ASSESSING THE IMPACT OF PRODUCTION UNITS ON ENHANCEMENT OF TRAINING IN TECHNICAL AND VOCATIONAL EDUCATION INSTITUTIONS, A CASE OF KIAMBU COUNTY, KENYA

BY

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A RESEARCH THESIS SUBMITTED TO THE DEPARTMENT OF TECHNOLOGY EDUCATION, SCHOOL OF EDUCATION IN PARTIAL FULFILMENT OF REQUIREMENTS FOR THE AWARD OF THE DEGREE OF MASTER OF EDUCATION IN TECHNOLOGY EDUCATION

MOI UNIVERSITY

2024

DECLARATION

Declaration by the Student

I hereby declare that this study is my original work and has not been previously submitted for any of the study programmes in any institution of higher education. No part of this thesis can be reproduced without the consent of the author and/or Moi University

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DEDICATION

To my loving family: my dear wife Kylien Rikana and my daughter Lesline Wamaitha. They have been very supportive throughout the period of writing this work. I also thank my parents Mr. and Mrs. Stephen Kamau for their encouragement and moral support. God bless you abundantly.

ACKNOWLEDGEMENT

I thank my supervisors, Dr. Julius Keter and Dr Titus Murgor: their commitment and support throughout the writing of this thesis has been immense. I deeply appreciate their valuable guidance throughout.

I am equally grateful to my lecturers who took us through the course work that served as an introductory to this research study. I also thank my classmates. They shared in academic discussions that contributed to success of the study period. I also express gratitude to the Department of Technology Education of Moi University, for the support, that enabled me to proceed with studies and complete as expected.

I am also grateful to the respondents who participated in the study, without whom it would have been impossible to complete this study. The valuable data they provided was of great assistance in writing research findings.

ABSTRACT

Globally, education stakeholders have put great interest on the extent to which Technical and Vocational training institutions contribute to acquisition of relevant skills necessary for producing a skilled, all round developed youth. However, TVETs face a number of challenges ranging from lack of adequately skilled trainers, outdated courses to mismatch of trained skills for the market needs. The study therefore, was to assess the contribution of production units in enhancing training in TVET institutions in Kiambu County, Kenya. The choice for the study area was informed by the presence of well-established and accredited TVET institutions offering similar courses with other TVET institutions within the country thus forming a representation. This study was guided by the following specific objectives: To investigate the extent of integration of production units in training in TVET institutions, to examine the influence of production units on the acquisition of practical skills among trainees, to assess the role of production units in mobilising resources for supporting technical training and to investigate the influence of production units on acquisition of entrepreneurial skills among the trainees in TVET institutions in Kiambu County. The study was guided by human capital theory. The study adopted a quantitative research approach was adopted as it would give precise responses where survey cross sectional design was used. The study was contacted in Kiambu County involving three TVET institutions. The study target population comprised 513 trainers and 8969 trainees. Slovin's formula was used to calculate the sample size of 76 trainers and 307 trainees. Questionnaires solicited data from trainers and trainees. Random and proportionate sampling technique was employed to select trainers and trainees to participate in the study. The research instruments were validated using Cronbach's alpha analysis where internal reliability coefficient of 0.74 and 0.73 were ascertained and which were significant as they were close to 1.0, both for trainees and trainers respectively. Quantitative data was analysed using descriptive and inferential statistics using multiple linear regression analysis which is suitable to test the relationship of the independent variables on the dependent variable. The analysed data was presented using tables to obtain mean and standard deviation, and charts to represent frequencies. From the findings, regression coefficient β value for integration of production units was (0.068), this showed that their integration had a positive effect on enhancing training. Acquisition of practical skills showed a regression coefficient β value of (0.227) indicating that production units to a great extent are useful in acquisition of practical skills. Findings on mobilisation of resources for supporting technical training gave a regression coefficient β value of (0.350) revealing that resources availed in production units enhanced training. The regression coefficient value β of (0.141) showed that trainees exposed to production units to a large extent acquire entrepreneurial skills. The positive β values indicated the direction of relationship between independent (Integration of Production units, acquisition of practical skills, mobilisation of training resources and acquisition of Entrepreneurial skills) and dependent (enhancement in training) Variables. The study therefore concluded that all the factors under study significantly contributed to enhancement in training. From the findings, the study recommends that research and consultancy aspects of production units should be developed fully, collaborations with the industries be embraced and adequate policies be instituted in order to contract trainees in production units. This will enable the TVET institutions improve the training within the production units.

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ABBREVIATIONS AND ACRONYMS

ADB	:	Asian Development Bank
GoK	:	Government of Kenya
ILO	:	International Labour Organization
OECD	:	Organization for Economic Co-operation and Development
TVET	**:**	Technical Vocational Education and Training
UNESCO:		The United Nations Educational, Scientific and Cultural Organization
TVETA	:	Technical Vocational Education Training Authority

CHAPTER ONE

INTRODUCTION TO THE STUDY

1.1 Background to the Study

Globally, today's life has placed great expectations on the education system as opposed to long ago when much other than training was expected from technical training institutions. According to (Adekola, 2022), employability rate statistics are key indicators that encourage individuals to pursue education with the consequence that higher education will become increasingly vocational driven. These expectations place a great deal of pressure on the training institution to meet all the stakeholders' expectation and still remain relevant to the industry demands. Therefore, it should be noted that trainees need to possess a set of skills to engage the much needed manpower at the industry level which can be obtained through TVET (Erdem, 2019).

Employment is a crucial aspect of adulthood (Ookeditse G. B., 2022). Engaging in gainful employment is an indication of leading a productive life in the society for all persons, and their participation in employment is a positive contributor to any economy. Therefore, acquisition of theoretical and practical skills should be viewed as enablers to personal development that lead to either gainful employment or entrepreneurship. Training institutions are among the centres of transitions for people into being productive in their societies. Technical and vocational training centres thus have their work cut out for them as far as national development is concerned.

The world over, TVET training is faced with a multitude of hindrances like practical training and job market incompatibility that have continued to impact negatively on education impact on the society. This has resulted into low employment rates, poor productivity and inadequate skills to make graduates employable. The TVET graduates are basically not in synch with the job market. In addition, (Jabarullah,

2019) reported that the low entry requirements to technical and vocational training are a major factor to the unpreparedness of graduates for the job market. Those who do not post good grades often end up in technical and vocational training.

According to (Hassan, 2019) posited that after the global financial crisis of 2008, most of the job requirements and or skill sets were changed and this necessitated rethinking of technical and vocational training and their contribution in the job market. Graduates are now required to do more tasks and thus should be trained adequately. This calls for technical and vocational training to revamp their training curriculums to accommodate the new job market requirements. Otherwise the TVET graduates will find themselves equipped with inadequate skills that will eventually decrease their job quality and render them jobless.

Various initiatives have been put forward by governments and various institutions around the world to solve unemployment needs. Top among these initiatives is revamping technical and vocational training to accommodate today's job market needs. UNESCO (2012) proposed a raft of measures aimed at solving the unemployment and labour training requirements. The proposal sought to address the challenge of inadequate training through continuous trainings at technical and vocational training, reviewing curriculums and aligning training with market requirements (Kamau and Ngubu, 2017)

According to UNESCO (2012) requirement of skills from practical training has led to increased intake of trainees in technical and vocational training in an effort to curb unemployment. The education requirements especially in secondary schools are not enough to make the graduates employable. Thus enrolment to technical and vocational training helps impact these graduates with technical knowledge that can

help them be self-employed and create job opportunities for the other people (Kamau and Ngubu, 2017)

According to Orbeta and Esguerra (2016), Asia and Latin America had to make strong their TVET institutions so as to meet the ever changing demands of the industry. Moreover, to ensure that trainees have the requisite skills needed to secure gainful employment, these countries strengthened their training institutes by incorporating practical production units which are hosted within the training institutions. They also encouraged funding of these institutes and changed their training systems to accommodate industrial demands. The production units helped link the classroom training with practical requirements expected of the technical and vocational trainees once they seek employment.

Production units refer to physical spaces where the institutions combine human inputs and materials to manufacture items, products and services. Ogumbe (2015), further observed that production units are a representation of the industry within the training institute. These units make training relevant and practical as what is theoretically taught is practically done in the same institute. The production units have been seen to be centres of incubations and innovation as they encourage technical and vocational trainees to be creative and practical in their respective occupations (Ananda & Mukhadis, 2016).

It is further observed that the main objective of technical and vocational training production units is to offer technical and vocational trainees with practical experience that can aid them start their own ventures or gain experience to become employable. The units offer technical and vocational trainees requisite environment to conceptualize what the industry expects of them (Ananda & Mukhadis, 2016).

Production units in TVET institutions also perform a very important function in ensuring that these institutions become self-reliant. The units are used to produce products and services that can be sold or taken to the market thereby earning money needed to run operations (Kaufman, 2013). TVET's production units while giving technical and vocational trainees the relevant practical skills and experience also generate cash required to run some of the institutions operations and they can therefore become self-reliant Ogumbe (2015). In Africa, some countries like Nigeria are increasingly becoming cognisant to the importance of having production units revamp training offered by TVET institutions. To this end, the Nigerian government has in the recent past established policies aimed at establishing production units within the technical and vocational training (Oviawe, 2018). This has not only aided in impacting real or practical experience to technical and vocational trainees but is also serving another purpose of utilizing idle time and capacity in the production of innovative products and services. These are then sold to generate income that can add to the funding already provided to TVET institutions. The training curriculum in these technical and vocational training institutions was also revised to include practical industrial experience that can only be achieved beyond theoretical training.

TVET institutions were in the past considered to be out of touch with the market requirements. They had to be up to speed with the dynamics of the labour market and this led to the establishment of the production units so as to simulate the industry in a learning environment. Also, there were financing issues and this was another motivation to establish units that could utilize the competitive advantage that the technical and vocational training have to generate some income and take care of their operational costs and consequently lead to growth of these institutions immensely (Akpomudjere, 2015).

In Africa, it has been reported that in some countries like Nigeria, the education system is led by poor management in TVET institutions because there exists inadequate policies to bring up to date the educational requirements with market changes. (Ramadan, 2018) Observed that there is a need to align the training programmes with current market requirements through proper planning and foresight. However, some of the challenges facing African technical and vocational training are related to social economic hindrances like lack of facilities, funds and good will from the top leadership to enhance training in technical and vocational training.

In Uganda, (Rajadurai, 2018) asserted that TVET training is hampered by inadequate facilities, like machines and equipment currently required offering graduates with practical skills. There are also challenges with use of old education systems that were functional decades ago. These systems are responsible for half-baked TVET graduates who cannot match today's labour requirements.

Akpomudjere (2015) further observed that production units are also important cogs in ensuring that TVET institutions forge partnerships with the private sector. There have been uses of institutes human resources and the private sector funding to produce innovative goods and services out of the production units. According to Dike (2013), production units in TVET institutions in Nigeria bridge the gap between skills taught in class and industrial expectations of the TVET technical and vocational trainees.

In Kenya, (Rono, 2019) asserts that without ways of checking theoretical and practical training in TVET institutions, the existing skills gap will widen. The graduates from such institutions will not qualify to engage in labour market demands. Introduction of production units therefore becomes a critical component in giving TVET technical and vocational trainees real industrial experience. In the process, the TVET institutions also benefit from sale of products and services thereby having income that

ensures they sustain themselves or in the very least have cash to run some of their operations internally.

(Wanyonyi, 2018), Opined that despite there being many TVET training institutions in Kenya, very few have the requisite materials and capacity to train graduates in tandem with labour market needs. Many institutions therefore churning out graduates with below par skills and this either leads to unemployment or poor productivity. Most of the TVET institutions are basically underfunded yet are required to provide training to thousands of graduates and equip them with enough skills to make them secure employment and create more jobs themselves.

(Nalbandi, 2019), Posited that in Kenya, despite tax payers funds committed to technical and vocational training, these institutions have sometimes not been meeting labour market requirements. Therefore, their existence needs to be radically reviewed through a number of means like reviewing their trainings, policies regulating their functionality and meeting or matching market needs with relevant courses.

The Kenyan government also needs to review policies relating to technical and vocational training to make them competitive and attractive to graduates. They need to set up minimum labour market standards that should be met by every TVET institution in the country so as to ensure that the graduates are relevant to the tasks they train for. Also, the institutions should also not be for the secondary school failures but should attract equally strong academic qualifications so as to attract talent and serious technical and vocational trainees. This will make sure that the graduates are up-to to labour market requirements (Kihara, 2019)

(Lukman, 2017), Observed that there are a myriad of issues facing Kenyan technical and vocational training. These includes, inadequate funding, poor management, lack

of requisite policies to regulate training and poor organization. For technical and vocational training to be adequately equipped to offer up to standard trainings, they need to be given necessary infrastructure and clear policies that are meant to guide them on how to prepare technical and vocational trainees according to current labour market needs.

The government through the Kenya gazette supplement of 2013 led to the enactment of the Technical and Vocational Education and Training Act, 2013(GoK, 2013). The Act provide for the structures and institutions for the governance and administration of institutions providing TVET in Kenya (GoK, 2013). The Act also provide for the establishment of the Technical and Vocational Education and Training Authority (TVETA) which have the responsibility of regulating TVET. This includes; registering TVET institutions, registering training, approving curricula, assessment and certification. However the Act did not incorporate production units as a means of skills acquisition during training. Overall TVETA has the mandate of ensuring quality and relevant skills are offered. TVET institutions cannot achieve desired growth and sustainability according to Asian Development Bank (ADB) report if they continuously skewed training focusing too much on class theory (ADB, 2009). According to Onderi, Ajowi and Malala (2014) for TVET institutions to remain relevant they have to invest in more practical and industry driven skill training so as to produce competent technical and vocational trainees required in the labour market.

Onderi *et al.* (2014) further observes that in Kenya, funding provided by the government cannot adequately cover the running costs fully. Thus the TVET institutes are required to increase their income generation activities. This increase in income generating activities includes opening more training branches and opening production units in departments that can use practical skills to produce goods and services. These

initiatives give them alternative sources of income rather than just depending on state funding. More than 55,000 young men and women come out of tertiary institutions every year in Kenya. However, the labour market cannot absorb all of them and thus there is need to train them how to be self-reliant. This will involve impacting them with requisite skills needed to ensure they can start their own ventures. TVET production units therefore become the first and probably the only place they can gain experience (GoK, 2012).

1.2 Problem Statement

TVET institutions in developing countries face a number of challenges in impacting skills to technical and vocational trainees such as inadequately skilled trainers, outdated courses offered and being unable to meet the labour market requirements for the technical and vocational trainees they release every year (Mack & White, 2019; Ngure, 2015). TVET education also lack recognition as compared to University education in developing countries (Norton, 2021). TVET institutions are required to balance and meet expectations from the technical and vocational trainees, the labour market and other stakeholders. This has driven them to establish other means through which to meets these expectations. Some of the methods applied are by establishing production units where theoretical skills can be matched with practical skills needed in the labour market. A number of studies have been done in relation to technical and vocational training production units. According to, Uchenna and Osita (2017), there exist poor curriculums, below average teaching methods inadequate resources for skills training in TVET institutions. TVET teacher education has been found to have teaching challenges in TVET institutions (Grosch, 2017; Ferej, Kitainge & Ooko (2012). Technical teacher education has been found to be faced with challenges of lack of motivation on training technical courses. This is due to lack of acquisition of

adequate skills, proper qualifications and industrial experiences. Also, vocational and technical training has been affected negatively by trainees with low academic grades which require extra commitment and high emotional intelligence and lack of professional development (Ismail, Nopiah, & Rasul, 2018). The impact of community attitudes on TVET institutions was studied by Kamau & Ngubu (2017). This study established that TVET institutions sustainability, technical and vocational trainees' enrolment and absorption is dependent on perceptions of the stakeholders. From the reviewed literature, it is evident that information regarding the role played by production units in TVET institutions is scanty. Therefore, this study seeks to establish the contribution of production units towards enhancing training in TVET institutions in Kenya.

1.3 Objectives of the Study

1.3.1 General Objective

The main objective of the study was to assess the impact of production units on enhancement of training in TVET institutions in Kiambu County, Kenya.

1.3.2 Specific Objectives

The study was guided by the following research objectives;

1. To investigate the extent to which the integration of production units impacts training in TVET institutions
2. To examine the influence of production units on the acquisition of practical skills among trainees in the TVET institutions
3. To assess the role of production units in mobilising resources for supporting technical training in the TVET institutions

4. To establish the influence of production units on acquisition of entrepreneurial skills among the trainees in the TVET institutions

1.4 Research Questions

1. To what extent does integration of production units' impact on training in TVET institutions?
2. How production units impact on acquisition of practical skills among the trainees in TVET institutions?
3. What role have production units played in mobilising resources to support technical training in TVET institutions?
4. How production units have impacted acquisition of entrepreneurial skills among the trainees in TVET institutions?

1.5 Significance of the Study

This study aimed at assessing the contribution of production units in enhancing training in TVET institutions in Kiambu County. This helped shed light to TVET institutions on how best to utilize their production units and address the challenges that limit their usefulness. To the policy makers, this study offered recommendations for improving and harnessing the contribution of production units available in TVET institutions. To the researchers, this study forms a good basis on which to conduct further studies relating to the phenomenon under study. The study also contributed to shedding light on the practices of production units as well as the literature regarding how production units have enhanced training in TVET institutions.

1.6 Scope of the Study

The study was conducted in three (3) selected TVET institutions, namely Kiambu Institute of Science and Technology (KIST), Thika Technical Training Institute

(Thika TTI) and Nyaga Vocational Training Centre. The choice of this study location was informed by the fact that Kiambu County hosts some of the oldest and established TVET institutions which have production units in place. These institutions offer courses in Technical fields in Building and Construction, Electrical, Mechanical, Agricultural, Catering and Baking Technology.

1.7 Justification of the Study

The study was informed by the fact that Kiambu County hosts the three mentioned institutions which have operational production units. The existence of production units facilitated the study as they formed a representation of other TVET institutions that has production units within the county. Thus the researcher chose to conduct the study within Kiambu County due to the proximity of these institutions and the similarity in the nature of the operations of production units in other TVET institutions within the country.

1.8 Limitations of the Study

The study encountered some respondents who were not free to volunteer to give information. This limitation was addressed by assuring the respondents of their confidentiality. Also, the respondents were assured that any information given herein is for academic purposes only. Another problem was time required to complete the study, which was limited. This was addressed by using questionnaires for data collection as they were easy to respond to and thus reduced time taken to complete the study. The researcher also ensured that the time for responding to questionnaires was minimal and within the respondents free time to ensure fast responses and minimize the time the respondent spent with the questionnaire in order to improve the response rate.

1.9 Assumptions of the Study

The study was carried out in cognisant of several assumptions. Firstly, the researcher assumed the selected TVET institutions have production units which were active in production of good and services, secondly, the selected TVET institutions allowed technical and vocational trainees to actively participate in operations undertaken by the production units, thirdly, that technical and vocational trainees were engaged in industrial attachment within the production units to further improve their skills and that trainees were engaged contractually on their free time within the production units, and finally, the study assumed that the respondents would cooperate and provide useful data related to the contribution of production units in enhancing training in TVET institutions.

1.10 Theoretical Framework

The study was anchored on human capital theory of education. This theory was first mooted in 1964 by Garry Becker and Theodore Schultz (Wagner & Hollenbeck, 2014). The theory posits that formal education is very important and very necessary where improving a people's production capacity is required. The theory further proposes that for any population to be productive, their capacity needs to be empowered. Yamoah (2014), used this theory to study the link between human resource capacity building and job performance. The theory was used to explore human resources capacity building as the development of knowledge, skills and attitudes in individuals. It also examines groups of people relevant in design, development, management and maintenance of institutional and operational infrastructures and processes that are locally meaningful. The study found out production units were instrumental in enabling training through integrating them in learning, mobilizing resources for training, enabling trainees acquire practical skills

and entrepreneurial skills. The theory was instrumental in identifying what the training institutions should do to improve their training so as to meet the requirements of the job market. This calls for investments in practical training, changing their curriculums to meet market demand and refresh the tutors' skills to the current curriculum. (Wuttaphan, 2017) View of human capital to education is based on the premise that any improvement to the productive capacity through training is in fact an investment that will bring back returns to the societies that practice it. These returns from investing in human resources will lead to growth of the society economically.

In a study conducted by Nyerere (2009), it was postulated that in an effort to improve on the productive capacity of human resources, mapping of labour is required. This will lead to bringing forth the labour market requirements. Training facilities and institutions therefore need to strategize and improve on their theoretical and practical trainings so as to move in tandem labour market changes. Human capital theory of education is important in this study as it will help conceptualize TVET trainings and their strategy to have production units. These production units are meant to give the technical and vocational trainees an opportunity to work in an environment that mimics the industry where they will go after completion of their training. Production units are set up to serve several purposes; giving practical experience, are alternative sources of income, give TVET institutions a competitive edge to attract trainees and this leads to growth.

1.11 Conceptual Framework

The study used the following conceptual framework to represent the relationship between the dependent and independent variables. Kothari (2016) posits that independent variables bring about changes or variations to dependent variables in a study. The conceptual framework for the study is presented in figure 1.1. The

conceptual framework indicates that the dependent variable is the enhancement of training in TVET institutions. The independent variables are; integration of production units and enhancement of training, production units on acquisition of practical skills, production units and mobilisation of resources and production units on acquisition of entrepreneurial among trainees.

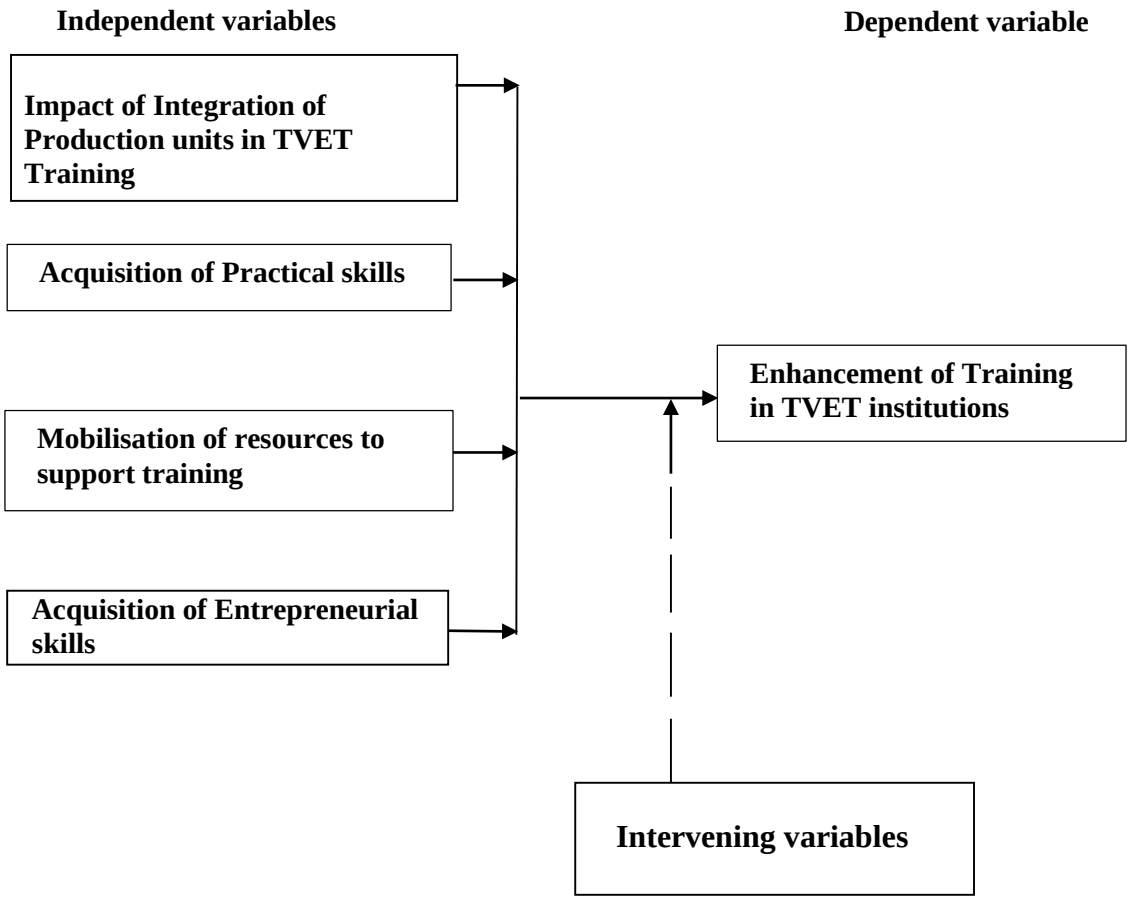


Figure 1.1: Conceptual framework

Source: Author (2022)

1.12 Operational Definition of Key Terms

Enhancement: Refers to skills acquisition, increase in enrolment of trainees in technical courses, increased production of products, improved innovation and integration of production units in the instruction of technical training in TVET institutions.

Production units: A production unit refers to the physical space within a training facility where materials and human inputs interact in the process of creating goods or services, and which work separately as an industry.

Technical and Vocational Education Training: This refers to that training and technical education that includes the larger objectives of education and it may include in training centers and on the job training.

Technical and Vocational Education: This refers to that part of education that can make trainees acquire the required, know how or practical skills that can be utilized in employment in a certain occupation or trade

Technical Education: This refers to the structured system geared towards giving recipients some skills or knowledge to perform efficiently industrial and practical tasks.

Technical and Vocational Education and Training (TVET): This is a composite term meaning the aspects in the educational process that incorporate training and acquisition of technical and vocational skills in relation to relevant training programs.

Technical and Vocational Education and Training Authority (TVETA): This is a constitutional body formed to regulate and coordinate training, inspect, register and

accredit training institutions, programs and courses and relevance and quality of training programs within the country.

1.13 Chapter Summary

This chapter has presented the background to the study, the problem to the study as well as the general aim and specific objectives of the study. Also, the chapter has presented the research questions that the study will seek to answer. Next, the significance of the study has been presented, the scope of the study as well as the study's justification and limitations. Also, in this chapter, the assumptions of the study have been outlined. Lastly, the theoretical frameworks of the study as well as the conceptual framework have also been presented.

CHAPTER TWO

LITERATURE REVIEW

2.0 Introduction

This chapter presented review of literature related to the study phenomena. Specifically, the literature and empirical review of the impact of production units in enhancing training in TVET institutions, influence of production units on acquisition of employable practical skills and contribution of production units on mobilising resources for supporting technical training and the influence of production units on acquisition of entrepreneurial and innovation skills

2.1 Enhancement of Training in TVET Institutions

TVETs are tertiary institutions whose primary mandate is to impact technical and vocational skill sets to graduates. These skill sets help trainees acquire gainful employment and even start their own enterprises to cater for market demands. In this pursuit, the TVETs ought to have production units that can enhance theoretical training by practicing it while still in school. The production units therefore are the physical space within a training facility where materials and human inputs interact in the process of creating goods or services, and which work separately as an industry (Hassan, 2019).

It has been postulated that, for TVETs to remain relevant and attract students with strong academic qualifications, the training offered in TVETs must evolve, adapt and be updated. The notion that TVETs offer training to high school graduates who never met university requirements should thus be diffused with enhancement of training in TVETs (Kihara, 2019).

In addition to changing with the current training requirements, TVETs are also required to adhere to labor market standards. These standards set the training requirements as demanded by the industry and not as set in TVETs curriculum. This ensures that graduates skill sets are matched with labor market needs and relevance of the graduates therefore cannot be overlooked (Kihara, 2019).

TVET policies are other factors that have a strong bearing on training of graduates. These policies regulate the types of training required, how they are conducted, the changes needed to curriculums and enhancements needed to attract qualified graduates. Traditionally, TVET training was just a functionality of the individual institution and the relevant ministry offering oversight role. Today, the functionality of TVETs is highly influenced by the respective industry as well as to capture the market demands to avoid unemployment due to irrelevant skills (Nalbandi, 2019).

Without ways of checking theoretical and practical training in TVET institutions, the existing skills gap will widen. The graduates from such institutions will not qualify to engage in labor market demands. The curriculums needs to be enhanced, training modernized and skill sets made to match industry requirements (Rono, 2019)

2.1.1 Extent of Integration of Production Units in Training in TVET Institutions

According to the study conducted by Marope, Chakroun and Holmes (2015) on unleashing the potential of TVET institutions, their findings were that integration of production units is critical in ensuring that TVET trainees are given education that matches the national agenda of development. The production units were found to enhance practical training for TVET graduates.

According to Raphotle, (2023) production units in Technical and Vocational Education and Training Institutes have been found as a contributive factor to

experimental learning, active learning, employability and entrepreneurial skills. The study also noted that work based sustainability among trainees enabled an increased cooperation and collaborative learning abilities, thus called for enhanced industrial like activities within TVET institutions which could be achieved through introduction of Production units.

Production units have therefore gained traction among vocational educators and other TVET institutions as it is supported by organizations like International Labour Organization (ILO), UNESCO and Organization for Economic Co-operation and Development (OECD) (Maclean, Panth & Jagannathan, 2018). The study was conducted in Singapore and it involved reviewing the issues faced by TVETs and the potential solutions. Among the prime issues identified were enhancement of training to meet today's labour market requirements.

UNESCO (2012) noted that TVET systems of education require to be revitalised by sustainable transformations like introduction of production units to provide real industrial experience to technical and vocational trainees as these units greatly influence the growth and sustainability of TVET institutions around the globe. TVET institutions have been faced with new demand for technical and vocational trainees who require the services provided by production units. The introduction of these units would therefore be important in expanding the TVET mandate from theoretical training to practical training. This in turn will serve to bridge gap between labour market requirement and training.

Graduates are now required to do more tasks and thus should be trained adequately. This calls for technical and vocational training to revamp their training curriculums to accommodate the new job market requirements. A production unit therefore serves

technical and vocational training well in bridging the gap between labour market requirements and training.

Kamau and Ngubu (2017) conducted a study in Kenya regarding the impact of the society and the attitudes people have regarding vocational courses. The results pointed out that a number of initiatives including establishment of production units inside TVETS is necessary to meet today's job market needs. UNESCO similarly proposed measures aimed at solving the unemployment and labour training requirements. The proposal sought to address the challenge of inadequate training through continuous trainings at technical and vocational training production units. Inadequate training was linked to lack of facilities like production units to enhance practical training to the TVET graduates. Incorporating these units in TVETs therefore solves the inadequate training problems faced by many TVET institutions in Kenya Currently.

UNESCO (2015 in Paris sought to evaluate the potential of TVETs through transformative education. It was reported that the introduction of new transformations like production units has been aimed at revitalizing and empowering technical and vocational trainees to meet industrial empowerment in TVET institutions. This very need has contributed to the expansion of tertiary institutions as the curriculum education offered elsewhere is sometimes considered not to meet labour market requirement due to lack of essential skills and experience. Therefore, the UNESCO report found a nexus between enhancement of training by TVETs and introduction of production units.

In addition, Ananda & Mukhadis (2016) study sought to review production units in terms of its entrepreneurial aspect, as well as bridging the gap between industry and training. The study observed that the main objective of technical and vocational

training production units is to enhance technical and vocational trainees through giving practical experience that can aid them start their own ventures or gain experience to become employable. The units offer technical and vocational trainees requisite environment to conceptualize what the industry expects of them The Kenyan government of Kenya in 2012committed to supporting strategic disciplines by the year 2020 and has since allocated more funds to the TVET institutions (GoK, 2012). The growth of these institutions have come as a result of the national agenda to make the training program relevant and adequate to equip trainees with relevant skills that will ensure their employability and contribution to the national economy.

The numbers of TVET trained graduates is considered a key performance indicator for the TVET sub sector. This indicator helps track the progress made in attaining the objectives of the sector and has led to improvement of numbers of trainees enrolled and trained (GoK, 2013). Also, the integration of production units in the TVET institutions helped greatly in marketing the training institutions as they are considered as centres of innovation and the specialised skills they give to their trainees are well received in the labour market.

Oviawe (2018) study sought on how to review and revamp of TVETs through the use of partnership between private and public cooperation in East Africa. It was recorded that some countries mostly in the developing world, are increasingly recognizing the importance of having production units in TVET institutions. To this end, many governments have in the recent past established policies aimed at establishing production units within the technical and vocational training. This is aimed at enhancing the way in which TVETs impact knowledge to technical trainees. It will also impact positively the operations of the institutions as the production units will give them the flexibility to train in real life simulations. TVETs idle time and capacity

in the production of innovative products and services will also be unlocked (Ahmad, 2022). The production units can also enhance the institution through revision of training curriculum to include practical industrial experience.

Furthermore, Cunha & Rocha (2012) evaluated the efficiency of institutions of higher learning in Portugal and included institutions like polytechnics and universities. They found out that these institutions may be operating at an inefficient level if the components of giving practical experience and doing industrial simulations are not catered for in their training programs. Therefore, those institutions that have integrated production units into their programs are highly placed to operate optimally.

Agasisti & Joanna (2014)study explored higher education efficiency and differences in Poland and Italy. The findings from the review showed that the facilities like production units and size of the education institutions determine greatly the performance of institutions that are of higher learning across the European countries. Growth of the institutions that have invested in physical training facilities have been seen to outdo growth of institutions that have not invested in their training facilities.

UNESCO (2012) reported that since the financial crisis of 2008, the labour market around the world has shifted and undergone changes which are now requiring change of training by the vocational institutions. There is currently, less jobs than before and the rate of unemployment have soared in the last decade. This changes places the TVET institutions at the centre stage as agent who will bridge training offered and market requirement for productive skills. Establishment of production units and investment in physical training facilities is a boost towards attainment of these objectives and in the process TVET institutions have grown in numbers and size.

According to Oviawe (2018) in order to enhance training in TVETs, in third world countries, educationists are becoming cognisant to the importance of having production units revamp training offered by TVET institutions. This includes establishing production units within the technical and vocational training (Oviawe, 2018). This helps give real or practical experience to technical and vocational trainees but is also serving another purpose of utilizing idle time and capacity in the production of innovative products and services. The products produced are then sold to generate revenue. The training curriculum in these technical and vocational training institutions was also revised to include time in production units so as to enhance theoretical training.

2.1.2 Production Units influence on the Acquisition of Employable Practical Skills

Ejiofor, Orji and Ejiofor (2015) studied TVET and production units in Nigeria. The study sought to establish the hindrances and challenges faced by TVETs in West Africa. The findings of the study showed that there is a positive correlation between production units and industrial work experience among trainees. They found out that trainees are exposed in the production units to the machines, processes and materials necessary to produce goods. These technical skills are relevant in the manufacturing industry and certify the trainees as employable. The study postulated that acquisition of practical skills is a must addition to TVETs. Many challenges facing TVET graduates can be attributed to poor training, and too much theoretical considerations with little emphasis on practical experiences. Use of production units therefore is important in alleviating joblessness challenges in West Africa.

According to (Shtembari, 2023), cognitive skills acquired from production units and in internships are very important in performing tasks in hard times. The study pointed

out that critical thinking and problem solving skills were reported by many trainees involved. Such skills would also come in handy for trainees involved in production units as such skills are considered kills for the future. The study also advised trainees to take such opportunities because they not only help them gain real life experiences from their institutions, but also help them connect theoretical knowledge gained through their courses with real life professions

Ogumbe (2015) studied mechanical engineering production unit in Nigerian technical colleges. The study established that production units are industrial place here trainees acquire technical skills in their disciplines. The trainees acquire knowledge through being supervised by qualified personnel in their respective areas. The production units were found to be more than laboratories and were found to be centres where theories learnt are turned into practical production of goods. The study further posited that production units are catalysts of labour market requirements fulfillments. They make TVETs not complacent but conscious to what their graduates need in the actual market. The products produced must be sold to the market. The processes used must be complacent to what the industry is doing and thus TVETs can no longer sit pretty without minding the industry requirements when it comes to training their graduates.

In Nigeria, the education system is led by poor management in TVET institutions because there exists inadequate policies to bring up-to to date the educational requirements with market changes. Ramadan, Chen and Hudson (2018) study focused on the skill sets of TVET trainers and their information communication and technology integration. It was observed that there is a need to align the training programmes with current market requirements through establishing production units where graduates can work producing marketable products. This will accord them the chance to gain practical skills that the employers will come looking for.

(Daryanto, 2015) Evaluated entrepreneurship in the unit of production of vocational training institutes in North Sumatra. The study found out that constantly practicing how to turn theoretical knowledge into practical goods and services instils technical skills to trainees in vocational training centres. UNESCO (2012) noted that one way of measuring effectiveness of a TVET programme is the ability of the trainees to possess the required technical skills in the areas of their study. The learning and teaching process therefore acts as a yard stick of the training institute. The production units in vocational training centres provides a quality assurance function in ensuring that the learning process is impacting technical skills to technical and vocational trainees. Ability of the TVET program to impact technical skills is dependent on the facilities like production units, materials and machines necessary in the production process where simulations and real production can be practiced.

Nyerere (2009) studied technical and vocational education training sector mapping in Kenya. The study established that for TVET institutions to adequately impact technical skills on trainees, the instructor to student ratio should be low so as to maintain attention of the teacher to all the trainees. The technical and vocational trainees should also be given enough industrial exposure that will reinforce the theoretical, practical lessons they have received in the vocational institutes. UNESCO (2016) reported that TVET have a major role to play in equipping the trainees with the technical skills they require to be employed in an effort to gain sustainable development by the year 2020. The study further outlined that the rate of unemployment is negatively affecting the global economy. This problem was partly due to inadequate employment opportunities as well as lack of adequate technical skills that are require for graduates to be employed.

Dike (2013) study assessed Training and vocational education in Nigeria. The study found out that integration of production units within the institution helps create a balance between theoretical lessons and practical industrial skills taught in the technical and vocational institutes. This helps meet the labour market demand for technical and vocational trainees who are required to be up to tasks and demands of the market. In many developing countries, it's easy to set up and run TVETs without practical training facilities and this leads to half-baked graduates flooding the market. Not because there are no jobs but because they do not have the required capacity to do the jobs available in the market.

In Tanzania according to (Munishi, 2016), majority of the trainees from the higher learning institutes do not have adequate technical education. Graduates are equipped with theoretical knowledge but lack in practical skills necessary to gain employment. This problem is seen to be less affecting vocational training centres that have production units as they are equipped just like in real industries and technical skills are thus impacted to vocational technical and vocational trainees. Most of the institutions of higher learning in Africa are churning out graduates with literally no practical training other than the industrial attachment they do once they complete programs. To sort out this challenges, the study found out that technical colleges ought to incorporate practical lessons. Among the most sustainable way of incorporating practical training includes establishment of production units within the TVETs themselves. This will ensure from day one, graduates are drilled on practical aspects of their respective courses.

(Ongesa, 2020), reported that critical thinking in the Kenyan education curriculum can achieve the development of training programs aimed at equipping trainees from training institutes with practical skills required. Thus new curriculum ought to be

designed to be competency based and will give trainees hard and soft skills required to gain employment. The report pointed out that practical training is somewhat superior to theoretical training when it comes to TVETs training. Most offer vocational and technical courses whose competency can be evaluated using practical tasks in the industry and not theoretical qualifications.

Ngure (2015) study on stakeholders' evaluation of TVET process found out that inability to have technical skills among trainees from training institutions is a major drawback for the country. Curriculum is seen to be a cost effective means of training but it does not address specific training demands in Kenya. This was found to have a negative influence given that there are lots of certified graduates who do not possess any technical skills and cannot secure gainful employment.

According to (Kisilu, 2022) who studied training and changing technology found out that there is a mismatch between training and requirements in the automotive industry. Lack of technical skills comes with failure of the training program to be flexible in tandem with changes in industries and technology used. The industry and the training institutes should collaborate in order to give trainees the technical skills necessary to survive the ever changing needs of the production industry

There are also challenges with use of old education systems that were functional decades ago. These systems are responsible for half-baked TVET graduates who cannot match today's labour requirements. Rajadurai, Supuan, David and Abidin (2018) study evaluated the saleability of TVET graduates in Malysia. The report of the study asserted that TVET training is hampered by inadequate facilities, like machines and equipment currently required offering graduates with practical skills. Nonetheless, strategies like establishment of production units have been used around

the world to help solve technical and vocational trainees' inadequate experience and learning. The technical and vocational trainees can go through the production unit as part of their learning. The technical and vocational training when involved in production of actual goods in the market will be forced to use up-to date methods and techniques and these accords the trainees a chance to train in real life scenarios where they can update their skills to what is actually required in the market.

Introduction of production units are a critical component in giving TVET technical and vocational trainees real industrial experience. In the process, the TVET institutions also benefit from sale of products and services thereby having income that ensures they sustain themselves or in the very least have cash to run some of their operations internally. Without policies of regulating theoretical and practical training in TVET institutions, the existing skills gap will widen. The graduates from such institutions will not qualify to engage in labour market demands. One of the best ways to curb this limitation is through using internal units of production dealing with goods and services the technical and vocational training train. This not only ensures experience is impacted on graduates but also solves the makes technical and vocational trainees employable. The study by Rono reviewed the TVETs strategic plans implementations in Kenya (Rono, 2019)

Kihara (2019) study focused on the effects of performance of SMEs in the manufacturing sector in Kenya. The study reported that technical and vocational training needs to review policies to make them market competitive and attractive to quality graduates. They need to set up minimum standards that should be met by every TVET institution in the country so as to ensure that the graduates are relevant to the tasks they train for. Establishing production units as part of mandatory requirements will help remove theoretical training and instead major on practical

training. This will make sure that the graduates are up-to to labour market requirements. The units can also be used to market the technical and vocational training in the region as people would associate quality products they produce with quality of training the graduates from such institutions can produce.

According to Akpomudjere (2015), the establishment of the production units came as a result of needs arising from half-baked graduates being produced in most technical institutions. To solve this scenario, it was established that if a TVET can ensure they integrate production units into their operations, then they can bridge the practical experience gap. In addition, the graduates can acquire skills similar to what the market demands and thus fulfil labour market requirements while still in training. Therefore, it was established that production units are an integral part of training and not just for commercial reasons. The benefits of these in house production units are multi-faceted. This arises from the fact that they will enhance training, at the same time keep the idle TVETs capacity occupied and generate own sources of revenue.

2.1.3 Production Units on Mobilization of Technical Training Resources

UNESCO (2015) reported that based on the changing labour market requirements, the training of graduates should match the industrial requirements. This calls on the governments and all stakeholders to make available training facilities for the purposes of training skills in TVET institutions. One way of ensuring that these institutions produce skilled technical and vocational trainees is through introduction of production units. Production units contribute significantly in increasing the capacity of the TVET institution in producing skilled technical and vocational trainees and in collaboration with other stakeholders like the private sector. The capacity to offer practical training is critical to TVETs if they are to remain relevant. Therefore, production units offer

them with such opportunities that their impact on trainees is focused on labour market requirements and not just general education.

According to Orbeta and Esguerra (2016) study, countries in Asia and Latin America had to make strong their TVET institutions so as to meet the ever changing demands of the industry. They also encouraged funding of these institutes and changed their training systems to accommodate industrial demands. The production units helped link the classroom training with practical requirements expected of the technical and vocational trainees once they seek employment. This was done through establishing partnerships between public and private players. These relationships were aimed at bringing market demanded production units in the training of TVETs graduates. Moreover, to ensure that trainees have the requisite skills needed to secure gainful employment, these countries strengthened their training institutes by incorporating practical production units which are hosted within the training institutions.

In Turkey, developments in production in TVETs has become one of the main suppliers of cleaning materials, medical masks, protection shields and disposable materials in high schools within the country. (Mahmut, 2020). Additionally, resources required for training with regards to machinery, equipment and materials for production required to constantly be provided and upgraded to be abreast with technological changes which in turn would result in improvement of production units. Thus the study required trainees to be engaged more on daily operations of production units.

Ramadan, Chen and Hudson (2018) thus observed that in Africa, it has been reported that in some countries there exists inadequate policies to bring up-to to date the educational requirements with market changes. There is a need to align the training

programmes with current market requirements through proper planning and foresight. However, some of the challenges facing African technical and vocational training are related to social economic hindrances like lack of facilities, funds and good will from the top leadership to enhance training in technical and vocational training. Some of these challenges can be minimized through establishment of production units in which graduates can be involved in actual work. The products from these production units can be sold in the market and the income generated used to fund technical and vocational training programmes. In some cases, production units can be modelled in a way that they are revenue generators for the institution. This will reduce the dependency on government for funding and create indirect and direct benefits to the technical and vocational training, technical and vocational trainees and the market.

Orbeta & Esguerra (2016) studied the system used by TVET institutions in Philippines. The study established that TVET institutions have to revitalise their systems so as to meet the ever changing demands of the industry. Also, to ensure that trainees have the required skills needed to secure gainful employment, these countries strengthened their training institutes by incorporating practical production units which are hosted within the training institutions. The study also encouraged these institutes to change their training systems to accommodate industrial demands. Kaufman (2013) assessed the methods in 21st century and why trainees need ideas for hands on experience. It was reported that production units in TVET institutions also perform a very important function in ensuring that these institutions gain reputation and popularity when technical and vocational trainees possess practical skills which are desirable in the job market, and are thus employable.

Most of the TVET institutions are basically underfunded yet are required to provide training to thousands of graduates and equip them with enough skills to make them

secure employment and create more job themselves. To help solve the resource challenges, a number of measures top among them being production units have helped address this issue of funding. When a TVET can generate own revenues, then their ability to offer up-to date training is significantly enhanced. They no longer therefore, require external actors to revamp their core mandate which is to produce market ready graduates whose skill sets match what is required presently (Wanyonyi, 2018).

Ogumbe (2015) whose study evaluated mechanical engineering and production units in Nigeria found out that TVET's production units offer technical and vocational trainees the relevant practical skills and experience but most importantly they engaged key resource persons from the industry who are well versed with industrial operations..Onderi *et al.* (2014) studied restructuring of TVET institutes for sustainable development in Africa. It was established that the training support provided by the government cannot adequately cater for the training needs. Thus the TVET institutes are required to increase their competitive advantage by continuously offering market driven programmes. This can only be achieved by continuously engaging the private sector players in skills transfer, and technological advice. Also, TVET institutions can be engaged in activities including opening production units in departments that can use practical skills to produce goods and services.

Technical and vocational training are faced with many challenges. These includes, inadequate funding, poor management, lack of requisite policies to regulate training and poor organization. For technical and vocational training to be adequately equipped to offer up to standard trainings, they need to be given necessary infrastructure and clear policies that are meant to guide them on how to prepare technical and vocational trainees according to current labour market needs. However,

Lukman, Adam, Jibrim and Umar (2017) observed that by establishing own production units, a number of these challenges can be alleviated. Own resources can be generated and used to fund TVET training to match labour market requirements.

Kyarizi (2012) evaluated TVET institutions in Uganda where it was established that quality learning was affected negatively by inadequate resources such as qualified personnel, inadequate training facilities and training materials. The study further recommended that institutions should initiate self-sustaining models that will enable the continuation of transfer of skills to technical and vocational trainees. This implies that production units if initiated, they can aid in transfer of skills to technical and vocational trainees.

Onderi (2014) assessment on TVET institutions in Kenya found out that there are a number of limitations affecting training in higher education. These limitations include poor training programs, lack of training facilities, poor regulations and management. The TVET institutions should be provided facilities that will help them achieve a sustainable training. Such revenue generating activities includes sale of manufactured goods and services from the institutions and collaboration with the other stakeholders. UNESCO (2016) in its report on employment and TVET training systems observed that training programs should be relevant to the labour market and this can be achieved with proper training and equipping TVET institutions with the capacity to offer practical and skill oriented programs in order to maintain proper training. TVET institutions were advised to institute channels that will enable them to adequately offer technical training that is responsive to market demands.

In Kenya, despite tax payers funds committed to technical and vocational training, these institutions still remain in dire need of resources to fund their programmes.

Therefore, their operations needs to be radically reviewed through a number of means that includes establishing own sources of revenues. The most common source of own revenues in technical and vocational training is establishment of production units that sell to market and thus generate income. These units are beneficial in a number of ways and not just resource mobilization. They also offer technical and vocational training new meaning as they can depend on these units to rejuvenate their operations and minimize under funding problems Nalbandi and Zonoozi, 2019)

2.1.4 Production Units influence on Acquisition of Entrepreneurial Skills

According to Eka & Penjaitan (2015), TVET institutions give trainees the ability to be entrepreneurs through creativity and innovations they are equipped to learn. The trainees from these institutions can be self-employed and go on to create new employment opportunities for many others in their ventures. Therefore, TVET institutions contribute greatly in creating self-employment by teaching trainees how to be innovative in production of new products and services. The study found out a significant relationship between entrepreneurial skills and involvement of TVET graduates in production units during their courses. Thus the impact of production units goes past practical skills acquisition and have an effect on how graduates perceive the world of self-employment and entrepreneurship.

One of the major challenges facing developing economies is unemployment. Many trained graduates come out of the school system every year yet the labour market cannot absorb all of them leading to oversupply of labour. TVET trained graduates have been equipped with requisite production and innovative skills that they may use to get employment in the labour market or be self-employed. When it comes to self-employment, having the required practical skills solves half the problem. The other

half is solved by funding and entrepreneurial skills that TVET graduates must have to do their own startups (Akpomudjere, 2015)

Kemevor and Kassah (2015) in their studies found out that lack of enough materials in the production units, inadequate funding and poor curriculums are some of challenges facing implementation of TVET education in Ghana. These challenges were found to hinder the ability of production units in the TVET institutions from equipping technical and vocational trainees with the skills to be self-reliant in the manufacturing sector. Anada and Mukhadis (2016) studied production units in TVET institutions. They found out that apart from equipping trainees with the required experience to gain employment, TVET's production units do equip trainees with entrepreneurial spirit through innovative thinking and on the job training that is practical. This function of TVET has the effect of influencing the whole economy as entrepreneurs contribute immensely to creating jobs for themselves and others.

Anada and Mukhadis (2016) further established that production units give trainees the required exposure, skills and ability to be self-reliant before they complete their training as part of the curriculum. This was found to have a positive effect on the ability of the TVET institutions to provide products and services that provide solutions to the needs of the society. Chukwu, Anaele, Omeje and Ohan (2020) who studied production units in educational facilities found out a number of factors that are affecting the capacity of TVET institutions to keep up with the industrial expectation. It was established that school production units promote entrepreneurship as they equip trainees with the environment and skill sets necessary to spur innovative thinking that helps them become self-employed and end up creating jobs for others

In Nigeria, (Ikutal, 2023), found out that utilization of infrastructural and institutional facilities had a significant influence on trainees employability skills acquisition in vocational education. It was therefore recommended that vocational education curriculum developers should increase the time allocated to practical activities to ensure effective utilization of available infrastructural facilities to improve employability skills development amongst trainees. Further, TVETs should boost the acquisition of employability and entrepreneurial skills in young citizens which enable the industrialization and economic development of a country, (Ogunsola, 2023).

Kamau and Ngubu (2017) study focused on the impact of community attitudes on TVET institutions. They established that people's attitude towards TVET is related to the sustainability of the institution given that enrolment of technical and vocational trainees and absorption of the same is dependent on perceptions the stakeholders have on such institutions. Such perceptions and attitudes include the ability to gain employment after training and ability to create and sustain self-employment after completion of vocational training.

Nalbandi and Zonoozi, (2019) study evaluated TVET programmes. The report asserted that these units are beneficial in a number of ways and not just resource mobilization. They also offer technical and vocational training new meaning as they can depend on these units to rejuvenate their operations and minimize under funding problems. However, the report also pointed to a situation whereby the establishment of production units opens the technical and vocational trainees to entrepreneurial opportunities. Once they learn how to produce goods and services as part of their training curricula, then something sticks in them. After graduation, most will seek employment but there are those who stick to producing the same products and

services they were doing in TVETs. This becomes the building block to their owning businesses.

According to Onderi et al (2014), impacting entrepreneurial senses in TVET graduates can only be can only be achieved by continuously engaging the private sector players in skills transfer, and technological advice. Also, TVET institutions can be engaged in activities including opening production units in departments that can use practical skills to produce goods and services. The study dealt with modernizing of TVET institutes for sustainable development. It was established that the training resources provided by the government cannot adequately cater for the training needs. Thus the TVET institutes are required to increase their competitive advantage by continuously offering market driven programmes as well as creating job creators and not job seekers.

According to Ramadan, Chen and Hudson (2018) in Africa, it has been reported that TVETs have inadequate policies to bring up-to to date the educational requirements with market changes. There is a need to align the training programmes with current market requirements and among these alignments is a change of training focus from job oriented to job creation. This will give graduates some insights on becoming self-reliant and creation direct and indirect jobs through entrepreneurship. However, some of the challenges facing African technical and vocational training are related to social economic hindrances like lack of facilities, funds and good will from the top leadership to enhance training in technical and vocational training. Towards this end, stakeholders should impact entrepreneurial insights to TVETs administrators in an effort to ensure they encourage their graduates to start own businesses. They should be linked with financiers for start-up capital. Some of these challenges can be minimized through establishment of production units in which graduates can be

involved in real life work. This will reduce the dependency on government for funding and create indirect and direct benefits to the technical and vocational training, technical and vocational trainees and the market. The entrepreneurial path for graduates is a better and sustainable way to help graduates access financial freedom through own businesses.

According to a study by Daryanto, Panjaitan and Muslim (2015) that evaluated entrepreneurship in the unit of production of vocational training institutes, it is postulated that helping technical and vocational graduates navigate the entrepreneurial world has more advantages than seeking employment. The study found out that constantly practicing how to turn theoretical knowledge into practical goods and services instills technical skills to trainees in vocational training centres. This creates jobs in the economy, aligns trainees' interests with market requirements, reduce dependency and tap into the ingenuity and creativeness of TVET graduates. UNESCO (2012) noted that one way of measuring effectiveness of a TVET programme is the ability of the trainees to possess the required technical skills in the areas of their study and converting the same knowledge into saleable goods and services. Ability of the TVET program to impact practical skills is dependent on the facilities like production units, materials and machines necessary in the production process where simulations and real production can be practiced. This calls for TVETs to establish production units where graduates can practice actual entrepreneurship as they will also learn how to sell, handle clients and do basic book keeping in the production units.

According to Ogumbe (2015) who studied mechanical engineering production unit in Nigerian technical colleges, production units are not mere laboratories. The study established that production units are industrial place where trainees acquire technical skills in their disciplines. They can tap into this knowledge to start their own

operations after formal education is done. The trainees acquire knowledge through being supervised by qualified personnel in their respective areas. This entrepreneurship training equips the graduates with the requisite skills to start business enterprises.

Since having production units within the technical and vocational training gives real or practical experience to technical and vocational trainees, they are left with the urge to venture into entrepreneurship through utilizing idle time and capacity in the production of innovative products and services. The products produced are then sold to generate revenue. Therefore production units have served as entrepreneurship launch pads (Oviawe, 2018).

Ananda & Mukhadis (2016) whose study reviewed production units in terms of its entrepreneurial aspect, as well as bridging the gap between industry and training posted that they help trainees possess skills that can make them establish own businesses. The study observed that the main objective of technical and vocational training production units is to enhance technical and vocational trainees through giving practical experience that can aid them start their own ventures or gain experience to become employable. The units offer technical and vocational trainees requisite environment to know what the market is requiring and with the skills impacted through production units, they can tap into this market demands as entrepreneurs.

According to a UNESCO (2015) report, that sought to evaluate the potential of TVETs through transformative education. It was reported that the introduction of new transformations like production units has been aimed at revitalizing and empowering technical and vocational trainees to meet industrial empowerment in TVET

institutions through entrepreneurship. This therefore expands the mandate of the TVETs from just educationists to industrialists. The graduates can from that point onwards venture into nation building through producing goods and services they learnt from TVETs production centres and create employment opportunities for others.

Graduates are now required to do more tasks and thus should be trained adequately. The existing job opportunities are diminishing by the day. This calls for technical and vocational training to revamp their training curriculums to accommodate entrepreneurship as a course. A production unit therefore serves technical and vocational training well in bridging the gap between labour market requirements and offering practical training. After they go through their training in production units, they can comfortably set up their small enterprises instead of relying on the scarce job opportunities handed to them. According to (Shamsudin, 2019), most of the market dynamics have shifted and this calls for a change in approach by TVETs

In an effort to improve on the productive capacity of human resources, practical learning is needed. Through market labour assessments, new requirements will be put forward. Training facilities and institutions therefore need to strategize and improve on their theoretical and practical trainings so as to move in tandem labour market changes. These practical trainings found for example in production units helps offer entrepreneurial aspect to trainees who would otherwise end up as job seekers. Through expansion of mindset to entrepreneurship, the trainees' skills sets are equipped to handle market demands through provision of what is required.

2.2 Chapter Summary and Literature Gap

In summary the literature reviewed has shown that integration of production units contributes to growth of TVET institutions Marope *et al.* (2015), UNESCO (2012), UNESCO (2015). Secondly, it was established that production units have been found to positively influence acquisition of technical skills by technical and vocational trainees Ejiofor et al. (2015); UNESCO (2015) and Dike (2013). Thirdly, production units have an influence in generation of revenue for funding technical training Orbeta and Esguerra (2016); Kaufman (2013) and Ogumbe (2015). Lastly, the literature review established that production units has a close nexus on acquisition of industrial skills for self-employment (Eka and Penjaitan, 2015; Akpomudjere, 2015) and Kemevor and Kassah (2015). However, these studies differ from the current study in terms of being carried out outside Kenya where the context is different from the current study. Also, most of the studies carried out have focused in production units in general and not in TVET institutions necessarily. This study seeks to fill this knowledge gap by establishing the contribution of production units to the growth of TVET institutions in Kenya. Hassan and Shamsudin (2019) evaluated service quality and student satisfaction in technical and vocational training and found out that there is satisfaction among TVET graduates who possess practical skills relevant in the job market. This study however was conducted outside Kenya unlike the current study that sought to evaluate the study phenomena in Kenya. Ismail, Nopiah and Rasul (2018) evaluated difficulties facing TVET teachers in Malysia. The study found out that among the issue challenging vocational teachers are lack of facilities to train practically. The study however, focused on just the vocational teachers. Kihara (2019) looked at strategies of SMEs manufacturers in Kenya. The study reported that hiring graduates from technical and vocational training with production units significantly

improves the chances of better performance. The study however, narrowed down to SME manufacturers. Lukman, Adam and Umar (2017) evaluated technical and vocational training in Nigeria. The study found out that external funding of technical and vocational training cannot by itself guarantee sustainable training, but establishing own source of revenues through activities like production units can significantly curb the challenges of underfunding.

CHAPTER THREE

RESEARCH DESIGN AND METHODOLOGY

3.0 Introduction

This chapter presented roadmap or the research methodology sought to use. This included the research design, study population, study area, sample size and sampling procedures, data collection procedures and analysis as well as ethical considerations.

3.1 Research Design

A research design is the blue print or a master plan which specifies the process of methods of data collection and analysis (Babin & Zikmund, 2015). The aim of research design is to plan, structure and strategize by the way of connecting major parts of research project for the purpose of answering research questions or study hypothesis (Merriam & Tisdell, 2015).

In this study, quantitative research approach was chosen as it enabled obtaining responses from a large population to obtain their views towards the study phenomena and thus enabled collection of in-depth data at the same time. Also, the research design was appropriate due to the large sample size and their quantity of responses.

The study adopted descriptive survey research design. The survey research design enabled collection of data related to the study in their current form. According to Creswell and Creswell (2018), Survey research design is appropriate as it allows exploration of the study variables in their present existing condition or undisturbed form. According to Kothari (2016), descriptive research design informs on the variables to be measured in an effort to discern causes of current status of phenomenon under investigation.

Survey research design is non-experimental and was used since it enabled the study of variables without manipulation. In the study, manipulation of variables was not important since the study was aimed at investigating what production units actually do rather than what they ought to be doing.

The Cross sectional type of survey was adopted since the study variables required to be described in their current state and in the same time. Also, the study aimed at obtaining data from a large population at the same time frame.

3.2 Study Area

The study was carried out in three (3) selected TVET institutions in Kiambu County Namely Kiambu Institute of science and technology, Thika Technical Training Institute and Nyaga Vocational and Technical Training Centre. The choice of this study location was informed by the fact that the institutions are well established, registered and accredited by TVETA to offer TVET training, the programmes offered are similar to those offered by other TVET intuitions within the country and have operational production units.

3.3 Study Population

The study population comprised of TVET trainers and trainees. Data was collected in line with specific objectives as set out in this study. The target population was distributed as shown in tables 3.1 and 3.2.

Table 3.1: Trainers study population

Category	Institution	Target population
Trainers	KIST	178
	Thika TTI	142
	Nyaga Vocational Centre	56
Total		**376**

Source: County Director of Education, Kiambu County. (2022)

Table 3.2: Trainees study population

Category	Institution	Target population
Trainees	KIST	3421
	Thika TTI	2257
	Nyaga Vocational Centre	543
Total		**6221**

Source: County Director of Education, Kiambu County. (2022)

3.4 Sampling Procedure and Sample Size

3.4.1 Sample Institutions

Purposive sampling technique was employed to select Kiambu Institute of Technology (KIST), Thika Technical Training Institute (Thika TTI) and Nyaga Vocational Training Centre. The sampling method was arrived at since they are the only TVET institutions within Kiambu county that have operational production units, and thus suitable for study. According to (Etikan, 2016), Purposive sampling is the deliberate choice of a participant as they possess certain attributes which the researcher needs to study and does not need underlying theories or a given set group of participants. This method was chosen since the respondents were sourced from various departments, and trainees were also at different levels of education varying from first, second and third year of study. The three institutions are categorised at different levels as Institutes of Technology, Technical Training Institutes and Vocational and Technical Training Centres under Technical and Vocational Education and Training Authority (TVETA) classification. Both by Kiambu Institute of Technology and Thika Technical Training Institute offer technical courses from

Artisan to a level of Diploma while Nyaga Vocational Training Centre offer Artisan and Craft Certificate Courses.

3.4.2 Trainers and Trainees Sampling Procedure and Sample Size

The study used Slovin's formula$n = \frac{N}{1+N(e)^2}$, (where ***"n"*** is the desired sample size, ***"N"*** is the population size, and ***"e"*** is the margin of error [0.05]) to determine the sample size of trainers and trainees. According to (Israel, 2013), Slovin's formula is appropriate in determing the study sample size when the available population of the subjects is known (finite).

3.4.3 Sampling Procedure and Sample Size

The total population of Trainers is 376 and the total technical and vocational trainees are 6221. The total population was thus 6597and the sample size was computed as follows; $= \frac{6597}{1+6597(e)^2}$, which gave 377respondents. The sample size of trainees and trainers in each institution was proportionately determined. Table 3.3 and 3.4 presents the sample size of the respondents that were involved in the study.

Table 3.3: Trainers respondents sample sizes

Category	Institution	Target population	% Proportionate	Sample Size
Trainers/ Trainers	KIST	178	47.34	32
	Thika TTI	142	37.77	29
	Nyaga Vocational Centre	56	14.89	15
Total		**376**	**100.00**	**76**

Source: Respective office of registrar of trainees (2022)

Table 3.4: Trainees respondents sample sizes

Category	Institution	Target population	% Proportionate	Sample Size
Trainees/ Trainees	KIST	3421	54.99	151
	Thika TTI	2257	36.28	122
	Nyaga Vocational Centre	543	8.73	28
Total		**6221**	**100.00**	**301**

Source: Respective office of registrar of trainees (2022)

3.5 Data Collection instruments

The study used closed ended questionnaires to collect primary data from the respondents. According to (Ekinci, 2015), closed ended questionnaires with a Likert scale range of 1- 5 indicating (Very Low Extent– **VLE** [1], Low Extent - **LE** [2], Don't Know – **DK** [3], High Extent - **HE** [4] and Very High Extent - **VHE** [5]) give useful insights from target respondents regarding a study phenomenon. Closed ended questionnaires were appropriate for this study as they permitted collection of a wide range of data from a large number of respondents. According to (Baburajan, 2022), closed ended questionnaires aid to guide the response suggestion within a certain range of aspects enabling the focus as precisely as possible. These study instruments collected data from the technical and vocational trainees and trainers in selected TVET institutions. The questionnaires were divided into two sections; section one collected background information of the respondents and section two that collected data as per the study specific objectives

3.6 Reliability and Validity of Research Instruments

3.6.1 Validity of Research Instruments

Validity is the level to which findings obtained from the collected data represents the study phenomena (Egami, 2023). To ensure validity, the researcher reviewed the

literature in order to identify the items required to measure concept. i.e, The level of integration of production units in training, mobilization of training resources, acquisition of practical and entrepreneurial skills. The questionnaires were then reviewed by the supervisors who read and ensured that there were no repetitions, ambiguous language, the language used was simple to understand, and that they fairly represented the study phenomenon. Thus, validity was ensured through verification of questionnaire items to ensure they measured the specific objectives.

3.6.2 Reliability of Research Instruments

Instruments reliability is the extent to which results obtained from a study remain consistent if the same instruments are used under similar methodology over different time periods Ekinci (2015). The dependability of the data collected and the results obtained were defined by the researcher as credibility, accuracy and consistency. The internal consistency technique was used to determine the reliability of the study instruments. In this study, instruments reliability was ensured by subjecting the research instruments to a pilot study before commencement of the final data collection exercise

3.7 Pilot Study

A pilot study was conducted in the Dairy training Institute located in Nakuru County. The institution was chosen for piloting since it was not within the study area and that it had production units in agricultural value addition and processing as found in the study institutions. The production units are further supported by Applied Sciences, Mechanical Engineering, Electrical Engineering and ICT departments which are established within the institution. Mugenda and Mugenda (2013) opined that between 1 and 10% of the research instruments are adequate for pretesting and yields reliable data that can assess how reliable the instruments are in a study. The researcher

proposed to pre-test 3% of the technical and vocational trainers and trainees within the institution. Out of the total population of 485 trainers and trainees, a 3% sample of 74 trainers was computed to obtain the pretest sample of 3 trainers and 13 trainees which was then distributed randomly. Cronbach's alpha test was then used to test the internal consistency of the data collection instruments, and which were adjusted until an internal reliability coefficient of 0.74 and 0.73 for trainers and trainees respectively were attained and adopted.

3.8 Data Collection Procedures

The study used the help of research assistants to collect data from the respondents given that the researcher could not cover the large number of respondents alone within the given period of time. Research assistants are normally engaged to assist with academic or private research (Madkur, 2021), their main task is to provide support either by collecting or analysing data. This in turn exposes them to research and develop skills such as data collection and analysis, communication and problem solving. The researcher first trained the research assistants on the purpose of the study and the specific objectives. The research assistants were trained on ethics to be observed before, during and after the data collection exercise. They were trained on how to approach the respondents, create a rapport and seek permission from the respondents before asking any questions. They assisted the respondents in filling the questionnaires. Those who do not want to be included in the study were not coerced or forced to participate.

Before the actual data collection exercise, the research assistants were involved in the piloting to help them be conversant with the study and research instruments to be used. The researcher sought permission from the administration of each TVET institution included in this study before any data collection was carried out. The

respondents were first categorised within their respective departments(Building and Civil Engineering, Electrical Engineering, Hospitality, Business and Liberal Studies, Applied Sciences, Baking, ICT, Mechanical Engineering and Agricultural Engineering departments), Secondly, the respondents were divided equally within their respective years of study, thirdly, the classes to which the respondents were to be sourced were obtained and lastly, every 5^{th} respondent was randomly selected in classes and departments visited until the target population was attained. According to (Iliyasu, 2021), stratified random sampling involve a chosen group of items from a population based on classification and random selection where separation of target population is done into a homogenous and exclusive segment from which random sampling is done. Therefore, stratified random sampling was done to ensure accurate representation of the population within the institutions. Duly completed and filled questionnaires were collected from all the respondents. The researcher then serialized the instruments in readiness for data verification and analysis.

3.9 Data Analysis Procedures

The study used quantitative data analysis techniques. The collected quantitative data using questionnaires was edited for error checking, coded and entered into computer package; Statistical Package for Social Sciences (SPSS) version 24 where it was subjected to analysis. The study performed quantitative analysis using descriptive statistics that included measures of central tendency, distribution, frequencies and cross tabs to compare data from various respondent categories. The findings from the analysed data were then presented using tables, figures and charts for easier interpretation. The findings were then summarised as per the specific objectives. The following is the regression mode used in the study;

$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X4 + e$

Where :

Y= Enhancement of training in TVETs

X_1 = Integration of production units in training

X_2= Acquisition of practical skills

X_3= Mobilization of resources to support training

X_4 = Entrepreneurial skills

e= The error term

β_0= The constant

3.10 Ethical Consideration

The study was guided by ethics before, during and after the exercise. Firstly, the researcher sought permission from the university's Office of the Dean, School Of Education by getting data collection clearance and an introduction letter. Secondly, the researcher applied for a research permit from the National Commission of Science, Technology and Innovation (NACOSTI). Next, permission was also obtained from the administration of each TVET institution to be included in this study. Before any questionnaire was administered, the permission of the respondent was sought first. Those who for any reason did not want to be included in the study were not coerced into filling the questionnaire. The administration of the questionnaire was terminated upon request of non-continuation by the respondents for whatever reasons. The respondents were also given a chance to ask questions relating to the study. To ensure that the information given herein remained private and confidential, no

personal details were recorded in the questionnaires. Also, the respondents were assured that all the information obtained was used for academic purposes only.

3.11 Summary

This chapter has presented the research methodology that the researcher employed in the study. The data collection instruments are presented, the procedures for data collection and sample sizes are also presented as well as the analysis that followed data collection is also presented.

CHAPTER FOUR

DATA ANALYSIS, PRESENTATION, INTERPRETATION AND DISCUSSIONS

4.0 Introduction

The main objective of the study was to investigate the contribution of production units in enhancement of training in TVET institutions in Kiambu County, Kenya. This chapter presents the study's findings from the analyzed data. The findings are presented based on the data collected through questionnaires from trainers and technical and vocational trainees of TVET institutions in Kiambu County.

4.1 Response Rate

The study sought to collect data from 377 respondents who included Trainers and technical and vocational trainees in TVET institutions in Kiambu County. Out of the 377 questionnaires issued, 258 questionnaires were returned. This response was attributed to the fact that most respondents had lessons at the time of their administration thus were not responded to on time. The returned questionnaires represented a response rate of 68.62% which was found adequate for analysis. This response rate agrees with (Holtom, 2022) who notes that response have been improving over time, and rates above 50% considered adequate for the study and can be used to draw conclusive deductions.

4.2 Respondents General Information

4.2.1 Gender

Figure 4.1 shows the gender distribution of trainers and technical and vocational trainees.

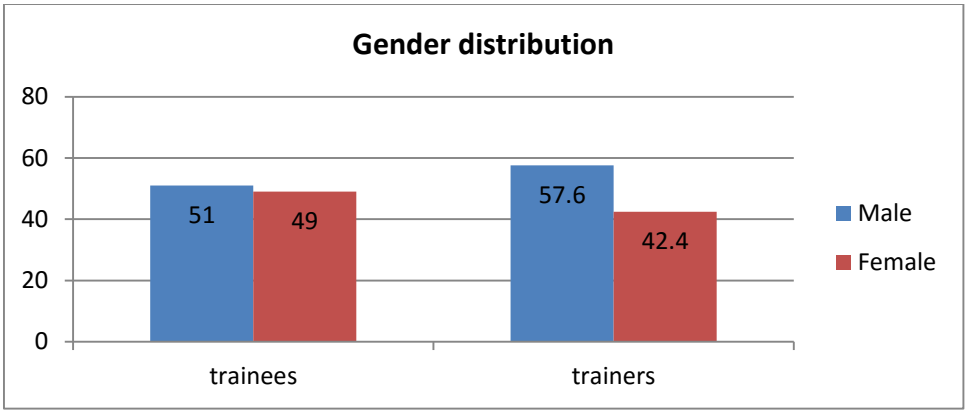


Figure 4.1: Respondent's gender

The study found out that majority of the respondents were male both as technical and vocational trainees (51%) and (57.6%) trainers as compared to (49%) and (42.4%) for both female trainees and trainers. This shows that the majority of the population in TVET institutions are men. These findings rhymes with Anada and Mukhadis (2016) who reported that majority of the population in technical institutions are male as they prefer more technical courses than their female counterparts. According to Hassan and Shamsudin (2019) who posited that after the global financial crisis of 2008, most of the job requirements and or skill sets were changed and this necessitated rethinking of technical and vocational training and their contribution in the job market. Therefore, graduates are now required to do more tasks and thus should be trained adequately since tasks that used to be dominated by men are now being done by women.

4.2.2 Trainees module

The trainees were asked to indicate the module they were on at the time of the survey. The results are presented in figure 4.2.

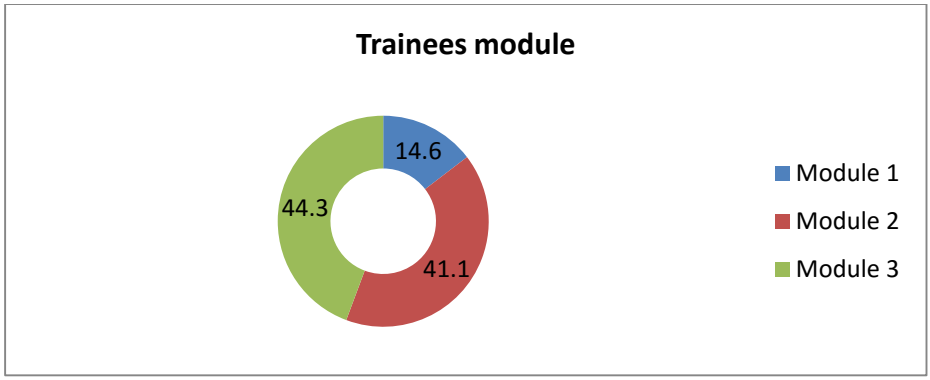


Figure 4.2: Trainees module

The results of the study established that majority of theS respondents (85.4%) were either in module two or three at the time of the study. This was important because they have stayed long enough in the TVET institution to have been actively involved in the production units and understand how they influence training.

4.2.3 Age and Education of trainers

The study sought to establish the relationship between age and education level of the trainers. This was by cross tabulating the age and highest education level attained by the trainers. The results were presented in table 4.1.

Table 4.1: Age and highest level of Education Cross tabulation

Age	**Please indicate the highest level of education attained**						**Total**
	Craft	Diploma	Higher National Diploma	Bachelor Degree	Masters	Doctorate	
25 - 30 years	0	2	0	11	0	0	13
31 - 35 years	0	0	1	6	1	0	8
36 - 40 years	0	1	1	17	0	0	19
41 - 45 years	1	0	1	8	1	0	11
Above 45 years	0	2	4	5	3	1	15
Total	1	5	7	47	5	1	66

Majority of the trainers (68.2%) were aged above 35 years of age. From the age and education level cross tabulation the study found out that those trainers who hold a bachelor degree are (71.2%) while those with a master's degree are only7.6% and

those with a Doctorate degree are just 1.5%. From the cross tabulation, a majority of trainers hold a Bachelor's degree (80.3%) while the trainers who hold certification at Higher Diploma, Diploma and Craft Level at (19.7%) with a majority above the age of 35 years.

4.2.4 Designation

The study sought to establish the designation of the trainers involved in the survey. The results were presented in figure 4.3

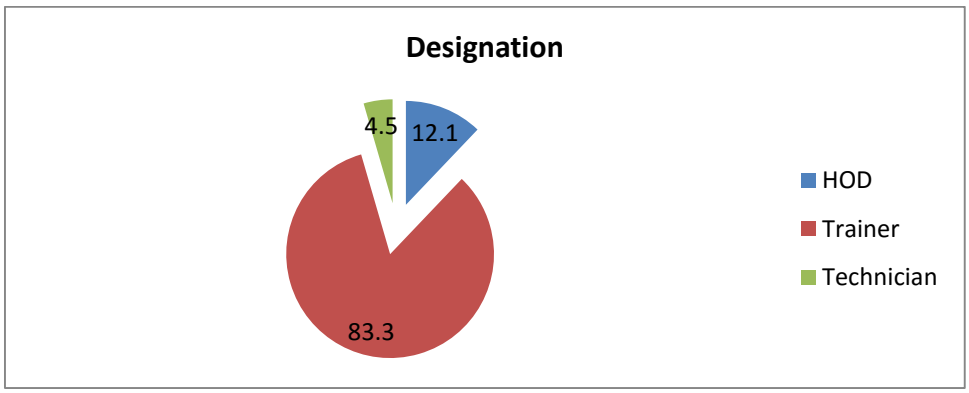


Figure 4.3: Instructor's designation

The findings of the study were that, a majority (83.3%) were trainers in technical and vocational training while heads of departments were 12.1% and technicians represented 4.5% of the respondents. These results shows that majority of those interviewed are close to technical and vocational trainees acting as trainers directly or workshop technicians and therefore they understand well the nexus between production units and training.

These findings mimic a proposal by UNESCO that insinuated that various initiatives have been put forward by governments and various institutions around the world to solve unemployment needs. Top among these initiatives is making technical and Vocational training more accessible and revamping it to accommodate today's job

market needs. UNESCO proposed a raft of measures aimed at solving the unemployment and labour training requirements including matching trainer's profiles to trainee requirements so as to easily help trainees internalize the TVET trainings.

Kihara (2019) also posted similar views that the Kenyan government also needs to review policies relating to technical and vocational training to make them competitive and attractive to graduates. Among the policies put forward was to profile designations of trainers so that only those who are suitable technically will offer training in a given level. They need to set up minimum labour market standards that should be met by every TVET institution in the country so as to ensure that the graduates are relevant to the tasks they train for. Also, the TVET institutions should not be viewed as an avenue to accommodate secondary school failures but should attract equally strong academic qualifications from both trainers and trainees in order to attract talent and produce competent technical and vocational trainees.

4.2.5 Department

The study results indicated that 18.2% of the trainers involved in the survey were from the Building and Civil engineering department, 7.6% were in mechanical department and 18.2% were in electrical department.4.5% of trainers were from applied sciences, 7.6% from business department while hospitality had 13.6% and both baking and ICT departments had 15.2%.

The trainers' department were presented in the figure 4.4.

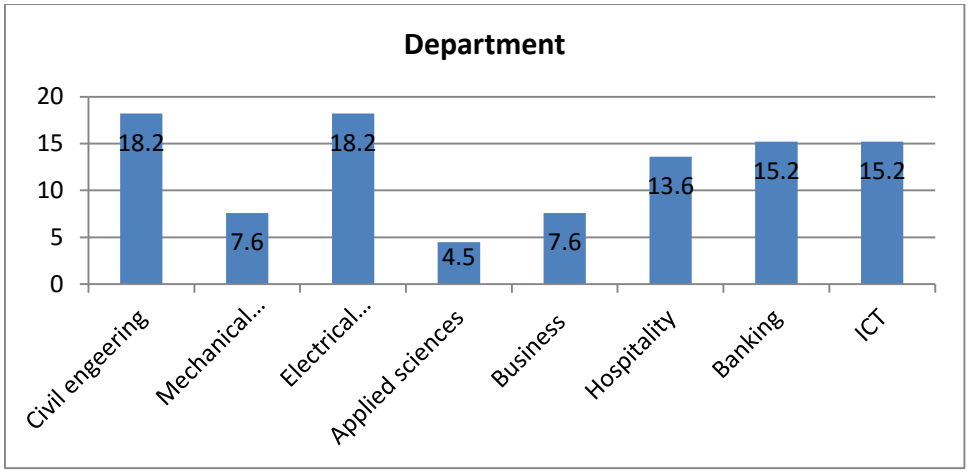


Figure 4.4: Trainers' department

Kamau and Ngubu (2017) also found out that majority of the graduates pursue technical courses like engineering in technical and vocational training. The education requirements especially in secondary schools are not enough to make the graduates employable. Thus enrolment to technical and vocational training helps impact these graduates with technical knowledge that can help them be self-employed and create job opportunities for the other people (Kamau and Ngubu, 2017).

4.2.6 Experience

The study sought to establish the experience of the trainers and the results were presented in figure 4.5.

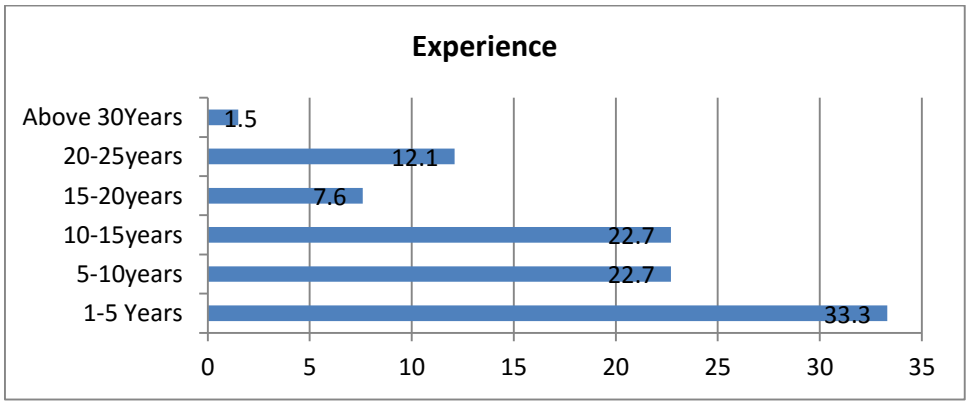


Figure 4.5: Trainer's experience

The study sought to find out how experienced the trainers involved in the study were. It was established that majority (66.7%) had more than 5 years as trainers. Further, those who had more than 10 years of training were 43.9% indicating that the respondents clearly are experienced on technical and vocational training and can give accurate insights in relation to the study phenomena.

These findings are similar to a report by Maclean, Panth & Jagannathan (2018) in which experience of trainers was among the key indicators of efficiency in TVETs. The graduates are supposed to match larger economic and national goals and are thus supported by international organizations like International Labour Organization (ILO), UNESCO and Organization for Economic Co-operation and Development (OECD). Therefore, the trainers responsible for induction and training of graduates should be highly experienced and accomplished.

4.3 Objective One: To Investigate the Extent to Which the Integration of Production Units Impacts Training in Selected TVET Institutions

The study sought to establish the extent of integration of production units in training in selected TVET institutions. The respondents were asked to indicate to what extent they agreed on the following statement on likert scale (1-Very low extent,2-Low extent,3-Don't know,4-High extent and 5-Very high extent) . The results are presented in table 4.2

The study sought to establish the relationship between integration of production units and enhancement of training in technical and vocational training. It was established that both technical and vocational trainees and trainers agreed (Mean=4.50, Mean=4.30) that the integration of practical training in production units have enhanced training in TVET institutions. Maclean, Panth & Jagannathan, 2018) also posited that TVET institutions are critical in ensuring that technical and vocational

trainees are given education that matches the national agenda of development Production units.

Table 4.2: Extent of integration of production units on training

		Trainees		Trainers	
		Mean	SD	Mean	SD
1	Integration of practical training in production units have enhanced training in TVET institutions	4.50	1.232	4.30	1.136
2	Integration of formal curriculum in production units have enhanced training in TVET institutions	4.21	1.295	4.23	1.107
3	Integration of research in production units have enhanced training in TVET institutions	3.27	1.257	3.79	.985
4	Integration of consultancy services in production units have enhanced training in TVET institutions	2.79	1.299	2.53	.881
5	Integration of theory and practice learning have enhanced training in TVET institutions	4.78	1.169	4.65	.953
6	Integration of industrial attachment have enhanced training in TVET institutions	4.11	1.248	4.17	.815

a) Integration of practical training in production units have enhanced training in TVET institutions

Hassan and Shamsudin (2019) study further found out that Technical and vocational training are increasingly establishing production units as a way of giving practical experience to technical and vocational trainees. Graduates are now required to do more tasks and thus should be trained adequately. This calls for technical and vocational training to revamp their training curriculums to accommodate the new job market requirements. A production unit therefore serves technical and vocational training well in bridging the gap between labour market requirements and training. The production units are therefore seen as the bridge between training and labour market needs.

b) Integration of formal curriculum in production units have enhanced training in TVET institutions

It was established that the technical and vocational trainees and trainers were not sure (Mean=3.27, Mean=3.79) that Integration of research production units have enhance training. They have therefore gained traction among vocational educators and other TVET institutions as it is supported by organizations like International Labour Organization (ILO) among other institutions globally. There is therefore a positive relationship between integrating production units into technical and vocational training and market driven training (Maclean, Panth & Jagannathan, 2018).

In a similar study by Hassan and Shamsudin (2019), the findings were that most of the job requirements and or skill have changed and this necessitated rethinking of technical and vocational training curricula. Continuous improvement of the curricula thus incorporates training that accounts for changes in the market place. This was found to be true when the training leads to production of goods and services demanded in the market currently.

c) Integration of research in production units have enhanced training in TVET institutions

Regarding Integration of formal curriculum in production units, the respondents agreed (Mean=4.21, Mean=4.23) that they have enhanced training in TVET institutions. These results concur with the multiple regression analysis results in table 4.8 that showed that integration of production units in TVET training is significantly ($P<0.05$) and proportionately related to enhancement of training and any increase in integration will result to a unit increase in enhancement of training as indicated by a positive coefficient.

Ramadan, Chen and Hudson (2018) thus observed that there is a need to align the training programmes with current market requirements through proper planning and foresight. However, some of the challenges facing African technical and vocational training are related to social economic hindrances like lack of research, facilities, poor reviewed training programmes, funds and good will from the top leadership to enhance training in technical and vocational training. In Africa, it has been reported that in some countries like Nigeria, the education system is led by poor management in TVET institutions because there exists inadequate research, poor policies to bring up-to to date the educational requirements with market changes.

d) Integration of consultancy services in production units have enhanced training in TVET institutions

The respondent cited low extent (mean=2.79, Mean=2.53) of enhancement in training as a result of Integration of consultancy services in production units. Orbeta & Esguerra (2016) study in Philipines similarly reported that it is not automatic that presence of practical training and consultancy service in technical and vocational training production units will guarantee enhancement of training for technical and vocational trainees. The study opined that TVETS must revitalize their systems in order to meet ever changing industry demand.

e) Integration of theory and practice learning have enhanced training in TVET institutions

The respondents agreed (Mean=4.78 and 4.65) that Integration of theory and practice learning have enhanced training in TVET institutions. Rajadurai, Supuan, David and Abidin (2018) asserted that TVET training is hampered by a lot of theoretical training lacking practical, inadequate facilities, like machines and equipment currently

required offering graduates with practical skills. There are also challenges with use of old education systems that were functional decades ago. These systems are responsible for half-baked TVET graduates who cannot match today's labour requirements.

f) Integration of industrial attachment have enhanced training in TVET institutions

They also agreed (mean=4.11, mean=4.17) that integration of industrial attachment has enhanced training. There is therefore a positive relationship between integrating production units into technical and vocational training and market driven training. The findings that industrial attachment enhances TVET training is similar to a report by (UNESCO, 2016) that found out that industrial attachment is relevant to the labour market as it aligns the TVETS graduate training with industrial requirements. Marope, Chakroun & Holmes (2015) who conducted a study on unleashing the potential of TVET's, posted that having industrial attachment in TVETs gives the trainees a chance to learn in accordance with greater national objectives and not just course training. The findings of the study were that integration of production units within the TVET institutions is critical in ensuring that technical and vocational trainees are given education that matches the national agenda of development.

Lastly, the technical and vocational trainees and trainers all cited high extent (mean=4.11, mean=4.17) of enhancement of training as a result of Integration of industrial attachment in TVET training. Ogumbe (2016) study in Nigeria reported similar views that giving TVET technical and vocational trainees some industrial practice helps they link theoretical knowledge with practical market experiences thus enhancing what they have already been trained on.

4.4 Objective Two: Impact of Production Units on the Acquisition of Practical Skills among Trainees in TVET Institutions

The study's second specific objective was to establish the influence of production units on the acquisition of practical skills amongst technical and vocational trainees in selected TVET institutions In Kiambu.

Table 4.3: Influence of production units on acquisition of practical skills

Statement	Trainees		Trainers	
	Mean	Std. Deviation	Mean	Std. Deviation
1. Combining theory and practice in production units has influenced acquisition of practical skills	4.67	1.054	4.03	.495
2. Production units has contributed to production of graduates with practical saleable skills	4.97	1.073	4.14	.677
3. Availability of industrial standard tools and modern equipment in the production units has influenced acquisition of practical skills among trainees in TVET institutions	4.28	1.477	4.02	.568
4. Trainees in TVET have access to technically skilled persons in production units which has influenced acquisition of practical skills	3.65	1.210	3.86	.802
5. There is linkage and collaboration between production units and industry which has influenced acquisition of practical skills among trainees in TVET institutions	3.13	1.349	3.02	.969
6. Production units has incorporated new technologies which has influenced acquisition of practical skills among trainees in TVET institutions	2.23	1.343	2.98	1.060
7. Staff in the production units mentor trainees thus influencing acquisition of practical skills among trainees in TVET institutions	4.48	1.407	4.00	.765

The respondents were asked to indicate to what extent they agreed on the following statement where (1-Very low extent,2-Low extent,3-Don't know,4-High extent and 5-Very high extent) . The results are presented in table 4.3

a) **Combining theory and practice in production units has influenced acquisition of practical skills**

The study found out that the technical and vocational trainees and trainers cited high extent (mean=4.67, mean=4.03) of enhancing training as a result of combining theory and practice in production units.

These results concur with the multiple regression analysis results in table 4.8 that showed that acquisition of practical skill in TVET training is significantly ($P<0.05$) and proportionately related to enhancement of training and any increase in acquisition of practical skills will result to a unit increase in enhancement of training as indicated by a positive coefficient (0.048).

Rono (2019) similarly asserts that training is related to quality of TVET graduates skill sets as required by the market. And thus without ways of checking theoretical and practical training in TVET institutions, the existing skills gap will widen. The graduates from such institutions will not qualify to engage in labour market demands. Introduction of production units therefore becomes a critical component in giving TVET technical and vocational trainees real industrial experience.

b) **Production units has contributed to production of graduates with practical saleable skills**

It was established that the respondents agree (mean=4.97, mean 4.14) that production units have contributed to production of graduates with practical saleable skills. Ogumbe (2015) study also pointed to similar views that availability of modern equipment used in production units enhances TVET training.

Ananda & Mukhadis (2016) study which sought to bridge the gap between industry and training, reported that practicality of courses taught at TVETs is a great

determinant to the graduates employability. The study observed that the main objective of technical and vocational training production units is to enhance technical and vocational trainees through giving practical experience that can aid them start their own ventures or gain experience to become employable. The study however, argued that even though practical skills needs to be impacted, it is not a necessity to have production units in TVETs. They argued that you can have partnerships between the industry and TVETs to have graduates take programs that included working with them as part of their practical training.

c) Availability of industrial standard tools and modern equipment in the production units has influenced acquisition of practical skills among trainees in TVET institutions

The respondents also cited high extent (mean=4.28, mean=402) of enhancement of training as a result of availability of industrial standard tools and modern equipment in the production units.

UNESCO (2015) report that sought to evaluate training and joblessness found out that practical training is important to TVETs. The report proposed measures aimed at solving the unemployment and labour training requirements and they included provisions for modern equipment for practical training based on today's labour market demand. The proposal sought to address the challenge of inadequate training through continuous trainings at technical and vocational training production units.

d) Trainees in TVET have access to technically skilled persons in production units which has influenced acquisition of practical skills.

The respondents were however not sure (mean=3.65, mean=3.86) that the trainees in TVET have access to technically skilled persons in production units which has influenced acquisition of practical skills.

Onderi et al (2014) reported similar views that unavailability of technically skilled trainers is a limitation that continues to negate gains made in many TVET training institutions in Africa.

In another study in Kenya by Kamau and Ngubu (2017), the researchers studied the society and people's attitudes towards TVETs. They established that trainees lacked requisite skills required in meeting job market demands. The study asserted that when graduates are trained on theoretical aspects alone, when they graduate, they find that the market has shifted and products and services they were taught in TVET's to produce are no longer needed. This calls for rethinking of the training strategies to keep abreast with the market changes through practical knowledge. Therefore, a number of programs need to be established to meet today's dynamic and training needs in order to adapt to the industry including establishment of production units inside TVET'S which is necessary to meet today's job market needs.

e) There is linkage and collaboration between production units and industry which has influenced acquisition of practical skills among trainees in TVET institutions

The respondents were not sure (mean=3.13, mean=3.02) that there is linkage and collaboration between production units and industry which has influenced acquisition of practical skills among trainees in TVET institutions.

Similar findings were posted by Oviawe (2018) in a study that established that many governments have in the recent past established policies aimed at establishing production units within the technical and vocational training to create industry and training collaborations. These have enhanced the way in which TVEts impact knowledge to technical trainees. It will also impact positively the operations of the institutions as the production units will give them the flexibility to train in real life simulations.

f) Production units has incorporated new technologies which has influenced acquisition of practical skills among trainees in TVET institutions

The study further established that the respondents did not agree (mean=2.23, mean=2.98) that the production units have incorporated new technologies which has influenced acquisition of practical skills among trainees in TVET institutions.

The Kisilu (2022) study also reported that incorporating new technologies in TVET production units is a great determinant in enhancing practical training on the graduates and failure to incorporate these new technologies becomes deterrent in knowledge acquisition by graduates.

g) Staff in the production units mentor trainees thus influencing acquisition of practical skills among trainees in TVET institutions

Lastly, the respondents reported a high extent (mean=4.48, mean=4.00) that staff in the production units mentor trainees thus influencing acquisition of practical skills among trainees in TVET institutions.

Kisilu (2022) study reported that the behavior of technicians and trainers in technical and vocational training does influence how technical and vocational trainees acquire

specific training. When the trainers act as mentors, they inspire quick acquisition of knowledge by technical and vocational trainees.

4.5 Objective Three: Role of Production Units in Mobilizing Resources for Supporting Training in TVET Institutions

The study sought to find out the role that production units have played in mobilizing resources for supporting training in the TVET institutions. The respondents were asked to indicate to what extent they agreed on the statements where (1-Very low extent,2-Low extent,3-Don't know,4-High extent and 5-Very high extent) . The results are presented in table 4.4.

Table 4.4: Role of production units in mobilizing resources for supporting training

	Trainees		Trainers	
	Mean	Std. Deviation	Mean	Std. Deviation
1. Production units engage qualified personnel in their operations	4.44	1.277	4.11	.558
2. Production units provide materials for production which are used as training materials	4.47	1.240	4.02	.595
3. Production units have provide tools and equipment used for training purposes	4.19	1.344	4.92	.791
4. Production units have enable the provision of machinery in workshops for production purposes	4.55	1.210	4.91	.626
5. Production units have enabled construction of workshops for expansion	4.37	1.300	4.77	1.093
6. Production units facilitate involvement of trainees in industrial attachments.	4.47	1.410	4.03	1.202
7. Production units facilitate involvement of trainees in contract tasks in their free time.	2.55	1.410	2.42	1.313

These results concur with the multiple regression analysis results in table 4.8 that showed that mobilization of training resources in TVET training is significantly

(P<0.05) and proportionately related to enhancement of training and any increase in mobilization of training resources will result to a unit increase in enhancement of training as indicated by a positive coefficient (0.073)

a) Production units engage qualified personnel in their operations

The study found out that the respondents agreed (mean=4.44, mean=4.11) that the production units engage qualified personnel in their operations. Kisilu (2022) study also cited the views that in most TVET production units, there are qualified personnel. However, the challenge comes with failure to align these qualifications with changes in industry as well as having TVET and industry collaboration that will see graduates involved in relevant industry production units. Thus many technical and vocational training in Kenya were found by Kisilu study to lowly engage technical and vocational trainees in contracts while at school even though they have production units.

b) Production units provide materials for production which are used as training materials

The study also established that the respondents agreed (mean=4.47, mean=4.02) that the production units provide materials for production which are used as training materials.

Rono 2019 also pointed to the introduction of production units therefore becomes a critical component in giving TVET technical and vocational trainees real industrial experience. In the process, the TVET institutions also benefit from sale of products and services as well as production of materials used for training thereby having income that ensures they sustain themselves or in the very least have cash to run some of their operations.

c) Production units have provide tools and equipment used for training purposes

Further they agreed (mean=4.19, mean=4.92) that production units have provided tools and equipment used for training purposes. Munishi (2016) studies similarly reported that in mobilising tools and equipment for supporting training in Tvet institutions, most production units do not live up to this expectation. Production units ought to help acquire latest machinery, equipments and technology that will accelerate acquisition of skills by the graduates. Nonetheless, due to financial constraints, low output in production and inadequate follow ups, the production units do not mobilise resources that can support training adequately.

d) Production units have enable the provision of machinery in workshops for production purposes

Also, they agreed (mean=4.55, mean=4.91) that production units enable the provision of machinery in workshops for production purposes. Similar views were recorded by Orbeta and Esguerra (2016) study that included countries in Asia and Latin America had to make strong their TVET institutions so as to meet the ever changing demands of the industry. They also encouraged funding of these institutes and changed their training systems to accommodate industrial demands. The partnership between industry and TVETs brings with it finances and resources needed to have production units sustain themselves. This includes providing machinery and facilities required for training.

e) Production units have enabled construction of workshops for expansion

Furthermore the respondents agreed (mean 4.37, mean=4.77) that production units have enabled construction of workshops for expansion. The results on resource mobilization were however in contrast with Ananda & Mukhadis (2016) study that

found out that the main goal of technical and vocational training production units is to enhance technical and vocational trainees through giving practical experience and resource mobilization for expansion.

f) Production units facilitate involvement of trainees in industrial attachments.

Equally, the respondents agreed (mean=4.47, mean= 4.03) that production units facilitate involvement of trainees in industrial attachments. Orbeta and Esguerra (2016) further posited that the production unit's initiative is not just to train practical requirements expected of the technical and vocational trainees once they seek employment but also to mobilize resources for the TVETs to aid their mandates. This was done through establishing partnerships between public and private players who see the need to offer TVETs capacity to fund their operations. In turn, the industries get well trained graduates who can match the job market requirements. These relationships were aimed at bringing market demanded production units in the training of TVETs graduates.

g) Production units facilitate involvement of trainees in contract tasks in their free time.

Lastly, the respondents cited a disagreed (mean=2.55, mean=2.42) that production units facilitate involvement of trainees in contract tasks in their free time. In some aspects, production units drain TVEt resources especially when they have to produce goods not in demand and thus not offset costs from sales. However, the study reckons that in some instances, production units have done well and mobilized resources but this cases are rare and far in between especially in the developing world.

4.6 Objective Four: Impact of Production Units on Acquisition of Entrepreneurial Skills among the TVET Trainees

The study sought out find out the influence of production units on acquisition of entrepreneurial skills among TVET technical and vocational trainees.

Table 4.5: Influence of production units on acquisition of entrepreneurial skills

	Trainees		Trainers	
	Mean	SD	Mean	SD
1. Production units has provided opportunities of innovating product and services	4.49	1.245	4.95	.711
2. Production units has provided opportunities of mentoring entrepreneurs	4.51	1.171	4.09	.799
3. Production units have provided opportunities for learning business management skills	3.58	1.159	3.79	.755
4. Production units have provided an environment for acquiring 5.Teamwork and leadership skills	4.66	1.214	4.18	.493
5. Production units have enhanced communication and listening, and 7.Customer service skills.	3.56	1.248	3.88	.668
6. Production units have enhanced acquisition of book keeping and financial skills.	3.15	1.302	3.62	.890
7. Production units have enabled technical and vocational trainees development of business ideas	4.75	1.219	4.06	.721
8. Production units have enabled technical and vocational trainees develop analytical and problem-solving skills	4.56	1.305	4.21	.645

The respondents were asked to indicate to what extent they agreed on the statements where (1-Very low extent, 2-Low extent, 3-Don’t know, 4-High extent and 5-Very high extent). The results are presented in table 4.5.

a) Production units has provided opportunities of mentoring entrepreneurs

The study established that the respondents agreed (mean=4.51, mean=4.09) that production units has provided opportunities of mentoring entrepreneurs. The graduates will learn this entrepreneurial skills practically from TVET's and after graduation they can employ the same skills in startups. They also offer technical and vocational training new meaning as they can depend on these units to rejuvenate their operations and minimize under funding problems (Nalbandi and Zonoozi, 2019).

According to Onderi et al (2014), TVETs production units' impacts entrepreneurial skills in TVET graduates through continuously engaging the private sector players in skills transfer, and technological advice. Also, TVET institutions can be engaged in activities including opening production units in departments that can use practical skills to produce goods and services.

b) Production units have provided an environment for acquiring Teamwork and leadership skills

The respondents also agreed (mean=4.66, mean=4.18) that production units have provided an environment for acquiring teamwork and leadership skills. Kihara (2019) also reported that technical and vocational training and education ministry should to review policies relating to technical and vocational training to make them competitive and attractive to graduates. They need to set up minimum labour market standards that should be met by every TVET institution in the country so as to ensure that the graduates are relevant to the tasks they train for and gain management and leadership skills. Also, the institutions should also not be for the secondary school failures but should attract equally strong academic qualifications so as to attract talent and serious

technical and vocational trainees. This will make sure that the graduates can generate employment through setting up their enterprises.

c) Production units have enabled technical and vocational trainees development of business ideas

They agreed (mean =4.75, mean=4.06) that production units have enabled technical and vocational trainees development of business ideas. These results agree with the multiple regression analysis results in table 4.8 that showed that acquisition of entrepreneurial skills in TVET training is significantly ($P<0.05$) and proportionately related to enhancement of training and any increase in entrepreneurial skills acquisition will result to a unit increase in enhancement of training as indicated by a positive coefficient (0.025)

d) Production units have enabled technical and vocational trainees develop analytical and problem-solving skills

The technical and vocational trainees and trainers both agreed (mean 4.56, mean=4.21) that production units have enabled technical and vocational trainees develop analytical and problem-solving skills. The results are consistent with findings made by Nalbandi and Zonoozi, (2019) in a study that evaluated TVET programs. The report asserted that these units are beneficial in a number of ways including self-employment opportunities and not just resource mobilization.

e) Production units has provided opportunities of innovating product and service

It was also was established that the respondents agreed (mean=4.49, mean 4.95) that production units has provided opportunities of innovating product and services. The

results are consistent with findings made by Nalbandi and Zonoozi, (2019) in a study that evaluated TVET programmes. The report asserted that these units are beneficial in a number of ways including self-employment opportunities and not just resource mobilization. The study established that TVET's themselves can be entrepreneurial in nature. This means that the production units can serve the purpose of practical training as well as business units.

Similar views were echoed by Eka & Penjaitan (2015) who opined that production units enhance training through creativity and innovations development. They learn how to solve problems through filling gaps with ideas and can thus profit from problem solving as entrepreneurs. They thus benefit immensely through this exposure in production units.

f) Production units have provided opportunities for learning business management skills

The respondents were found not sure (mean=3.58, mean= 3.79) that production units have provided opportunities for learning business management skills. However, Eka & Penjaitan (2015) criticises technical and vocational training for failure to incorporate adequately soft skills like communication, book keeping and customer care. These were found out to be weak links in training TVET graduates as entrepreneurs. Production units in TVETS provide relevant technical skills but graduates often fail to grasp essential entrepreneurial skills that would enable them start businesses after training.

g) Production units have enhanced communication and listening, and Customer service skills

The respondents were also not sure (mean=3.56, mean=3.88) that production units have enhanced communication and listening, and Customer service skills. The results also agree with previous findings from Anada and Mukhadis (2016).They established that production units grant technical and vocational trainees with opportunities for skills acquisition, communication and exposes them as entrepreneurs to development of innovations and ideas. They are also exposed to problem solving skills through involvement in production units.

h) Production units have enhanced acquisition of book keeping and financial skills.

It was also established that the respondents were not sure (mean=3.15, mean=3.62) that production units have enhanced acquisition of book keeping and financial skills.

According to Onderi et al (2014) study dealt with modernizing of TVET institutes for sustainable development. The study established that the training resources provided by the government cannot adequately cater for the ever increasing training needs. Thus the TVET institutes are required to first be entrepreneurs through their production units, then be practical trainers when it comes to entrepreneurship training.

4.7 Contribution of Production Units in Enhancement in Technical Training in TVET Institutions

The study finally, sought to find out the extent to which the respondents agreed that production units have contributed to the enhancement of production units in technical

training in TVET institutions. They were asked to rate using 1-Very low, 2-Low, 3-Not at all, 4-High and 5-Very high. The results are presented in figure 4.6

The study endeavored to find out the overall contribution of production units in enhancement of technical training in TVET institutions. The results from the study indicated that majority (63.5% of technical and vocational trainees and 66.7% of trainers) cited that production units have made great contribution in enhancing technical training in technical and vocational training in Kiambu county.

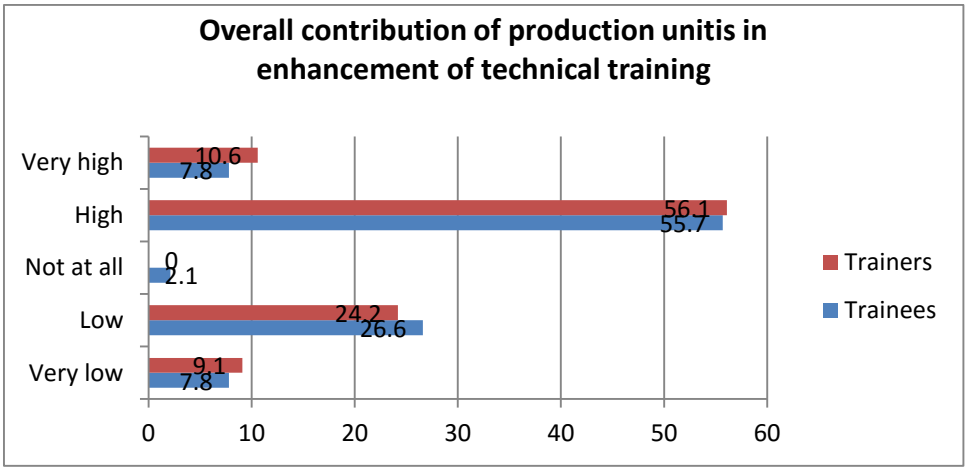


Figure 4.6: Overall Contribution of production units in technical training

A number of studies UNESCO (2016), Maclean, Panth & Jagannathan, (2018), Marope, Chakroun & Holmes (2015), Grosch, 2017 and (Ismail, Nopiah, & Rasul, 2018) have similarly supported the assertion that production units do improve and enhance technical training in TVET institutions. These previous studies point out that technical skill are better acquired through incorporating production units that mimic the industry into the TVET training programs.

Nalbandi and Zonoozi (2019) posted similar views that posited that in Kenya, TVET institutions have sometimes not been meeting labour market requirements. Therefore, their existence needs to be radically reviewed through a number of means like

initiating measures like use of production units in training, reviewing their trainings, policies regulating their functionality and meeting or matching market needs with relevant courses. This will make them give the graduates practical experiences and enhance their training.

(Rono, 2019) Study established that that without checking theoretical and practical training are balanced in TVET institutions, the existing skills gap will widen. The study further observed that graduates from such institutions will not qualify to engage in labour market demands. It was thus the study's recommendation that introduction of production units therefore becomes a critical component in giving TVET technical and vocational trainees real industrial experience. The production units contribution to enhanced training can therefore not be gainsaid.

4.8 Inferential Analysis

In order to draw conclusive inference on the relationship and influence of the study's independent variables (integration of production units, acquisition of practical skills, mobilization of training resources and entrepreneurial skills) and enhancement of training, in selected technical and vocational training.

The study performed multiple linear regressions using enhancement of training as the dependent variable and integration of production units, acquisition of practical skills, mobilization of resources and acquisition of entrepreneurial skills as the independent variables. The results of the linear regression are presented in tables 4.6, 4.7 and 4.8.

Table 4.6: Regression model summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.621[a]	.586	.573	.927

a. Predictors: (Constant), Entrepreneurial, integration, mobilization of training resources acquisition of skills

The study's independent variables (integration of production units, acquisition of practical skills, mobilization of training resources and entrepreneurial skills) accounts for 58.6% (R square=0.586) of the variance or change in the dependent variable enhancement of training in TVET institutions. This means that other variables not captured in this study accounted for 41.4% of change in the enhancement of training in technical and vocational training.

Table 4.7: Analysis of variance

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	101.003	4	25.251	29.390	.000[b]
	Residual	160.664	187	.859		
	Total	261.667	191			

a. Dependent Variable: Overall, what is your opinion on the contribution of production units in enhancement in technical training in TVET institutions

b. Predictors: (Constant), entrepreneurial, integration, mobilization of training resources, acquisition of skills

From the analysis of variance, the F statistic significant value was 0.0001 indicating that the independent variables (integration of production units, acquisition of practical skills, mobilization of training resources and entrepreneurial skills) explain the variation in enhancement of training and that the multiple linear regression model is significant.

Table 4.8: Regression Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-.244	.355		-.685	.494
	Integration	.001	.017	.068	.075	.041
	Acquisition of skills	.048	.018	.227	2.602	.010
	Mobilization of training resources	.073	.017	.350	4.352	.000
	Entrepreneurial skills	.025	.013	.141	1.901	.039

a. Dependent Variable: Overall, what is your opinion on the contribution of production units in enhancement in technical training in TVET institutions

The results of the regression model coefficients indicated that all the independent variables (integration of production units, acquisition of practical skills, mobilization of training resources and entrepreneurial skills) were statistically significant integration of production units (p value 0.041<0.05); acquisition of skills (p value =0.01>0.05); mobilization of resources (p=0.001<0.05) and entrepreneurial skills (p value =0.039>0.005) as indicate in table 4.8. The results further indicate that the independent variables (integration of production units, acquisition of practical skills, mobilization of training resources and entrepreneurial skills) have positive coefficients meaning they are positively related to enhancement of training in the selected technical and vocational training in Kiambu County. An increase in any of these independent variables will lead to a unit increase in dependent variable enhancement of training. The results thus indicate there was a positive relationship between the independent variables (integration of production units, acquisition of practical skills, mobilization of training resources and entrepreneurial skills) and enhancement of training in selected TVET institutions in Kiambu County. The influence of the independent variables (integration of production units, acquisition of practical skills, mobilization of training resources and entrepreneurial skills) was also found to be statistically significant (P value=0.001<0.05).

The multiple regression results echoed Eka & Penjaitan (2015) study who opined that production units enhance training through creativity and innovations development. They learn how to solve problems through filling gaps with ideas and can thus profit from problem solving as entrepreneurs. Onderi et al (2014) reported similar views that production units have positively contributed to enhancement of technical training in many TVET training institutions in Africa. Ogumbe (2015) study also pointed to

similar views that giving practical skill, modern equipment, entrepreneurial training enhances TVET training.

The results on the effect of production units on enhancement of training in TVETs mimic findings by Maclean, Panth & Jagannathan, (2018). The study though conducted in Singapore and it involved reviewing the issues faced by TVETs and the potential solutions. Among the identified recommendations were enhancement of training to meet today's labour market requirements. The study found out a positive and significant relationship between establishment of production units within TVETs and production of practically able and trained graduates.

Hassan and Shamsudin (2019) study also reported correlation between TVETs production units and practical training. The study argued that since most of the job requirements and or skill have changed and this necessitated rethinking of technical and vocational training curricula. This change includes establishment of production units that can solve the inadequate training challenges. Technical and vocational training are increasingly establishing production units as a way of giving practical experience to technical and vocational trainees.

However, Oviawe (2018) study pointed out that production units do not by themselves impact practical training. It's a concerted effort between TVETs and industry. The Oviawe study sought to review revamp of TVETs through use of partnership between private and public cooperation in East Africa. It was established that some countries mostly in the developing world, are increasingly recognizing the importance of having production units in TVET institutions. To this end, many governments have in the recent past established policies aimed at establishing production units within the technical and vocational training. However, the study

cautioned that meeting labour market requirements requires much more than production units. There ought to be all stakeholders' involvement, curricula changes to incorporate practical training modules and policies to guide and regulate TVETs involvement in production units.

CHAPTER FIVE

SUMMARY, CONCLUSIONS AND RECOMENDATIONS

5.0 Introduction

In this chapter the study presents the study discussions of the findings, conclusions and the recommendations thereof. The chapter presents summarized discussions of the study findings from analyzed data according to the specific objectives of the study. Conclusions are also drawn and suggestions for further studies included.

5.1 Summary

The summarised research findings on the contribution of production units in enhancement of training in TVET institutions in Kiambu County are presented in this section.

5.1.1 To investigate the extent to which integration of production units impact training in selected TVET institutions

The first objective of the study was to investigate the extent to which the integration of production units impact training in selected TVET institutions. The respondents agreed that; integration of practical training in production units, Integration of formal curriculum in production units and integration of theory and practice learning do enhance training in their institution. The study also established that mainly the technical and vocational trainees and trainers agreed that integration of industrial attachment aspect brought about by production units have enhanced training in technical and vocational training. However, the study established that the trainers and technical and vocational trainees were not sure that integration of research in production units has enhanced training in TVET institutions. It was also established that integration of consultancy services in production units have not enhanced training in TVET institutions.

5.1.2 Impact of production units on the acquisition of practical skills among trainees in TVET institutions

The study's second objective was to assess the influence of production units on the acquisition of practical skills among trainees in TVET institutions. The findings of the study was that the respondents agreed that combining theory and practice in production units has influenced acquisition of practical skills and that production units has contributed to production of graduates with practical saleable skills. It was further established that availability of industrial standard tools and modern equipment in the production units has influenced acquisition of practical skills among trainees in TVET institutions. Moreover, the trainers and technical and vocational trainees agreed that staff in the production units mentor student's thus influencing acquisition of practical skills. However, the technical and vocational trainees and trainers were not sure that trainees in TVET have access to technically skilled persons in production units which has influenced acquisition of practical skills and that there is linkage and collaboration between production units and industry which has influenced acquisition of practical skills among trainees in TVET institutions. Lastly, it was found out that the production units' aspect of incorporating new technologies has not influenced acquisition of practical skills among trainees in TVET institutions.

5.1.3 Role of production units in mobilising resources for supporting training in TVET institutions

The study's third objective was to assess the role production units in mobilising resources for supporting training TVET institutions. It was established that the respondents agreed that production units engage qualified personnel in their operations. Additionally, both the trainers and technical and vocational trainees agreed that; production units provide materials for production which are used as

training materials, production units have provide tools and equipment used for training purposes and that the production units have enabled the provision of machinery in workshops for production purposes. It was also established that production units have enabled construction of workshops for expansion and that they facilitate involvement of trainees in industrial attachment. Lastly, the respondents disagreed that production units facilitate involvement of trainees in contract tasks in their free time.

5.1.4 Impact of production units on acquisition of entrepreneurial skills among the TVET trainees

The fourth objective of the study was to establish the influence of production units on acquisition of entrepreneurial skills among TVET trainees. The study established that production units have provided opportunities of innovating product and services and have provided opportunities of mentoring entrepreneurs. The trainers and technical and vocational trainees further agreed that production units have provided an environment for acquiring teamwork and leadership skills. It was also established that the technical and vocational trainees have developed business ideas as a result of production units and have developed analytical and problem solving skills.

The study however established that production units provision of opportunities for learning business management skills has not been realized as a result of production units. It was also established that the respondents were not sure that production units have enhanced communication and listening, and customer service skills. The respondents were also not sure that production units have enhanced acquisition of book keeping and financial skills

5.1.5 Contribution of production units in enhancement in technical training in TVET institutions

The study sought to establish the overall contribution of production units in enhancement in technical training TVET institutions. It was found out that over 63% of trainers and technical and vocational trainees agreed that production units contribution in enhancement of technical training in technical and vocational training to a great extent.

5.2 Conclusions of the study

5.2.1 To investigate the extent to which integration of production units impact on training in selected TVET institutions

In conclusion it was established that integrating production units in technical and vocational training have enhanced training in the selected institutions in Kiambu County through incorporating practical training, use of formal curriculum in production units, integration of theory and practical and use of industrial attachments

5.2.2 Impact of production units on the acquisition of practical skills among trainees in TVET institutions

From the study findings, it was concluded that production units have influenced positively the acquisition of practical skills among trainees in TVET institutions through combining theory and practice, availability of industrial standard tools and modern equipment and production units' staff mentoring the technical and vocational trainees.

5.2.3 Role of production units in mobilising resources for supporting training in TVET institutions

The study concluded that the production units have played a huge role in helping mobilise resources for supporting training in TVET institution s through engaging qualified personnel, providing training materials, tools and equipment's, machinery and enabling construction of workshops for industrial attachment.

5.2.4 Impact of production units on acquisition of entrepreneurial skills among the TVET trainees

It was concluded that the production units have led to acquisition of entrepreneurial skills among the TVET trainees through provision of opportunities of innovating product and services, mentoring entrepreneurs to come up with ideas, development of teamwork and leadership skills as well as developing analytical and problem solving skills.

5.3 Recommendations

The study found out that integration of consultancy services and research in production units has not had enough impact on enhancement of training in technical and vocational training. The study thus recommends that research and consultancy aspects of production should be developed fully so a s to improve the units' ability to enhance technical training to technical and vocational trainees.

The study also found out there is low extent of incorporating new technologies in the production units. The study thus recommends that the management of the technical and vocational training ought to keep updating their production units technology to and resemble those in the industry so as to enhance acquisition of technical skills by graduates.

The study also found out that trainees are not involved contractually in their free time. It is recommended that the management of the technical and vocational training should consider aid trainees get practical skills through giving them contracts in the production units.

The study also found out that trainees have not fully gained entrepreneurial skills through their involvement in production units. Thus the also recommends that future review on curriculums should emphasize on development of soft skills like communication, customer relations, human resource management and book keeping to technical and vocational trainees to enable them take advantage of skills acquired to start their own businesses.

5.4 Areas of Further Research

The following areas may require further research;

a) Investigation of technical and vocational training production units' influence on technical and vocational trainees acquisition of market driven skills
b) Establish the progress of technical and vocational trainees who have gone through the production units and graduated with a view to improving the training curriculum of integrating production units into training.
c) The study finally recommends that a similar study should be undertaken but the scope of the study to include industry players who can rate performance of TVET graduates with production units Vis a Vis those who don't have such units.

REFERENCES

Abdulaziz, M., & Osinde, K. (1997). Sheng and English in Nairobi. *International Journal of the Africa*.

Asian Development Bbank. (2009). *Good Practice in Technical and Vocational Education and Training.* Philippines: Asian Development Bank.

Adekola, O. (2022). Employability in higher education. *Employability in higher education: a review of key stakeholders' perspectives. Higher Education Evaluation and Development,*, 16(1), 16-31.

Adom, D., Hussein, E. K., & Agyem, J. A. (2018). Theoretical and Conceptual Framework: Mandatory Ingredients of a Quality Research. *International Journal of Scientific Research, 7*(1), 433-441.

Agasisti, T., & Joanna , W.-D. (2014). Exploring universities' efficiency differentials between countries in a multi-year perspective: an application of bootstrap DEAand Malmquist index to Italy and Poland, 2001-2011. *IRLE Working Paper No. 113-14* (pp. 1-38). Berkeley: University of California.

Ahmad, A. Y. (2022). Unlocking the potentials of Micro and Small Enterprises (MSEs) in building local technological capabilities in agro-processing industry. *Innovation and Development*, 12(2), 279-303.

Akpomudjere, O. (2015). Technical vocational education and training (TVET) and private sector partnership for national development. *Nigerian Vocational Association Journal, 20*(2), 155-166.

Algarin-Ruiz, K. M. (2014). *Code switching: A tool in the classroom.* New York: State University of New York.

Ananda, A. F., & Mukhadis, A. (2016). Production unit as edupreneurship, cooperation business and industrial world with the school for the development of vocational student entrepreneurship mindset. *In AIP Conference Proceedings. (Vol. 1778, No. 1, p. 030048.* AIP Publishing LLC.

Babin, B. J., & Zikmund, W. G. (2015). *Essentials of Marketing Research (6th ed.).* Boston: Cengage Learning.

Baburajan, V. e. (2022). Open vs closed-ended questions in attitudinal surveys, Comparing, combining, and interpreting using natural language processing. *Transportation research part C: emerging technologies*, 137, 103589.

Boone, H. N., & Boone, D. A. (2012). Analyzing Likert Data. *Journal of Extension, 50*(2), 1 - 5.

Brewer, L., & Comyn, P. (2015). *Integrating core work skills into TVET systems: Six country case studies.* Geneva, Switzerland: International Labour Organization.

Chukwu, D. U., Anaele, E. A., Omeje, H. O., & Ohan, I. B. (2020). Assessing Technical Vocational Education and Training (TVET) Labour Market Potentials: Comparison of Conferees' Opinions. *Journal of Technical Education and Training, 12*(2), 12-23.

Creswell, J. W., & Creswell , J. D. (2018). *Research Design: Qualitative, Quantitative, and Mixed Methods Approaches (5th ed.).* Newbury Park, California: SAGE Publications.

Cunha, M., & Rocha, V. (2012). On the efficiency of public higher education institutions in Portugal: An exploratory study. *FEP Working Paper, 468* (pp. 1-28). Porto, Portugal: University of Porto.

Daryanto, Panjaitan & Muslim P. &. (2015). Evaluation of Entrepreneurship in Unit Production Vocational High School (SMK) Simalungun Northern Sumatra. *American Journal of Educational Research*, 3(9), 1072-1076.

Dike, V. E. (2013). *Technical and Vocational Education and Training (TVET): Understanding the Nigerian Experience.* Philadelphia, USA: Drexel University.

Egami N & Hartman E. (2023). Elements of external validity: Framework, design, and analysis. *American Political Science Review*, 117(3), 1070-1088.

Ejiofor, T. E., Orji, T. C., & Ejiofor, T. E. (2015). Pre-Service Vocational Teachers perceptions on the Challenges of SIWES in Tertiary Institutions in Enugu State of Nigeria. *Nigeria Vocational Association Journal, 20*(2), 111-124.

Eka, D. K., & Panjaitan, M. (2015). Evaluation of Entrepreneurship in Unit Production Vocational High School (SMK) Simalungun Northern Sumatra. *American Journal of Educational Research, 3*(9), 1072-1076.

Ekinci, Y. (2015). *Designing research questionnaires for business and management students.* Sage.

Erdem, C. (2019). Chapter One Introduction To 21st Century Skills And Education Cahit Erdem. , 1. *21st century skills and education*, 1.

Etikan, I. M. (2016). American journal of theoretical and applied statistics. *Comparison of convenience sampling and purposive sampling*, 5(1), 1-4.

Ferej, A., Kitainge, K., & Ooko, Z. (2012). Reform of TVET teacher education in Kenya: Overcoming the challenges of quality and relevance. *Triennale on Education and Training in Africa*, 12-17.

Gliem, J. A., & Gliem, R. R. (2015, 07 10). *Calculating, Interpreting and Reporting Cronbach's Alpha Reliability Coefficient for Likert -Type Scales*. Retrieved 02 12, 2015, from ssnpstudents.com/wp/wp-content/uploads/2015/02/Gliem-Gliem.pdf

Goel, V. P., & Vijay, P. (2011). *echnical and vocational education and training (TVET) system in India for sustainable development.* UNEVOC: Bonn.

GoK. (2012). *A Policy Framework for Education and Training: Reforming Education and Training Sectors in Kenya.* Nairobi: Ministry of Education and Minstry of Higher Education, Science and Technology .

GoK. (2013). *Kenya Gazette Supplement No.44 (Acts No. 29).* Nairobi: Governent Printers.

Grosch, M. (2017). Developing a competency standard for TVET teacher education in ASEAN countries. *Jurnal Pendidikan Teknologi dan Kejuruan, 23*(3), 279-287.

Hassan, S. & Shamsudin, M. F. (2019). Measuring the effect of service quality and corporate image on student satisfaction and loyalty in higher learning institutes of technical and vocational education and training. *International Journal of Engineering and Advanced Technology*, 8(5), 533-538.

Holden, L. (2016). *The Introduction of Human Capital Theory into Education Policy in the United.* Michigan : Michigan State University.

Holtom. (2022). Survey response rates. *Trends and a validity assessment framework. Human relations*, 75(8), 1560-1584.

Ikutal, A. I. (2023). Facilities Utilization and Employability Skills Acquisition among Undergraduates of Vocational Education in Cross River State, Nigeria. *UNIZIK Journal of Educational Research and Policy Studies*, 15(2), 29-40.

Iliyasu, R. &. (2021). Comparison of quota sampling and stratified random sampling. *Bio Rev,m. Biostat. Int. J. 10(1)*, 24-27.

Ismail, K., Nopiah, Z. M., & Rasul, M. S. (2018). Challenges faced by vocational teachers in public skills training institutions: a reality in Malaysia. *Journal of Technical Education and Training, 10*(2), 13-27.

Israel. (2013). Measurement approaches to partnership success. *Theory and methods for measuring success in long-standing CBPR partnerships. Progress in community health partnerships: research, education, and action*, 129.

Jabarullah, N. H. (2019). The effectiveness of problem-based learning in technical and vocational education in Malaysia. *Education+ Training*, 61(5), 552-567.

Julie, P. (2003). *SPSS survival manual.* London: Open University Press.

Kamau, P. W., & Ngumbu, C. (2013). Impact of Community Attitudes Towards Technical/Vocational Skills on Youth Enrollment forSkills Training: A Case of Youth Polytechnics in Gatundu-Kiambu County, Kenya. *JKUAT Annual Scientific Conference Proceedings* (pp. 526-534). Nairobi: JKUAT .

Kaufman, K. J. (2013). 21 ways to 21st century skills: why students need them and ideas for practical implementation. *Kappa Delta Pi Record, 49*(2), 78-83.

Kemevor, A. K., & Kassah, J. K. (2015). Challenges of Technical and Vocational Education and Training and Educational Stakeholders in the Volta Region of Ghana. *International Journal of Humanities Social Sciences and Education, 2*(6), 70-79.

Kihara, M. (2019). Influence of student retention strategies on performance of TVETs in Nairobi County, Kenya. *Kenya. Journal of Business and Strategic Management*, 4(1), 1-24.

Kisilu, W. L. (2022). The Effect of Work-Based Learning on the Acquisition of Technical Skills amongst Mechanical Engineering Students in National Polytechnics in Western Kenya Region. *frican Journal of Education, Science and Technology*, 7(2), 318-328.

Kothari, C. R. (2016). *Research Methodology: Methods and Techniques.* New Delhi: New Age International Pvt Ltd Publishers.

Kyarizi, L. (2012). *Improving my practice as a facilitator of learning while using learner-centred approaches to teaching and learning. Published Masters Thesis.* Kampala: Kyambogo University, Uganda.

Lukman, S., Adam, S. M., Jibrin, D. U., & Umar, B. (2017). The role of Business Education in restructuring the funding of TVET for sustainable economic recovery in Nigeria. *American International Journal of Social Science Research*, 1(1), 52-58.

Mack, A. J., & White, D. (2019). Challenges Affecting Technical and Vocational Education and Training in Trinidad and Tobago: Stakeholders' Perspective. *Journal of Technical Education and Training, 11*(3), 136–143.

Maclean, R., Panth, B., & Jagannathan, S. (2018). *Technical and Vocational Education and Training: Issues, Concerns and Prospects.* Singapore: Springer.

Madkur, A. F. (2021). *REFLECTIONS ON PEDAGOGICAL PRACTICES DURING COVID-19 PANDEMIC.*

Mahmut, Ö. Z. (2020). ocational education and training as "a friend in need" during coronavirus pandemic in Turkey. *Bartın University Journal of Faculty of Education*, 9(2), 1-7.

Marope, P. M., Chakroun, B., & Holmes, K. P. (2015). *Unleashing the potential: Transforming technical and vocational education and training.* Paris, France: UNESCO Publishing.

Merriam, S. B., & Tisdell, E. J. (2015). *Qualitative Research: A Guide to Design and Implementation (4th ed.).* London: John Wiley & Sons.

Mugenda, A. G., & Mugenda, O. M. (2013). *Research Methods Dictionary.* Nairobi: Arts Press.

Munishi, E. J. (2016). Factors contributing to lack of employable skills among technical and vocational education (TVET) graduates in Tanzania. *Business Education Journal*, 1(2).

Nalbandi, Z.. Maina, L. W., & Muathe, S. M. (2019). Revitalizing Performance Of Technical And Vocational Education And Training Institutions In Kenya Through Strategic Interventions. *researchgate.net*.

Newby, P. (2014). *Research Methods for Education (2nd ed.).* London: Routledge.

Ngure, S. (2015). An Empirical Evaluation of Technical, Vocational, Education and Training'(Tvet) Processes in Kenya. *Advances in Social Sciences Research Journal, 2*(12), 159-173.

Norton, M. (2021, January 2021). *Challenges to TVET in Developing Countries*. Retrieved May 05, 2021, from https://tvetjournal.com: https://tvetjournal.com/tvet-systems/tvet-challenges-developing-countries/

Nyerere, J. (2009). *Technical and Vocational Education and Training (TVET) sector mapping in Kenya. Amersfoort: Edukans Foundation, 75.*

Ogumbe, B. E. (2015). *Assessment of mechanical engineering craft practice production units in technical colleges in the south–south zone of Nigeria. An unpublished PhD. Research Thesis.* Nsukka: University of Nigeria.

Ogunsola, J. A. (2023). Addressing Entrepreneurial Performance Gap among Graduates of Technical, Vocational, and Education Training through Soft-skills Acquisition. *ENTREPRENEURSHIP AND SUSTAINABLE DEVELOPMENT IN THE 21ST CENTURY*, 158.

Onderi, H., Ajowi, J., & Malala, G. (2014). Restructuring technical and vocational education and training (TVET) for sustainable development in Sub-Saharan Africa. *International Journal of Interdisciplinary Research and Innovations, 2*(1), 40-45.

Ongesa, C. M. (2020). Critical thinking skill gap in the Kenyan educational curriculum, Ongesa, Cosmas Masega. "Critical thinking skill gap in the Kenyan educational curriculum: The 21st-Century skills for the Global Citizen. *Soka Approaches in Education*, 9(6).

Ookeditse, G. B. (2022). Vocational teachers' perceptions of transition components and relevance of curriculum to employment for students with disabilities. 9(1), 2091621.

Ookeditse, G. B. (2022). Vocational teachers' perceptions of transition components and relevance of curriculum to employment for students with disabilities. *Cogent Education*, 9(1), 2091621.

Orbeta, A. C., & Esguerra, E. (2016). The national system of technical vocational education and training in the Philippines: Review and reform ideas. *Discussion Paper Series NO. 2016-07* (pp. 1-27). Quezon City: Philippine Institute for Development Studies.

Oviawe, J. I. (2018). Revamping Technical Vocational Education and Training through Public-Private Partnerships for Skill Development. *Makerere Journal of Higher Education, 10*(1), 73 – 91.

Rajadurai, Supuan, David and Abidin (2018). raduate Candidates' 21st Century Skills and Challenge for the Faculty and the University in Online Learning Era. *The Turkish Online Journal of Educational Technology*, 1, 201-216.

Ramadan, A., Chen, X., & Hudson, L. L. (2018). Teachers' Skills and ICT Integration in Technical and Vocational Education and Training TVET: A Case of Khartoum State-Sudan. *World Journal of Education*, 8(3), 31-43.

Raphotle, M. (2023). VET students work-integrated learning for qualification acquisition and employability: A South African TVET college perspective. *In Refereed Proceedings of the 23rd WACE World Conference on Cooperative and Work-Integrated Education, 2023, University of Waterloo, Ontario, Canada.*

Rono, K. J. (2019). Influence of Employees' Perception of Leadership Strategy on Strategic Plan Implementation in Public Technical Training Institutions in Kenya. 197.136.17.126.

Shamsudin, H. a. (2019). The effect of service quality and corporate image on student satisfaction and loyalty in TVET higher learning institutes (HLIs). . *Journal of Technical Education and Training*, , 11(4).

Shtembari, E. &. (2023). Generation Z "Life Skills" Acquired and Enhanced through Internships before and during COVID-19 Pandemic. *Administrative Sciences*, 13(2), 38.

Uchenna, C. D., & Osita, O. H. (2017). School Production Units: A Stride Towards Promoting Entrepreneurship in TVET for Post Oil Economy. *25th International Conference 2017 of the Association of Vocational & Technical Educators of Nigeria* (pp. 1-16). Calabar: University of Calabar.

UNESCO. (2010). *Why and how Africa should invest in African languages and multilingual education: An evidence- and practice-based policy advocacy brief.* Hamburg, Germany: UNESCO Institute for Lifelong Learning.

UNESCO. (2012). *Transforming TVET from idea to action.* Paris, France: UNESCO-UNEVOC International Centre for Technical and Vocational Education and Training.

UNESCO. (2015). *Unleashing the potential: Transforming technical and vocational education and training.* Paris: UNESCO .

UNESCO. (2016). UNESCO strategy for technical and vocational education and training (TVET)(2016-2021). *voced.edu.au*.

Wagner, J. A., & Hollenbeck, J. R. (2014). *Organizational Behavior: Securing Competitive Advantage (2nd ed.).* Oxfordshire, UK: Routledge.

Wanyonyi, M. (2018). Revitalizing Performance Of Technical And Vocational Education And Training Institutions In Kenya Through Strategic Interventions. *researchgate.net*.

Wuttaphan, N. (2017). Human capital theory: The theory of human resource development, implications, and future. *Life Sciences and Environment Journal*, 18(2), 240-253.

Yamoah,, E. E. (2014). The Link between Human Resource Capacity Building and Job Performance. *International Journal of Human Resource Studies, 4*(3), 139-146.

APPENDICES

Appendix I: Introduction Letter

Kamau Festus Mwangi
Department of Technology Education, School of Education
Moi University
P. O. BOX 3900 - 30100
ELDORET

30th November 2021

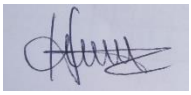
TO WHOM IT MAY CONCERN

I am Kamau Festus Mwangi, a Masters student in Department of Technology Education, School of Education, Moi University. I have completed my course work and I am embarking on my research on the **Contribution of production units in enhancement of training in selected technical and vocational education and training institutions in Kiambu County, Kenya.**

You have been selected to take part in the study by filling a questionnaire or being interviewed. You are requested to answer all the questions as objectively as possible. Be assured that all the information given will be treated with the outmost confidentiality it deserves and anonymity is guaranteed.

I sincerely thank you for your anticipated co-operation as you give this exercise your utmost attention and time out of your busy schedule.

Yours faithfully,



Kamau Festus Mwangi

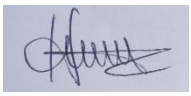
Appendix II: Trainers Questionnaire

I am Kamau Festus Mwangi, a Masters student in Department of Technology Education, School of Education, Moi University. I have completed my course work and I am embarking on my research on the **Contribution of production units in enhancement of training in selected technical and vocational education and training institutions in Kiambu County, Kenya.**

You have been selected to take part in the study by filling a questionnaire or being interviewed. You are requested to answer all the questions as objectively as possible. Be assured that all the information given will be treated with the outmost confidentiality it deserves and anonymity is guaranteed.

I sincerely thank you for your anticipated co-operation as you give this exercise your utmost attention and time out of your busy schedule.

Yours faithfully,



Kamau Festus Mwangi

INSTRUCTIONS

i) This questionnaire consists of **5 pages printed one side**

ii) There are 11 questions in total please answer all questions.

iii) **Respond by Ticking [√] or circling** your answer choice from options provided.

iv) Where **applicable explain or make your suggestions** on the spaces provided.

SECTION A: BACKGROUND INFORMATION

1. By use of a **tick [√], circling or write** in the spaces provided to describe yourself

   a) Please indicate your gender [ ] Female [ ] Male

   b) Kindly select your age

   [ ] 18 - 22 years [ ] 22 - 25 years [ ] 25 - 30 years

   [ ] 31 - 35 years [ ] 36 - 40 years [ ]41 - 45 years

   [ ] Above 45 years

   c) Please indicate the highest level of Education attained

   [ ] Craft [ ] Diploma [ ] Higher National Diploma

   [ ] Bachelor Degree [ ] Masters [ ] Doctorate

   d) Please indicate your designation

   [ ] Head of department and trainer [ ] Trainer/instructor

   [ ] Technician

   e) Please indicate your department

   [ ] Building and Civil Engineering [ ] Mechanical Engineering

   [ ] Electrical Engineering [ ] Applied Sciences

   [ ] Business and Liberal Studies [ ] Hospitality [ ] Baking

   [ ] ICT

   f) How long have you worked as a Trainer/Instructor in TVET

   [ ] 1- 5 years [ ] 5- 10years [ ] 10- 15 years [ ] 15- 20 years

   [ ] 20- 25 years [ ] 25- 30years [ ] Above 30 Years

SECTION B: EXTENT TO WHICH INTEGRATION OF PRODUCTION UNITS IMPACT ON TRAINING IN TVET INSTITUTIONS

2. What kind of production unit programmes has been integrated in the training in your institution?

   [ ] Curriculum integration [ ] Product design [ ] Product development

   [ ] Practical training [ ] Technical skills development

   [ ] Labour market information

   [ ] Provision of equipment and tools (Training facilities)

   [ ] Research [ ] Consultancy services [ ] Hiring of laboratories and workshops

3. Using a Likert scale measurement of 1- 5 (Very Low Extent– **VLE** [1], Low Extent - **LE** [2], Don't Know – **DK** [3], High Extent - **HE** [4] and Very High Extent - **VHE** [5]) indicate to what extent has integration of production unit have influenced enhancement of training in your institution.

		VLE-1	**LE-2**	**DK-3**	**HE-4**	**VHE-5**
a.	Integration of practical training in production units have enhanced training in TVET institutions					
b.	Integration of formal curriculum in production units have enhanced training in TVET institutions					
c.	Integration of research in production units have enhanced training in TVET institutions					
d.	Integration of consultancy services in production units have enhanced training in TVET institutions					
e.	Integration of theory and practice learning have enhanced training in TVET institutions					
f.	Integration of industrial attachment					

		VLE-1	LE-2	DK-3	HE-4	VHE-5
	have enhanced training in TVET					

SECTION C: INFLUENCE OF PRODUCTION UNITS ON THE ACQUISITION OF PRACTICAL SKILLS AMONG TRAINEES IN TVET INSTITUTIONS

4. Using a Likert scale measurement of 1- 5 (Strongly Disagree – **SD** [1], Disagree - **D** [2], Don't Know – **DK** [3], Agree - **A** [4] and Strongly Agree - **SA**[5]) indicate your opinion on the influence of production unit on acquisition of practical skills among trainees in your institution.

		SD-1	D-2	DK-3	A-4	SA-5
a.	Theoretical knowledge and practice in production units has influenced acquisition of practical skills					
b.	Production units has contributed to production of graduates with practical saleable skills					
c.	Availability of industrial standard tools and modern equipment in the production units has influenced acquisition of practical skills among trainees in TVET institutions					
d.	Trainees in TVET have access to technically skilled persons in production units which has influenced acquisition of practical skills					
e.	There is linkage and collaboration between production units and industry which has influenced acquisition of practical skills among trainees in TVET institutions					

		SD-1	D-2	DK-3	A-4	SA-5
f.	Production units has incorporated new technologies which has influenced acquisition of practical skills among trainees in TVET institutions					
g.	Staff in the production units mentor trainees thus influencing acquisition of practical skills among trainees in TVET institutions					

SECTION D: ROLE OF PRODUCTION UNITS IN MOBILISING RESOURCES FOR SUPPORTING TRAINING IN TVET INSTITUTIONS

5. Using a Likert scale measurement of 1- 5 (Strongly Disagree – SD [1], Disagree - D [2], Don't Know – DK [3], Agree - A [4] and Strongly Agree - SA[5]) indicate your opinion on the role of production units in mobilising resources for supporting technical training in your institution.

		SD-1	D-2	DK-3	A-4	SA-5
a.	Production units engage qualified personnel in their operations					
b.	Production units provide materials for production which are used as training materials					
c.	Production units have provide tools and equipment used for training purposes					
d.	Production units have enable the provision of machinery in workshops for production purposes					
e.	Production units have enabled construction of workshops for expansion					
f.	Production units facilitate involvement of trainees in industrial attachments.					
g.	Production units facilitate involvement of trainees in contract tasks in their free time.					

SECTION E: INFLUENCE OF PRODUCTION UNITS ON ACQUISITION OF ENTREPRENEURIAL SKILLS AMONG THE TRAINEES IN TVET INSTITUTIONS

6. Using a Likert scale measurement of 1- 5 (Strongly Disagree – SD [1], Disagree - D [2], Don't Know – DK [3], Agree - A [4] and Strongly Agree - SA[5]) indicate your opinion on the influence of production units on acquisition of entrepreneurial skills among the trainees in your institution.

		SD-1	**D-2**	**DK-3**	**A-4**	**SA-5**
a.	Production units has provided opportunities of innovating product and services					
b.	Production units has provided opportunities of mentoring entrepreneurs					
c.	Production units have provided opportunities for learning business management skills					
d.	Production units have provided an environment for acquiring Teamwork and leadership skills					
e.	Production units have enhanced communication and listening, and Customer service skills.					
f.	Production units have enhanced acquisition of book keeping and financial skills.					
g.	Production units have enabled technical and vocational trainees development of business ideas					
h.	Production units have enabled technical and vocational trainees develop analytical and problem-solving skills					

SECTION F: CONTRIBUTION OF PRODUCTION UNITS IN ENHANCEMENT IN TECHNICAL TRAINING IN TVET INSTITUTIONS

7. Overall what is your opinion on the contribution of production units in enhancement in technical training in TVET institutions

[ ] Very low

[ ] Low

[ ] Not at all

[ ] High

[ ] Very High

End

Thank you

Appendix III: Trainee Questionnaire

Dear Sir/Madam

I am a Masters student in the department of Technology Education in the School of Education of Moi University. As part of my studies, I am conducting a research on ***Contribution of Production Units in Enhancement of Training in Selected Technical and Vocational Education and Training Institutions in Kiambu County, Kenya.***

I would greatly appreciate you take time to fill this survey. Your response is crucial to document the contribution of production units in samples TVET institutions in enhancing TVET in Kiambu County. **It will not take more than 15 minutes.**

Your participation in this study is voluntary and your responses will be treated in confidence and will only be used for academic research purposes only.

Thank you in advance for your time and consideration. One again your participation will be greatly appreciated.

For further enquiries, kindly contact ……0724366420……

Kamau Festus Mwangi
Moi University

SECTION A: BACKGROUND INFORMATION

1. Please indicate the following
   a) Gender Male [ ] Female [ ]
   b) Age _____
   c) Year of Study/Module_____
   d) Programme/Course **(e.g. Diploma in Mechanical Engineering)**
      _____

SECTION B: EXTENT TO WHICH INTEGRATION OF PRODUCTION UNITS IMPACT ON TRAINING IN TVET INSTITUTIONS

2. Using a Likert scale measurement of 1- 5 (Very Low Extent– **VLE** [1], Low Extent - **LE** [2], Don't Know – **DK** [3], High Extent - **HE** [4] and Very High Extent - **VHE** [5]) indicate to what extent has integration of production unit have influenced enhancement of training in your institution.

		VLE-1	**LE-2**	**DK-3**	**HE-4**	**VHE-5**
a.	Integration of practical training in production units have enhanced training in TVET institutions					
b.	Integration of formal curriculum in production units have enhanced training in TVET institutions					
c.	Integration of research in production units have enhanced training in TVET institutions					
d.	Integration of consultancy services in production units have enhanced training in TVET institutions					
e.	Integration of theory and practice learning have enhanced training in TVET institutions					
f.	Integration of industrial attachment have enhanced training in TVET institutions					

SECTION C: INFLUENCE OF PRODUCTION UNITS ON THE ACQUISITION OF PRACTICAL SKILLS AMONG TRAINEES IN TVET INSTITUTIONS

3. Using a Likert scale measurement of 1- 5 (Strongly Disagree – **SD** [1], Disagree - **D** [2], Don't Know – **DK** [3], Agree - **A** [4] and Strongly Agree - **SA**[5]) indicate your opinion on the influence of production unit on acquisition of practical skills among trainees in your institution.

		SD-1	**D-2**	**DK-3**	**A-4**	**SA-5**
a.	Theoretical knowledge and practice in production units has influenced acquisition of practical skills					
b.	Production units has contributed to production of graduates with practical saleable skills					
c.	Availability of industrial standard tools and modern equipment in the production units has influenced acquisition of practical skills among trainees in TVET institutions					
d.	Trainees in TVET have access to technically skilled persons in production units which has influenced acquisition of practical skills					
e.	There is linkage and collaboration between production units and industry which has influenced acquisition of practical skills among trainees in TVET institutions					
f.	Production units has incorporated new technologies which has influenced acquisition of practical skills among trainees in TVET institutions					
g.	Staff in the production units mentor trainees thus influencing acquisition of practical skills among trainees in TVET institutions					

SECTION D: ROLE OF PRODUCTION UNITS IN MOBILISING RESOURCES FOR SUPPORTING TRAINING IN TVET INSTITUTIONS

4. Using a Likert scale measurement of 1- 5 (Strongly Disagree – SD [1], Disagree - D [2], Don't Know – DK [3], Agree - A [4] and Strongly Agree - SA[5]) indicate your opinion on the role of production units in mobilising resources for supporting technical training in your institution.

		SD-1	**D-2**	**DK-3**	**A-4**	**SA-5**
a.	Production units engage qualified personnel in their operations					
b.	Production units provide materials for production which are used as training materials					
c.	Production units have provide tools and equipment for production and training purposes					
d.	Production units haveenable the provision of machinery in workshops for production and training purposes					
e.	Production units have enabled construction of workshops or their expansion					
f.	Production units facilitate involvement of trainees in industrial attachments.					
g.	Production units facilitate involvement of trainees in contract tasks in their free time.					

SECTION E: INFLUENCE OF PRODUCTION UNITS ON ACQUISITION OF ENTREPRENEURIAL SKILLS AMONG THE TRAINEES IN TVET INSTITUTIONS

5. Using a Likert scale measurement of 1- 5 (Strongly Disagree – SD [1], Disagree - D [2], Don't Know – DK [3], Agree - A [4] and Strongly Agree - SA[5]) indicate your opinion on the influence of production units on acquisition of entrepreneurial skills among the trainees in your institution.

		SD-1	**D-2**	**DK-3**	**A-4**	**SA-5**
i.	Production units has provided opportunities of innovating product and services					
j.	Production units has provided opportunities of mentoring entrepreneurs					
k.	Production units have provided opportunities for learning business management skills					
l.	Production units have provided an environment for acquiring Teamwork and leadership skills					
m.	Production units have enhanced communication and listening, and Customer service skills.					
n.	Production units have enhanced acquisition of book keeping and financial skills.					
o.	Production units have enabled technical and vocational trainees development of business ideas					
p.	Production units have enabled technical and vocational trainees develop analytical and problem-solving skills					

SECTION F: CONTRIBUTION OF PRODUCTION UNITS IN ENHANCEMENT IN TECHNICAL TRAINING IN TVET INSTITUTIONS

6. Overall what is your opinion on the contribution of production units in enhancement in technical training in TVET institutions

[ ] Very low
[ ] Low
[ ] Not at all
[ ] High
[ ] Very High

End. Thank you

Appendix IV: Research Permit

REPUBLIC OF KENYA

NATIONAL COMMISSION FOR SCIENCE,TECHNOLOGY & INNOVATION

Ref No: **733124**

Date of Issue: **30/March/2022**

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This is to Certify that Mr.. Festus Mwangi Kamau of Moi University, has been licensed to conduct research in Kiambu on the topic: CONTRIBUTION OF PRODUCTION UNITS IN ENHANCEMENT OF TRAINING IN SELECTED TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING INSTITUTIONS IN KIAMBU COUNTY, KENYA for the period ending : 30/March/2023.

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Appendix V: Plagiarism Awareness Certificate

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Awareness test for Thesis: **CONTRIBUTION OF PRODUCTION UNITS TOWARDS ENHANCING TRAINING IN TECHNICAL AND VOCATIONAL EDUCATION INSTITUTIONS, A CASE OF KIAMBU COUNTY, KENYA** With a similarity index of 4% and striving to maintain academic integrity.

Awarded by:

Prof. Anne Syomwene Kisilu
CERM-ESA Project Leader Date: 14/09/2023