

Developing Industrial and Technological Manpower via Technical Vocational Education and Training (TVET) in Nigeria

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Abstract

The need for continual production and replacement of industrial and technological manpower cannot be undermined, since it will enhance the sustainable industrial and technological advancement and security for national development. One important and indispensable programme that can produce demand-driven manpower for sustainable industrial and technological advancement and national development is TVET. In line with the assertion, this study identified the mechanisms for developing industrial and technological manpower via TVET for national development. The study was guided with two research questions and one hypothesis. The descriptive survey research design was employed. The sample was made up of 135 TVET teachers and 123 TVET industrial workers in Delta and Edo States of Nigeria, who were selected using simple random and convenience sampling techniques respectively. Questionnaire validated by three experts and with a reliability coefficient of 0.83, obtained

through split-half method was used for data collection. The data analysis was carried out using mean and t-test statistics. The findings revealed that TVET policy reform issues and TVET-industry partnership are viable mechanisms for developing industrial and technological manpower for national development via TVET programmes in Nigeria. It was therefore recommended among others that stringent policy document should be prepared by government and TVET stakeholders to properly harmonize TVET programmes in Nigeria and industrial/technological advancement.

Keywords: Development, policy, partnership, manpower, industry, technology, TVET.

**For correspondences and reprints*

1. INTRODUCTION

Education generally brings about the transformation needed in every society for industrial and technological development. Imogie (2014) argued that no nation can develop to its fullest and keep pace with trends in science and technology without effective and efficient educational system. The industrial and technological advancement of any nation also depends on her natural, physical and human resources. The human resource is one vital resource that determines and controls other resources, and these are individuals trained formally or non-formally to take charge of other resources in an organisation so as to attain the defined objectives. These resources are needed in the industries, and are better prepared for the industries via the educational institutions. One educational programme that has the mandate of producing the required and demand driven industrial/technological manpower for Nigeria is the technical vocational education and training (TVET) (Ahobee, n.d.; Musa & Okorieocha, 2012; Ansah & Kissi, 2013; Okorieocha & Duru, (2013). The need therefore for functional TVET programmes in Nigeria.

TVET programmes help to meet societal trends in terms of technological changes. According to UNESCO and ILO (2002) technical and vocational education refers to those aspects of educational process involving, in addition to

general education, the study of technologies and related sciences, and the acquisition of practical skills, attitudes, understanding and knowledge related to occupation in various sectors of economic and social life. Similarly, FRN (2004) affirmed that one objective of TVET is to produce manpower required in the industry, commerce and agriculture. It is therefore important to note that TVET is meant to fulfill industrial and technological manpower development. The workplace preparatory characteristic of TVET should be a driving force of any nation in accepting TVET programme as a tool for national development.

According to Ansah and Kissi (2013) TVET is meant to equip people with the technical and professional skills needed for industrial development as well as social progress of any country. To demonstrate the umbrella attribute of TVET, the Japan International Cooperation Agency (JICA, 2001) conceptualizes TVET as a comprehensive term to cover institution-based formal and non-formal education and training programmes in the technical and vocational institutes. It can therefore be justified that TVET is a formally or non-formally programme meant to develop competent and demand driven TVET manpower for the industrial sector, leading to industrial and technological advancement.

One mandate of TVET institute is manpower production for the industries. According to Imandojemu (2001) development in TVET suggests training purposely planned for employees or people for efficiency and effectiveness, and maximization of profit or full benefit for the enterprise (industry, commerce or agriculture). Okafor (2011) stated that TVET plays important role in manpower development and job creation in Nigeria. The author opined that technical education is concerned with qualitative technological human resource development directed towards a national pool of skilled and self-reliant craftsmen, technicians and technologists in technical and vocational field. In the context of this study, TVET manpower development is the formal or non-formal training and dexterity given to an individual in relation to the requirements of any nation for industrial and technological security or development *visa viz* national

development. This means that the development of TVET manpower for the industry or labour markets is geared towards meeting the technological advancement of any nation.

The technological development of a nation is inseparable and indispensable with TVET (Musa & Okorieocha, 2012). Yusuff and Soyemi (2012) affirmed that TVET skills are vital to economic development because they are needed for enterprise (industry) productivity and profitability as well as individual's prosperity. For Budu-Smith (2005), without skilled technical manpower produced by the polytechnic, technical and vocational institutes for industry, commerce and agriculture, national development would virtually grind to a standstill. Many studies have also suggested that TVET is an instrument for industrial development and economic or national growth (Nsiah-Gyabaah, 2009; Okorieocha & Duru, 2013; Ansah & Kissi, 2013; Ezeani, 2014; Scott, 2014).

It is no doubt that TVET has been faced with issues and challenges in Nigeria that are militating the latent contributions of TVET for industrial advancement. Amongst the challenges and issues are policy issues, curriculum reforms, TVET-industry link, and government attitude to funding TVET, to mention but a few. Ansah and Kissi (2013) affirmed that the major challenge facing TVET implementation is the lack or unsatisfactory policy framework, and therefore stated that good policy framework will help promote TVET and its curriculum design and delivery to meet the labour market. With respect to policy issues, Wodi and Dokubo (2012) also stated that there is need to revise the school's curriculum to reflect multiple intelligent from the industrial sector. To ensure that the issue of policy framework is addressed in TVET, Nwana (1997) suggested that publicity and advocacy for new TVET policy can serve as a means for proper implementation of TVET programmes in Nigeria. Policy framework is truly the driving force to the planning, implementation and attainment of any programme's or organisational objectives, hence a good TVET policy framework can help to monitor and control manpower development for the industry.

Another challenge militating TVET manpower development for industrial and technological security/development is the link between the industries and the

educational institution. Yusuff and Soyemi (2012) suggested that TVET instructors in training schools should leverage on industry partners to gather industrial based experience and strict monitoring of industrial trainees.

Similarly, Egbri and Chukwuedo (2013) found that the existing students' industrial work experience scheme (SIWES) in Nigeria is not satisfactory, hence the need to re-engineer TVET through functional school-industry collaboration for capacity building of prospective TVET graduates and teachers. In order that TVET graduates become industrially demand driven for national development, there is need that the link between TVET and the industry is established in Nigeria.

The need for TVET manpower development to protect and improve industrial and technological development cannot be undermined since TVET has the elements needed to add substantially to national development. Ibeneme (2009) justified that no nation can develop beyond the level of human resources available in that nation. For Nigeria to develop technologically via the industry, it requires amongst others, but most fundamentally, TVET policy reform and industry partnership. This study therefore investigated policy issues and TVET-industry partnership as the fundamental mechanisms for developing manpower requirement for industrial security/development, *visa viz* national development.

Education has generally been described as instrument for national development. This may be likened to the objective of TVET which is basically meant to produce different levels of skilled manpower required in the industry for technological advancement of any nation. The fall in the standard of education in Nigeria has apparently led to the challenges facing the TVET programmes in achieving the main aim, goal and objectives. Okebukola (2006) affirmed that the educational system in Nigeria in the 70s had functional facilities that led to the production of skilled manpower for national development, but today the situation is the reverse. TVET programmes seriously suffer lack of, ill-equipped and/or inadequate workshops in specific and facilities in general.

The crippling pattern of industrial and technological development in Nigeria can be traced to the fact that the educational system is producing lower than the

required with respect to skilled industrial manpower, especially in TVET. This can be attributed to the reason why majority of the present day TVET graduates are not demand driven in terms of employment, hence they are not easily placed

in the industries where they ought to be after graduation. The case in the industries therefore remained haphazard employment pattern. These issues definitely result to under-advancement in the industries, leading to poor technological advancement. Consequently, the nation suffers since the economic growth largely depends on industrial and technological inputs and outputs. A good policy reform and strategies and functional TVET-industry partnership may restrain these challenges. The need therefore for this study to investigate the instruments that will be necessary to advance the adjustment of the aforementioned issues.

The main purpose of the study was to determine the mechanisms for developing industrial and technological manpower via the production demand-driven graduates from TVET programmes for national development. The objective of the study was to identify the mechanisms relating to TVET policy issues and TVET-industry partnership.

In order to achieve the objectives of this study, the following research questions were answered in this study.

1. What policy issues are related to development of industrial and technological manpower via TVET programmes in Nigeria?
2. What TVET-industry partnership mechanisms are necessary for production of demand-driven graduates for sustainable industrial and technological security/development?

The hypothesis that was tested in this study at .05 level of significant is

H₀: There is no significant difference between the mean responses of technical TVET teachers and TVET industrial workers as regards the mechanisms for

developing sustainable industrial and technological securities via production of demand-driven TVET graduates.

2. Methodology

The descriptive survey research design was employed in this study in order to describe, analyse and interpret the findings of the study for generalization. The population of the study was made up of all the technically oriented TVET industrial workers and the TVET teachers from technical colleges, colleges of education and universities in Delta and Edo States of Nigeria. A sample size of 135 teachers and 123 TVET industrial workers was used for this study by adopting the simple random and convenience sampling technique respectively. A closed ended questionnaire validated by three experts was used for data collection. The questionnaire was scaled strongly agree, agree, disagree and strongly disagree with nominal values of 4, 3, 2 and 1 respectively. The reliability coefficient of the questionnaire determined using the split half method was 0.83, indicating that the questionnaire was reliable for data collection.

Data collection was done by the researchers with the help of three research assistants. The methods of data analysis were by mean, standard deviation and t-test statistics. The decision rule for the research questions was based on mean value of 2.50, while the standard deviation was used to validate the mean. The hypothesis was tested at a significant level of 0.05.

3. Results

The data collated were analyzed using mean, standard deviation and t-test statistics, and were presented in tables in accordance with the corresponding research questions and the hypothesis.

Research Question 1: What policy issues are related to development of industrial and technological manpower via TVET programmes in Nigeria?

Table 1: Mean and Standard Deviation of the Policy Framework Mechanisms for TVET necessary for Production of Industrial Manpower

S/N	Policy Issues for Industrial Manpower Development	Mean	SD	Remarks
1	A good policy document guiding the establishment of industrial security via human resource development from TVET will help in industrial/technological growth	3.73	.482	Agree
2	Industrial policy should be linked to TVET programmes for effective TVET manpower development for the future industries	3.59	.495	Agree
3	It is necessary to have a separate TVET policy relating to industry that will guide TVET manpower development for industrial/technological development	3.44	.611	Agree
4	Policy documents for TVET should integrate the formal and non-formal sectors to strengthen the link between the two sectors.	3.35	.595	Agree
5	It is imperative to always revisit the curriculum of TVET programmes to meet the industrial and technological demand for the production of demand driven TVET manpower	3.56	.530	Agree

6	The existing science and technology innovation (STI) policy is good enough for producing TVET manpower for industrial and technological security	2.30	.928	Disagree
7	The policy making team should be made up of proportionate numbers of TVET scholars from the educational institutions and the industrial sector.	3.48	.614	Agree
8	Procedures for determining the projected number of manpower from the academic institution required in the industry should be spelt out in the policy	3.30	.679	Agree
9	The policy document should specify the criteria for carrying out researches with respect to meeting the industrial/technology demands and the number of required TVET manpower	3.38	.627	Agree
10	Specify the responsibilities of every TVET industry and the educational institution in the policy	3.48	.533	Agree
11	Establish the criteria for evaluating the policy implementation process towards industrial/technological advancement	3.39	.605	Agree

12	Define the procedures for reconciling the activities of TVET academic institutions and the requirements of the industrial sector	3.35	.595	Agree
13	Proportionate numbers of governmental and non-governmental agencies for making, implementing and evaluating the policy is necessary in the policy	3.15	.728	Agree
14	Establish the procedures for partnership between the TVET institutions and the industries in the policy	3.29	.602	Agree
15	The policy should document how to improve TVET students and staff welfare and development against industrial/technological hazards	3.33	.591	Agree
16	Comprehensively define every procedures and terms in the policy document	3.35	.540	Agree

Source: Field Study, 2014

Data presented in Table 1 reveal that the mean responses for the need to develop TVET policy for industrial manpower development ranged from 2.30 to 3.73. The relative low values of the standard deviation indicate that the respondents are in consensus in their responses. The mean results therefore show that there is need to develop TVET policy for industrial manpower development, hence the identified strategies should be employed for such development.

Research Question 2: What TVET-industry partnership mechanisms are necessary for production of demand-driven graduates for sustainable industrial and technological security?

Table 2: Mean and Standard Deviation of TVET-Industry Partnership Mechanisms necessary for Production of Industrial Manpower

S/N	TVET-Industrial Partnership Mechanism for Industrial Development	Mean	SD	Remarks
17	TVET-industry partnership is NOT necessary for developing human resources via TVET programmes for industrial advancement and security	1.85	.932	Disagree
18	TVET-industry partnership will help to produce the needed industrial manpower that will sustain the growth and functionality of the industry.	3.41	.701	Agree
19	The school system only cannot guarantee the security of the industry via TVET manpower development without functional partnership between the two sectors	3.36	.624	Agree
20	It is important that TVET institutions partner with the industries beyond the syndrome of the present day SIWES	3.53	.613	Agree
21	Establish legal criteria for TVET Industry collaboration	3.42	.47	Agree
22	Government should mandate all registered organizations to partake in the collaboration	3.69	.36	Agree
23	Determine the number of TVE students/staff that will be attached to an organisation	3.27	.50	Agree
24	Establish the criteria for selecting the number of industrial workers for	2.71	.61	Agree

the collaboration				
25	Establish a definite means of attaching TVE students/staff to organizations that are related to their areas of study or specialization	3.29	.51	Agree
26	Determine the appropriate level(s) the students should be attached to the collaboration	3.49	.46	Agree
27	Industries should be made to be aware and also have the curriculum of TVE programmes	2.83	.57	Agree
28	Make specifications of the extent of practical skills to be acquired in the collaboration	2.70	.56	Agree
29	Establish criteria through which industry and academic staff members should partner	2.60	.65	Agree
30	Establish the criteria for evaluating the extent of achievements during the partnership	2.66	.67	Agree
31	Determine the pattern to which non-formal and formal TVE programmes should partner	2.53	.81	Agree

Source: Field Study, 2014, and Adapted from Egbri and Chukwuedo, 2013

The data presented in Table 2 show that the mean value of the need for TVET-industry partnership ranged from 1.85 to 3.69. The relative low values of the standard deviation imply that the responses of the respondents are in coherent with one another. The mean results confirm that there is need for TVET-industry partnership, and that the identified strategies for TVET-industry partnership should be adopted. This consequently explains that TVET-industry partnership is necessary as a mechanism for developing industrial and technological manpower via TVET for national development.

Hypothesis: There is no significant difference between the mean responses of technical TVET teachers and TVET industrial workers as regards the mechanisms for developing sustainable industrial and technological manpower for industrial securities via production of demand-driven TVET graduates.

Table 3: The t-test Analysis of Mechanisms for Developing TVET Industrial Manpower

Variables	Status	N	Mean	SD	df	T	P	Decision
Mechanisms for developing TVET industrial workers for industrial and technological development					256	1.34	.806	NS
	TVET Teachers	135	3.23	.68				
	Industrial Workers	123	3.04	.75				

Source: Field Study, 2014.

NS: not significant

The t-test analysis shows that the t-value of 1.34 at degree of freedom (df) of 256 is not significant at probability (p) value of .806. The null hypothesis is therefore retained since the p-value is greater than the alpha value of .05. It thus implies that the mean responses of TVET teachers and the industrial workers did not significantly differ in accepting policy framework and TVET-industry partnership as the mechanisms for developing industrial and technological manpower for industrial security via TVET programmes for national development.

4. Discussion

The results presented in Table 1 to answer research question 1 revealed that development of TVET policy framework is an instrument for developing industrial and technological manpower via TVET. The results showed that various strategies should be employed to achieve this aim. The findings of research question 1 are in conformation with the assertion of Osinem and Nwoji (2010) which state that the integration of TVET into science and technology innovation (STI) policy is a hindrance to TVET development, hence the need for separate TVET policy.

From the findings of research question 2, it was found that TVET-industry partnership can be a mechanism for developing industrial and technological manpower development/security via TVET programmes for national development. This confirms to the assertions of Yusuff and Soyemi (2012) and Scott (2014) who stated that TVET can be re-engineered for effectiveness for the industry through functional partnership.

5. Conclusion and Recommendations

Industrial and technological development may determine the extent to which a nation economy grows; hence every nation largely depends on her technological advancement. The security of the industry is dependent on the manpower development from allied area of study from the educational institution. In Nigeria, industrial and technological advancement is crippling, and therefore requires adequate strategies to rescue the situation. It is therefore concluded in this study that TVET policy framework and TVET-industry partnership are the instruments necessary to salvage the manpower development of the industry via TVET education programmes, so that there will be continual replacement of competent manpower in the industry.

In line with the findings of this study, it is recommended that:

1. TVET policy framework for industrial manpower development should be designed by TVET scholars and policy experts.

2. Strategies for ensuring TVET-industry partnership should be developed through a team work between TVET scholars and industrial experts.

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