program, delays in production arising from destruction of equipment by students, need for students/institutions to take insurance covers for the attachment, inadequate logistics to

enable OJT institution liaison officers execute their responsibilities well, weak linkages between enterprises and education institutions to support OJT, inadequate numbers of trained workshop instructors with sound pedagogical skills to carry out OJT, lack of involvement of master craftsmen in OJT, lack of regular refresher courses for master craftsmen, lack of management and human resource skills by the master craftsmen, and lack of facilities and training support tools and logistics.

The report identified various tax incentives for industry that could be put in place to encourage their involvement in supporting and delivery of OJT. It further proposed various management initiatives, provision of grants, identification, financing and training of master craftsmen as additional measures that were likely to strengthen OJT. The practice that is in place in the state of Washington (Employment Security Department report, (2011) of providing refunds to industry for the cost of providing training and supervision is one worth considering as an added incentive to industry to offer placements and OJT.

Providing financial incentives for companies willing to release their employees to train personnel acquire needed skills was identified by Kobes (2013) as a way of encouraging the participation of companies in OJT programs. The advantages to industry of obtaining financial assistance from the State with the cost of training and of aligning training with required occupation skills and the benefit of sustained or increased productivity were highlighted in the Employment Security Department report (2011).

Kayani (2008) observed that OJT in companies was cost effective, efficient, and task oriented, was mainly offered by large companies, and that most successful companies spent about 4% of their payroll on training. Size of a company was identified by Zeytinoglu et al. (2005) as one of a number of independent factors that contributed to a company providing training or not. For small companies with limited resources and tight production schedules that limited their ability to recruit and train workers (Kobes, 2013), the practice helped employees retain relevance in changing technology, work processes and product lines in organisations (Kayani, 2008) and therefore minimised waste of human resources. Zeytinoglu et al. (2005) observed that skills requirements in many conventional occupations were changing continuously and many skills were becoming outdated with the emergence of new technologies and production processes. Zeytinoglu et al. (2005) noted that OJT was identified by the OECD employment outlook report of 2003 as one way of minimising the risk of workers falling into the trap of low quality jobs. The authors further observed that OJT was a process that raised future productivity and that it was offered either as general or company specific training. Moreover, it was noted that while general OJT raised productivity to the same level in and outside the company offering the training, company specific OJT did not do so outside the firm offering the training.

The status of OJT in a number of companies surveyed in Hong Kong was reported by Kayani (2008) as one with a small number not practicing it whatsoever, 1/3 doing it according to a companywide plan, 36% practicing it on the initiative of each division and 27% only doing it when necessary. The situation in Indonesia was different with little OJT being practiced and those few companies practicing it only doing so at a divisional level. In Pakistan 35.8% of the firms carried out OJT according to a plan, 17.6% on the initiative of

each division, 40.8% as and when necessary, while 6% did not practice it at all. Whilst the foregoing demonstrates the existence of OJT albeit to different levels in each of these three Asian countries, there is no apparent pattern of the nature of its practice.

Based on statistics obtained from Statistics Canada's Workplace and Employee Survey (WES) 1999 data, Zeytinoglu et al. (2005) observed that only 30% of workers in Canada received OJT, that workers were on average trained for 7 days. In addition, computer software and professional training were identified as the most common topics of training. It was further noted that training was mainly offered by supervisors and co-workers.

## **5.6 The Dual System**

The dual systems of Botswana, South African and Zimbabwe and the part-dual system of Uganda, could offer good insights into the dual system of TVET education and its application in Africa, bearing in mind the lessons learnt in Mali, that show it is not necessary to have a well developed industrial sector in order to implement such a system with good returns (Kayiranga and Mfinanga, 2008; Atchoarena and Delluc, 2002). For this system to work, it is necessary to convince industry of both the short and long term benefits of participating in the scheme (access to unpaid labour and retention of trained personnel, respectively), and the need to establish training and supervision structures in their places of work. This helps to monitor training in order to ensure continuous value is delivered to the trainees against set competency goals and guarantees that trainees are not used as unpaid labour. This type of OJT (the dual system) is able to respond effectively to the peculiar training needs of both a working population and that of full time students.

OJT ties in well with the modern trend of lifelong learning, and continuous training and re-training, in as a result of the demands of rapidly changing industrial environments. TIVET because it trains for industry and the world of work will change in content and mode of delivery with changing demands of technology. For this reason therefore, TIVET cannot be seen as an instance or period in training, but rather a lifelong engagement. The concept of lifelong learning is addressed in the ensuing section, in order to create some understanding of it. The development of curricula and the methods of delivery of TIVET in Kenya should bear in mind this concept in order to ensure the long term relevance of TIVET in the country.

## **5.7 Lifelong learning**

Zeytinoglu et al. (2005) noted that lifelong learning and particularly job skills training and skills upgrading were critical in ensuring the earning potential of workers and in maintaining their competitive employability profiles. Serban (2012) observed the need for permanent adaptation of the skills of individuals in response to the rapid technological, economic and

labour market changes, in order for them to become and remain employable. The author defined lifelong learning as the provision of education and training opportunities for the skills acquisition and enhancement to all citizens irrespective of age, gender, level of education, or position in the labour market. He further identified the transformation of TVET systems into vehicles for lifelong learning as a key task for policy makers in the world. In discussing the challenge of developing a skilled human resource for Africa's development, Afeti and Adubr (2012) presented the concept of lifelong learning in the three categories of; common core skills for lifelong learning and sustainable development, lifelong technical and vocational skills development for sustainable social-economic growth, and lifelong acquisition of scientific and technological knowledge and skills for sustainable development in a globalised world.

Global competition and the arising pressure to produce high quality products, which leads to a demand for high-quality and high-value work, has seen more and more integration of training and education into the production and work processes in order to create a balance between implicit experience-led learning and systematically contextualised training processes (UNESCO, 2004). Lifelong learning is defined by the European Commission as reported by Poulsen (2013), to be all learning activities undertaken throughout life with the aim of improving skills, knowledge competitiveness within a personal, civic, social or employment-related perspective.

Further definitions of lifelong learning are given in this work as well as its application in relation to TVET policy, physical infrastructure, teachers, curriculum, assessment and certification, national qualification framework, management and administration structures and procedures, and financing. Che Hassan (2013) observed that informal learning which consists of short course of various durations forms a substantial part of lifelong learning for post secondary students and adults in community colleges in Malaysia. They identified four methodologies which they noted were critical in professing the elements of lifelong learning, including; enhancing the ability of students to think for themselves and encouraging independent and participatory studies through for instance project modules, encouraging the development of problem solving skills as well as reflection on and debate of issues in order to develop critical and creative skills, learning from discovery and field work experiences, and embedding fundamental values and ethics, in addition to inducing development of sustainability in learning and training.

## **6 TIVET EQUIPMENT AND LINKAGES WITH INDUSTRY**

A TIVET system is as good as the equipment it has available and uses for training for reasons that effective TIVET must be competency and skill based. A good TIVET system must therefore ensure it maintains strong linkages with industry in order to keep abreast of current types of equipment in use there. It must also develop good contact with manufacturers of TIVET equipment for purposes of ensuring it is in the know of what is current in the market.

## 6.1 Equipment Specification and Sourcing

In today's world of rapidly changing technologies, it is necessary to source for the right equipment in respect of price, size, and long term utility. It is also necessary to procure the equipment from the right sources, preferably manufactures, who are then able to advise the client well on the trends industry. Equipment supplied must come with manufacturer's guarantees on good performance, as well as good guarantees on the supply of parts and spares, after delivery service, and possibilities of trades-ins for newer versions of the same. Optimal utilisation of TIVET workshops, in order to ensure maximum reach in respect of student numbers and skills acquired, is a major challenge that can only be addressed by well laid out workshops, the right equipment, and well developed practical exercises. It is necessary that all the foregoing be done professionally and to high standards, given the comparatively much higher cost of TIVET equipment in relation to that for other forms of education.

China today is a global manufacturing powerhouse and serves as the biggest source of manufactured goods in the world (Karel et al., 2013), thus qualifying for the reference world factory, (Qu et al., 2012) or the world's manufacturing factory. By 2006 the nation had been transformed from the World's Sweatshop to a global manufacturing centre (Sung, 2007), and as was noted by China Roland Berger Strategy Consultants (2012) was the world leader in low cost manufacturing and was poised to become the largest in manufacturing. McKay and Song (2009) observed that China was the world largest manufacturing exporter.

Buelow et al. (2013), noted that China has been the obvious or only choice for offshore manufacturing globally and observed that it would remain the dominant player in global manufacturing and the leading production option for many companies in the foreseeable future. It was noted in the Manufacturing Institute (2009) that China emerged as the leading exporter of manufactured goods over the years 2000 – 2007 rising from 7% in the year 2000 to 17% in the year 2007, whilst Wang (2012) observed that China was the world's biggest manufacture and largest exporter of global consumable products.

It was noted in the report by Deloitte China Research and Insight Centre (2011), that China was the largest industrial manufacturing country in the world, and a world leader in manufacture for export. China overtook Germany in the year 2009 to become the world's largest exporter of manufactured goods, while Zhao and Yang (2012) noted that China had become the world's largest manufacturing base for high tech products. It was observed in the World Economic Forum Report (2012) that China surpassed other countries in the period 2000 – 2009 to become the world's leading manufacturer in terms of Gross Domestic Product (GDP). It is evident from the foregoing that China would be a good source market for required TIVET equipment. It is necessary however, that other source markets for TIVET equipment are looked into in order to ensure best value for money.

The immediate user market of this industrial hub, are the nations of the Association of South Eastern Asian Nations (ASEAN), including such countries as Singapore, Indonesia, Malaysia and Japan. It is necessary to therefore establish good contact with TIVET players in this area as well as in China, whose synergy can be translated into quality equipment, and

good pricing. Persons charged with sourcing of equipment must be able to specify the right kind of equipment for the right purpose, not based on catalogues, but from direct access to the manufacturing companies. Visits to factories that manufacture TIVET equipment is necessary in order to verify first hand; their capacity, quality control and testing standards and processes, and to also see their whole product range of TIVET equipment. Such visits are considered critical in insuring the client develops a proper understanding of the various types of TIVET equipment and their manufacturers.

Areas of TIVET for which equipment is available from China and ASEAN include; Automation (Mechatronics, Instrumentation and Control), Electronics and Microprocessors, Machining, Fabrication and Welding, Light and Heavy Automobile Engineering, Refrigeration and Air Conditioning, Mining, Mineral processing, Construction Technology, Information and Communication Technology, and Food Processing.

## **6.2 Establishing Linkages with Industry**

It is recommended that the TIVET institutions consider the establishment of manufacturing contracts with the firms supplying equipment above and with identified local firms. This serves to facilitate transfer of manufacturing capacity to local entities. This is recommendation stems from the known the fact that TIVET is dynamic, changing with changing technology, and the arising reality that procurement of TIVET equipment cannot then be considered to be a single event in time but rather a continuous process. Growth of local manufacturing capacity will not only ensure currency of equipment, in order to minimise the severe skills gap such as was noted in the United States of America due to rapid changes in technology (Kobes, 2013), but also serve to minimise costs to the TIVET sector in the country. Obwoye et al. (2013) observed the lack of initiative by TVET institutions and poor response by industry as the major challenge limiting TVET institution/Industry linkages in Kenya. They underscored the importance of such linkages in the enhancement of practical training through provision by industry of, equipment and tools, staff exchange, and placement of staff and students in industry. The authors noted that whilst linkages did exist between industry and TVET institutions in Nairobi (Kenya), this was predominantly in the form of industrial collaboration (74.6% of 150 respondents from industry) and student attachments (100% of 50 respondents from TVET institutions). Other collaborations that were noted to exist based on responses from industry included; staff exchange (3.3%), research collaboration (4%), instructors' industrial experience (4%), shared equipment (4%), and other collaborations (4.7%) that included sharing of research findings and published materials, and physical facilities. The responses from TVET institutions highlighted the following other collaborations; staff exchange (8%), instructors' industrial experience (6%), equipment sharing (6%) and other collaborations (4%), which included industrial visits and workshops. The low percentages recorded for shared equipment and physical facilities creates room for investment leading to the establishment of manufacturing research contracts. There is also a need to enhance staff exchange and research collaboration in order to improve utility of the trained graduates and support improved industrial production.

10 areas of TVET institution/industry relations are identified, out of them four of which may support or benefit from the establishment of manufacturing contracts between TVET institutions and industry, including; Cooperation in Research and Development (joint Research and Development projects, Presentation of research, Supervision of trainees or Ph.D. students, financing of Ph.D. research, and sponsoring of research); Sharing of facilities (laboratories, machines, science parks, purchase of prototypes); Contract research and advising (research and consultancy); Intellectual property rights (patent texts, co-patenting, licenses of university-held patents, copyright and other forms of intellectual property); Spin-offs and entrepreneurship (spin offs, start ups, incubators and universities, and stimulating entrepreneurship).

Alias and Hassan (2012) identified the objectives of collaboration initiatives in place between industry and TVET institutions in Malaysian of; Improving research capacities and commercialisation potential, Promoting knowledge transfer between institutions and the community, Reducing demand and supply mismatch, Improving technical skills, and Enhancing employability skills. They observed that despite an apparent lack of a common understanding of function and process between industry and TVET institutions, the industry-TVET institution Ph.D. collaborative program between Technical Universities and industry that was launched in the year 2010 in Malaysia provided good opportunity to promote innovation aimed at increasing competitiveness of the economy by providing opportunity for industry practitioners to undertake industry based research. The authors further noted that the industry-TVET collaboration on research innovation and commercialisation was aimed at not only increasing knowledge and human capital as is common in institution-institution collaboration, but also intellectual property rights, and problem solving in industries in order to increase productivity and commercialisation potential of university research products. The mismatch of focus between industry and educational institutions of the increase of productivity on the one hand and development of human capital and increase of knowledge on the other hand, were highlighted as challenges to the successful implementation of this collaboration.

Majumdar (2008) enumerated the types of education institution/industry collaborations existing in the Asia Pacific region, including; problem solving interaction through research and development with respect to innovations, transfer, assimilation of latest technologies, and evolution of solutions to industrial problems; curriculum development, teaching, and learning systems aimed at maximising feedback from industry in order to ensure training of students with ready to use skills for industry; scholarship and placement systems that encourage industries to put up scholarships and offer placements, thus creating employment avenues for students and shortening the recruitment path for participating industries; industrial tours and study visits, which create a basis for forging linkages between students and proponent employers, while exposing them to technology and industrial practices; faculty and staff exchange which is useful in exposing academics to the skills needs of industry, availing to education institutions experienced industry trainers, while availing access to applied research in education institutions to the industry; industrial apprenticeship in various forms that places students in industry intermittently throughout their period of study, where they undergo structured practical training on the job; and establishment of incubation centres within education institutions, which provides shared access to

infrastructure, practices, venture capital, market information, concepts, the proceeds of research, laboratories process, practicalities of commercialisation, new innovations and products, credit technology, vocational and management training and consultancy facilities.

Peano et al. (2008) observed that adoption of the German Dual system in the Philippines in 1994 created awareness in TVET schools of the need to create linkages between themselves and enterprises with the benefits of; company involvement in school management and decision making, company involvement in curriculum development and upgrading, provision of customised training by schools to companies, and On-job-training of students in companies.

Howell (2010) noted that greater involvement of the employer in TVET leads to more sustainable programs, which results into more sustainable development. The author highlighted the challenge of getting employers to release their experts to assist in occupational analysis and standards panels and suggested that TVET institutions put in place incentives to attract employers to do so. Policy initiatives creating demand for new technologies were identified as possible ways of driving industry to seek cooperation with education institutions, and encourage education institution to restructure their programs while introducing new ones to meet the needs of industry created by such policies.

## **7 LINKAGES OF KENYAN TIVET WITH EXTERNAL, RECENTLY INDUSTRIALISED ECONOMIES**

Linkages should preferably be made with some of the recently industrialised nations of South Eastern Asia for their experiences and challenges are more recent and therefore possibly closer to ours, the nations of Singapore, South Korea, Japan, Malaysia, Indonesia and China. Visits to these nations and discussions with TIVET practitioners, trainers and policy makers in these nations are recommended, but even of greater importance, training attachments to selected technical institutions should be organised and co-supervised by TIVET trainers from both ends. In these attachments students should undertake specialised training to the standards of each institution, while at the same time getting exposure to state of the art technology available there.

Further to this one year post college industrial attachment could also be organised to selected industries in these same nations. The advantage of this last bit cannot be downplayed as it not only exposes the Kenyan students to modern technologies in nations that have recently gone through industrialisation, but also exposes the industries and technical institutions to the industry and ingenuity of Kenyan students and therefore creates a solid linkage between the Kenyan economy and the industries in these nations. The possibility of these industries off-shoring some of their production to Kenya, once they are confident of the ability of the Kenya TIVET labour market, would be very attractive to the Kenyan nation, as it will provide a quick way of growing the real income of Kenyans, and a quick way to industrialisation.

## 8 A PROPOSED INTEGRATED TVET SYSTEM FOR THE COUNTRY

One of the biggest challenges for TIVET in emerging economies is ensuring equitable access to TIVET training, and space to absorb all proponent students. The data given in the second paragraph of the introductory section of this paper shows that number of students joining the job market, having completed primary and secondary school in the year 2006, with no certified skills stood at just over 500,000. At this annual discharge rate, the cumulative number of persons in the job market with no certified skills over periods of 5 and 10 years would be 2,500,000 and 5,000,000, respectively. This as was pointed out in the year 2004, does not augur well for the productivity of industry and business, and does not engender dignity within the workplace, as these employees have little to bargain with for remuneration in terms of certified skills.

There is therefore an obvious need to expand TIVET in order to increase access both for those leaving the mainstream education and also for those that have already left without certified skills. These high numbers are best served by introducing a flexible TIVET system that allows integration in TIVET institutions in the country in respect of the various levels of TIVET, while at the same time allowing multiple entry and exit at any one TIVET training centre. The importance of integrating TVET in several identified centres of excellence where all levels of TVET training are made available, and which in turn serve to guide other less well established TVET centres cannot not be understated, as was proposed in the document for the Integrated Technical and Vocational Education Training System for Rwanda. As was noted in this document, not only would such a system if well spread increase access, but would also ensure equity in access, while at the same time flexibly allowing multiple entry into and exit out of the system in accordance with the individual needs of TVET trainees. A system such as this one affords a good basis for addressing the glut of 220,000 places in TIVET from the total demand of 300,000 (Nyerere, 2009).

Given the projected increase of the nations labour force by about 450,000 persons per year between the years 2001 – 2010, creation of ample TIVET training opportunities is paramount (EVD, 2007). The creation of a TIVET system with multiple entry and exit points, coupled with the development of innovative training schemes and schedules is one way of working towards addressing these numbers.

In order for such a system to work, there must be a single regulating authority for TIVET in the entire country, responsible for setting standards of workshops, equipment, developing curricula, setting standards for recruitment and training of TIVET trainers, examination, certification, accreditation, and liaison with Industry. The regulating authority must also facilitate the development and adoption of a national qualification framework, guiding the training of students in TIVET and their eventual entry into the labour market. The beauty of such a system is that every Kenyan is guaranteed of quality TIVET training no matter their location.

It is also easy to introduce changes into the system, particularly in response to changing international trends, thus ensuring equitable access to the international labour market for all the nation's TIVET graduates. If well managed, such a system will easily attract international

industrial players, as it provides a guarantee of well trained TIVET graduates, and a system that can quickly adapt to produce graduates with specific required competencies. The spin off effect of increased production capacity in the country, higher earnings and expanded employment cannot be underplayed. Because of the relatively higher sophistry of the Kenyan economy compared to others in the region, it is then quickly able to grow into an industrial hub for the entire region, with commensurate commercial and social benefits to its people. It is necessary however to move in this direction quickly, as it is likely that other nations of the region may also be looking in the same direction and what are presently advantages may not remain so for very long, if not utilised well.

## 9 CONCLUSIONS

It is proposed that the various shortcomings of TIVET in Kenya maybe resolved through the implementation of measures outlined in this paper including, the setting up of a competency based demand led curriculum development centre, retention of an institution for the training of technical teachers, procurement of relevant training equipment, adoption of on-job-training and life-long learning, strengthening of industrial attachment and entrepreneur training, and establishment of industrial parks or incubation units. This is in addition to the development of strong linkages between TIVET institutions and industry, establishment of integrated TIVET, setting up a TIVET regulating authority, addressing funding constraints, and reversing the negative image of TIVET as discussed in this paper.

## REFERENCES

- Ahmad, A., Muhammad, R. R., Kamin, Y., Udin, A., Minghat, D. H., and Cartledge, D. (2012). Applying Competency-Based Concept in Teaching Automotif Practical Work for Vocational Education. *Economics Development and Research (IPEDR)* 53(9), pp 41-44.
- Afenyadu, D., King, K., McGrath, S., Oketch, H., Rogerson, C., & Visser, K. (1999). *Learning To Compete: Education, Training & Enterprise in Ghana, Kenya & South Africa*. Report presented to the Education Division, Department for International Development by the centre of African Studies, University of Edinburgh
- Afeti, G. and Adubr, A. L. (2012). Lifelong Technical and Vocational Skills Development for Sustainable Social-Economic Growth in Africa. *Synthesis Paper - Sub-Theme 2, Triennale on Education and Training in African*, 12th February 2012. © Association for the Development of Education in Africa (ADEA), [www.adeanet.org/triennale/eng/docs/.../2\\_Synthesis\\_paper\\_2\\_en.pdf](http://www.adeanet.org/triennale/eng/docs/.../2_Synthesis_paper_2_en.pdf).
- Alias M. and Hassan R. (2012). TVET Agency-Industry Collaborations: Addressing Diversity. *Proceedings of the 2nd UPI international Conference on Technical and Vocational Education and Training*, Bandung, Indonesia, 4 – 5 December 2012.
- Atchoarena, D. and Delluc, A. (2002). Revisiting Technical and Vocational Education in Sub-Saharan African: An Update on Trends, Innovations and Challenges. *The International institute of Education Planning /UNESCO*, ISBN 92-803-1224-3.
- Atchoarena, D. and Esquieu, P. (2002). Private Technical and Vocational Education in Sub-Saharan Africa. *UNESCO - International Institute for Educational Planning*, November 2002.

- Barman, A. and Konwar, J. (2011). Competency Based Curriculum in Higher Education: A Necessity Grounded by Globalisation. *Revista Romaneasca Pentru Educatie Multidimensionala (Romanian Journal for Multidimensional Education)*, 3(6), pp. 7 – 15, ISSN: 067 – 9270.
- Black, N. (1997). Technical and Vocational Education for rural development: Delivery Patterns. *UNESCO International Workshop, UNEVOC, Info*, 1-5, Ottawa, Canada.
- Brownie, S., Bahnisch, M., & Thomas, J., (2011). Competency-based Education and Competency-based Career Frameworks: Informing Australians health workforce development. *Report on NHPRC Projects 4 and 5 regarding frameworks for competency-based education, training and health career frameworks*, ISBN 978-1-7472-039-5, 2011. University of Queensland Node of Australian Health Workforce Institute in partnership with Health Workforce Australia, Adelaide, Australia.
- Buelow D., Gish D., and Timberlake J. (2013). *Manufacturing Beyond China: New options. New opportunities. New risks. Business Trends*, <http://dupress.com/articles/manufacturing-beyond-china/>.
- Che Hassan H. *TVET Training and Education Delivery Approaches for Sustainable Development*. Sample Country Paper, Research and Development Center, Department of Polytechnic and Community College Education, Ministry of Higher Education, Malaysia, accessed on the 14<sup>th</sup> of December 2013, [http://politeknik.gov.my/webjpp2/penyelidikan/paper/files/SAMPLE%20Country%20Paper%20\\_KC.pdf](http://politeknik.gov.my/webjpp2/penyelidikan/paper/files/SAMPLE%20Country%20Paper%20_KC.pdf).
- Clayton, B. (2012). Keeping Current: The Industry Knowledge and Skills of Australian TVET Teachers. *Proceedings of the 2<sup>nd</sup> UPI International Conference on Technical and Vocational Education and Training*, Bandung, Indonesia, 4-5 December 2012.
- Coowar, F. (1998). Beyond the formal sector in Mauritius. In *UNEVOC, Under the Sun or in the Shade? Jua Kali in African Countries*, Berlin: UNESCO.
- Cornford, I. R. (2000). Competency-based training: Evidence of a failed policy in training reform. *Australian Journal of Education*, 44(2), 135-154.
- Dubois, D. and Rothwell, W. (2004). Competency-Based or a Traditional Approach to Training? *T+D*, 58(4), pp.46-57. Accessed on 3rd December 2013, <http://vetbiotech.um.ac.ir/parameters/vpb2/filemanager/behsazi/EnglishArticles/traditional%20approach.pdf>.
- Employment Security Department Report (2011). *On the Job Training (OJT Basics)*, Washington State, September 2011, accessed on the 18<sup>th</sup> of October 2013, <http://www.wa.gov/esd/1stop/docs/OJTWebinarSlides.pdf>.
- Fretwell, D. H., Lewis, M. V., and Deij, A. (2001). *A Framework for Defining and Assessing Occupational and Training Standards in Developing Countries*, World Bank Human Development Network Education Department, Human Development Sector Unit – European and Central Asia Region; Ohio State University, Centre for Education and Training for Employment; European Training Foundation.
- Howell W. (2010). Sustainable TVET Institutional Through Partnerships and Alliance Meeting the Needs of Industry Through Sustainable TVET Programs. *International Conference on Education for Sustainable Development in TVET*, November 2010, Manila, Philippines.
- Jacobs, R. L. (2010). *Structured on-the-Job Training: Unleashing Employee Expertise in the Workplace* (2<sup>nd</sup> ed.). Berret-Koehler Publishers.
- Mertens, L. (1999). Labour Competence: Emergence, Analytical Frameworks and Institutional Models, *International Labour Organisation (Cintefor/ILO)*, ISBN 92-9088-094-4, Montevideo.

- Kaitange, K. M. (2003). Education and training for work: A comparative study of Kenya and Australia. *The sixth Australian VET Research Association Conference, The Changing Face of VET*, April 2003, 9-11 Australian Technology Park, Garden Street, Eveleigh NSW, Sydney, Australia.
- Karel, E., Alan, H and Martin, L. (2013). A new era for manufacturing in China. *McKinsey Quarterly*, [http://www.mckinsey.com/insights/manufacturing/a\\_new\\_era\\_for\\_manufacturing\\_in\\_china](http://www.mckinsey.com/insights/manufacturing/a_new_era_for_manufacturing_in_china).
- Kayani, T. (2008). *Challenges of Human Resource Development to Pace with Globalisation*. Ph.D. Thesis, June 2008, Faculty of Advanced Integrated Studies and Research, National University of Modern Languages, Islamabad.
- Kayiranga, G. T., and Mfinanga, J. (2008). *Draft Strategic Plan for Technical Education in Rwanda for the Years 2009 – 2012*, Inclusive, Funded by the Ministry of Education (MINEDUC) and the Deutsche Gesellschaft für Technische Zusammenarbeit (GTZ).
- Kobes, D. (2013). Making On-the job Training Work: Lessons from the Boeing Manufacturing On-the-Job Training Project. *National Funds for Workforce Solutions*. Accessed Nov, 13 2013, [http://www.nfwsolutions.org/sites/nfwsolutions.org/files/publications/NFWS\\_MakingOnTheJobTrainingWork\\_110413%5B4%5D.pdf](http://www.nfwsolutions.org/sites/nfwsolutions.org/files/publications/NFWS_MakingOnTheJobTrainingWork_110413%5B4%5D.pdf).
- Majumdar, S. (2008, December). Industry-institute interaction to public-private partnership: a journey to excellence. In *International Symposium on Public-Private Partnership in TVET-Challenges, Opportunities and Best Practices*, pp. 1-2, Manila.
- McKay, H. and Song, L. (2009). Global Implications of China as a Manufacturing Powerhouse. in Ross Garnaut, Ligang Song and Wing Thye Woo (ed.), *China's New Place in a World in Crisis: Economic, Geopolitical and Environmental Dimensions*, ANU ePress, Canberra Australia, pp. 261-302, accessed on 5th December 2013, <http://press.anu.edu.au/wp-content/uploads/2011/06/ch133.pdf>.
- Ngerechi, J. B. (2003). Technical & Vocational Education and Training in Kenya. *Conference on the Reform of Technical and Vocational Education and Training (TVET) - Regulatory Instruments for TVET and National Qualifications Frameworks*, Gaborone, Botswana, August 4 – 6.
- Nyerere, J. (2009). *Technical & Vocational Education and Training (TVET) Sector Mapping in Kenya*, Zero Draft, Dutch Schokland TVET programme Edukans Foundation.
- Obwoye, E. M., Mwangi, S. M., and Nyongesa, J. W. (2013). Linking TVET Institutions and Industry in Kenya: Where Are We. *International Journal of Economy, Management and Social Sciences*, ISSN 2306-7276, 2(4), pp. 91-96.
- Palmer, R., Wedgwood, R., Hayman, R., King, K., and Thin, N. (2007). Educating out of Poverty? A Synthesis Report on Ghana, India, Kenya, Rwanda, Tanzania and South Africa, *DFID Department of International Development*, 2007.
- Pareek, V. K. (February 2011). *On-Job-Training in the Back-Office Business*. Wipro Technologies, Bangalore, Accessed on 29<sup>th</sup> November 2013, <http://www.wipro.com/Documents/resource-center/library/On-Job-Training-in-the-BackOffice-Business-Premium-Content.pdf?Mobile=1>.
- Peano, S., Vergei De Dios B., Atchoarena, D., and Mendoza, U. (2008). Investment in Technical Vocational Education and Training in the Philippines. *International Institute for Education Planning, United Nations Education Scientific and cultural Organisation*, © IIEO 2008.
- Poulsen, S. B. *Concept of Lifelong Learning (Policy and Strategic Implications)*, Regional Conference, Promoting the Social Image of TVET, accessed on the 3<sup>rd</sup> of December 2013,

[http://www.arabvet.net/files/file/2010-11-08%20Regional%20Conf%20on%20VET%20image%20-%20Lebanon/8%20LLL\\_Poulsen.pdf](http://www.arabvet.net/files/file/2010-11-08%20Regional%20Conf%20on%20VET%20image%20-%20Lebanon/8%20LLL_Poulsen.pdf)

- Puchett, J., Davidson, J., and Lee, E., (2012). Vocational Education: The missing Link in Economic Development, *bcg. perspectives, The Boston Consulting Group Inc*, 2012, [bcgperspectives.com](http://bcgperspectives.com), accessed on the 25<sup>th</sup> November 2013, [https://www.bcgperspectives.com/content/articles/education\\_public\\_sector\\_vocational\\_education/](https://www.bcgperspectives.com/content/articles/education_public_sector_vocational_education/),
- Riley, T., and William, S. (1999). Kenya Voucher Program for Training and Business Development Services. *World Bank*, unpublished manuscript.
- Serban, M. (2012). Making TVET a Vehicle for Lifelong Learning. Abstract of Contribution to round table on, "TVET and Lifelong Learning Strategies. *The Third International Congress on TVET, "Building Skills for life and Work"*, Shanghai, China, 13 – 16 May 2012. Accessed on the 28<sup>th</sup> of September 2013, [http://www.tvetoman.net/PDF/PDF\\_EN\\_9.pdf](http://www.tvetoman.net/PDF/PDF_EN_9.pdf).
- Shaw, W. J. (1998). Benefits of a Competency Based Training Program. *An applied research project submitted to the National Fire Academy as part of the Executive Fire Officer Program*, Willoughby Hills Fire Department, Willoughby Hills, Ohio. Accessed on the 9<sup>th</sup> of December 2013, <http://www.usfa.fema.gov/pdf/efop/efo28925.pdf>.
- Stout, B. L. and Smith, J. B. (1986). Competency Based Education: A Review of the Movement and a Look to the Future, *JVHEE*, 4(2).
- Sung, Y. W. (2007). *Made in China: From World Sweatshop to Global Manufacturing Centre?\**, *Asian Economic Papers* 6:3, © 2007, The Earth Institute at Columbia University and Massachusetts Institute of Technology.
- UNESCO. (2009). Industry Relevant TVET: Approaches to Promote Industry/Community/Institution Linkages in Pakistan Administered State of Azad Jammu and Kashmir. *Discussion paper no 1, Annex 7*, May 2009. Accessed on 10<sup>th</sup> of November 2013, <http://unesco.org.pk/eedrmu/resineaa/publications/apr2009/Annex%207.pdf>.
- UNESCO. (2004). International Framework Curriculum for a Masters Degree for TVET Teachers and Lecturers, UNESCO, *International Meeting on Innovation and Excellence in TVET Teacher Education*, November 8-10, 2004, Hangzhou, China.
- UNEVOC. (1998). Under the Sun or in the Shade? Jua Kali in African Countries, National Policy Definition in Technical and Vocational Education: Beyond the Formal Sector, *A Sub regional Seminar for Eastern and Southern African Countries Nairobi*, Kenya, 15-19 September, 1997. Accessed on 15<sup>th</sup> November 2013, [http://www.unevoc.unesco.org/fileadmin/user\\_upload/pubs/iug014e.pdf](http://www.unevoc.unesco.org/fileadmin/user_upload/pubs/iug014e.pdf).
- Vargas, Z. F. (2004). 40 Questions on Labour Competency: Montevideo. *International Labour Office, CINTERFOR/ILO*, 2004, 135 p. (Technical office papers, 13), ISBN 92-9088-182-8. Accessed on the 6<sup>th</sup> of October 2013, [http://www.ilo.org/public/libdoc/ilo/2004/104B09\\_264\\_engl.pdf](http://www.ilo.org/public/libdoc/ilo/2004/104B09_264_engl.pdf).
- Wang B. (2012). *Upgrading China's Economy Through Outward Foreign Direct Investment*. Australian National University, Canberra ACT 0200, Australia, ISBN 9781921862793 (pbk) 9781921862809 (ebook), © 2012 ANU E Press.
- Wanjala, K. B. (1995). Kenya: Co-operation and Vocational Education. *In Establishing Partnership in Technical and Vocational Education*, Berlin: UNEVOC.
- World Economic Forum Report. (April 2012). *The Future of Manufacturing: Opportunities to Drive Economic Growth*, a World Economic Forum Report in Collaboration with Deloitte Touche Tohmatsu Limited.

Zeytinoglu, I. U. (August 2005). Cooke G. B., and Jiao C., “*Determinants of On-Job-Training in Canada: Effects of Workplace Characteristics, Employment Status and Personal Characteristics on Differentiated Training Experiences*”, Human Resource and Skills Development (HRSD) and Industry Canada.

Zúñiga, F. V. (2008). *WHY LABOUR COMPETENCIES? KEY ELEMENTS TO BE CONSIDERED*. The Inter-American Centre for Knowledge Development in Vocational Training (ILO/Cinterfor) Avda. Uruguay 1238 - Montevideo - Uruguay - Tel: (5982) 908 6023 - 902 0557 - 908 0545 - Fax: (5982) 902 1305, webmaster@cinterfor.org.uy, Copyright © 1996-2008 International Labour Organisation (ILO) - Disclaimer.