



**UNIVERSITY OF NAIROBI**

**FACULTY OF SCIENCE AND TECHNOLOGY**

**DEPARTMENT OF MATHEMATICS**

**Analysis of Factors Affecting Employability rate among Youth in Kenya by  
Using Generalized linear model .**

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Reg No. I56/82312/2015**

**PROJECT SUBMITTED TO THE DEPARTMENT OF MATHEMATICS IN  
PARTIAL FULFILLMENT FOR A DEGREE OF MASTER OF SCIENCE IN SOCIAL  
STATISTICS**

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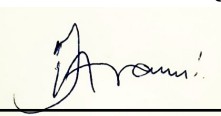
## Abstract

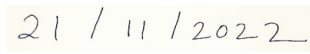
In Kenya, youth (age 18-34 years) has been facing employment challenges yet they are in their crucial stage of transitioning from dependence to self-reliance. They are also the majority in the country and are expected to drive social, economic and political developments. To address employment challenges, the government, nongovernment institutions and private sector has come up with interventions aimed at offering financial support, offering entrepreneurial skills and offering jobs to the youth. Despite the efforts, little is known on what matters for the youth in terms of their employment preference and determinants of employment preferences. The objective of this study is to inform decision makers on youth employment preference that can help in recruiting, retention and motivation of youth in the labour market. Specifically, the study aimed at establishing the youth employment preference and explore the factors related to youth employment preferences. A total of 650 youth participated in the study between November 2017 and March 2018, involving 127 unemployed, 343 employed and 180 self-employed youth. The study used a multinomial logit model to examine the determinants of youth employment preference in the private sector, public sector and self-employment in Kenya. The results indicate that, largely, youth prefer employment in public sector than in private sector due to job security and better payment. Youth employment preference in either private, public or self-employment are influenced by education, income, job security, participation in decision making and career growth among others. Employed youth and selfemployed prefer their current employment in private sector and self-employment, respectively, possibly because it was the only alternative available to them and also education level was not a hindrance to employment in the two sectors. Most youth in self-employment were in their first job and had limited work experience, which is a requirement in public and private employment and therefore their preference of self-employment. For employers to provide job security for the youth and improve on their company's productivity, the government needs to collaborate with the private sector in ensuring that youth acquire skills demanded in the labour market,

and link skilled youth to employers, which is likely to lead to employment of skilled youth, high profit, provision of good working conditions including job security. With the current government move in providing tax abatement to the private sector who offer youth internship intended to enhance employability of youth, the government needs to monitor internship programmes to ensure that the private sector does not make internship and industrial attachments an opportunity for engaging cheap labour from youth as interns. Youth involvement during designing, implementing and evaluating programmes aimed at them is important in ensuring that what is provided relevant to the them.

## Declaration and Approval

I the undersigned declare that this dissertation is my original work and to the best of my knowledge, it has not been submitted in support of an award of a degree in any other university or institution of learning.

  
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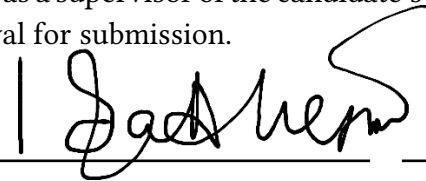
  
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In my capacity as a supervisor of the candidate's dissertation, I certify that this dissertation has my approval for submission.

  
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## Dedication

This study is dedicated to my family and friends who have supported me in various ways in my quest for trans-formative knowledge.

May God bless and increase your territories.

## KEYWORDS

Parameter ———Unknown proportion of the population to be estimated, also called regression coefficient

Unbiased———— is when  $Y_i E(Y_i)$

Odds ————— Chances of an event occurring against the same event not occurring.

Odds ratio ——— The ration of two odds between 2 groups

P-value ———-Probability of an event occurring against the set standard of error.

CSR ——Corporate Social Responsibility

## Acknowledgements

First and foremost I am grateful to the Almighty God for enabling and guiding me throughout this academic journey since preschool to postgraduate. My sincere appreciation goes to my supervisor Dr. Idah Orowe, for his insight, encouragement and assistance in writing this dissertation. His invaluable comments and guidance enabled me to complete this research. I also thank Mr. Peter Mecha who helped me pen my ideas and provided guidance on how to work with different statistical programmes. Finally, I must express my very profound gratitude to my family members and friends for providing me with continuous encouragement, prayers and unfailing support throughout the entire process of researching, writing this thesis and in my years of study. Thank you.

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JOB MUMBO ARANI

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Nairobi, 2022.

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# 1 GENERAL INTRODUCTION

## 1.1 Study Background

Unemployment among the youth has been increasing. This has been accelerated by the increase of the rate at which graduates have been leaving institutions of higher learning. Kenya is one of the countries worst hit by this predicament. According to 2014 World Bank report, Kenya's youth are the hardest hit by a significant unemployment. According to their report an estimate of 800,000 young people graduate from institutions of higher learning per year yet approximately 300,000 of them end up lacking a decent source of living. It is because of this that that the country's economic growth faces a challenge. In the report, it is evident that the most affected age group are those of age 18-25 years who have academic qualifications of primary and secondary education. Most of those with tertiary education suffer unemployment are between 25-28 years of age. Beyond this age, the rate of unemployment starts dropping

Evidently, unemployment has been a major concern in Kenya. After independence, Kenya started putting measures in place to address the issue of joblessness. According to Omolo (2010), the high wage policy of 1964 and sustained high rate of economic growth of 1969 aimed at ensuring that the economy grows at a faster rate than the rate at which labor force is ready and willing to join employment sector. With Kenyanization that started 1964 through to 1983, the states government intended to replace all non-citizen employees with Kenyans. Omolo argued that foreigners were excluded from rural trade and were to possess work permits [Fra14].

To address the unemployment problem, employers were encouraged to increase informal sector of employment by the use of jua kali sector. By 1979, they were to achieve a target of at least 10 per cent increase of employees per annum. In 1990s and 2000s the government utilized available labor information in the market to mobilize resources critical growth that is sustainable.

In 2003, the government formulated a 5-years development strategy geared towards achieving democracy and empowerment in addressing unemployment. Even so, Kenya has not been in position to solve the puzzle of unemployment that her economy has been facing

for decades.

### 1.1.1 Education

In any country, the future stability of an economy relies on past and current investments. One of the major areas that receive much attention when it comes to investment is the education sector. In this sector, the government usually put focus on young people. For instance, the government of Kenya has been providing free primary education for more than 5 years.

Last year, after release of K.C.P.E, ministry of education insisted that there has to be 100 per cent transition from primary to secondary school. At the dawn of this year, education cabinet secretary deployed personnel to counties to ensure that the transition plan has been accomplished. This indicates how the state treasures its future economic muscles by investing in educationcite..

Education in the country has been undergoing transformation for decades. Before 1985, there was 7-4-2- 3 system of education which was replaced by 8-4-4. A person was required to take 8 years in primary school, 4 years in secondary and 4 years in university. It has to be noted that someone could repeat, not get direct entry to university thus go through vocational and technical training institutions to acquire certificate and diploma. In such cases, one could take more than 16 years. National exams were K.C.P.E for primary and K.C.S.E for secondary schools. The scores from the two determined type of secondary one was to join, post secondary institution and the course to done and certain specific job qualifications. In university, those who completed the course are awarded bachelors degree. The graduates can further their studies by enrolling for post graduate diploma, masters and PhD.

Pupils start primary education at age 6 years while secondary admission is done when most of them are 14 years of age. English is the main language used to teach. At the end of primary level, one was supposed to do 5 exam papers and at least 8 subjects have to be examined at the end secondary level [Nu12]. This education system was posrulated to have shortcomings. It wsd loaded with content and exam oriented. Pressure was thus, exerted on learners physically and pschycologically. To address this problems, new curriculum development was embraced by government in 2017.

The 2-6-3-3 is a competency based system of education. It focuses on acquisition of skills. The system consist of Kindergaten that goes upto grade 3. Grade 4 to 9 is middle education school. Senior education school is from grade 10 to 12. Children spend 2 years in ECD. The education system was enrolled in 2018 after a pilot study had been contacted for a year [KAV18].

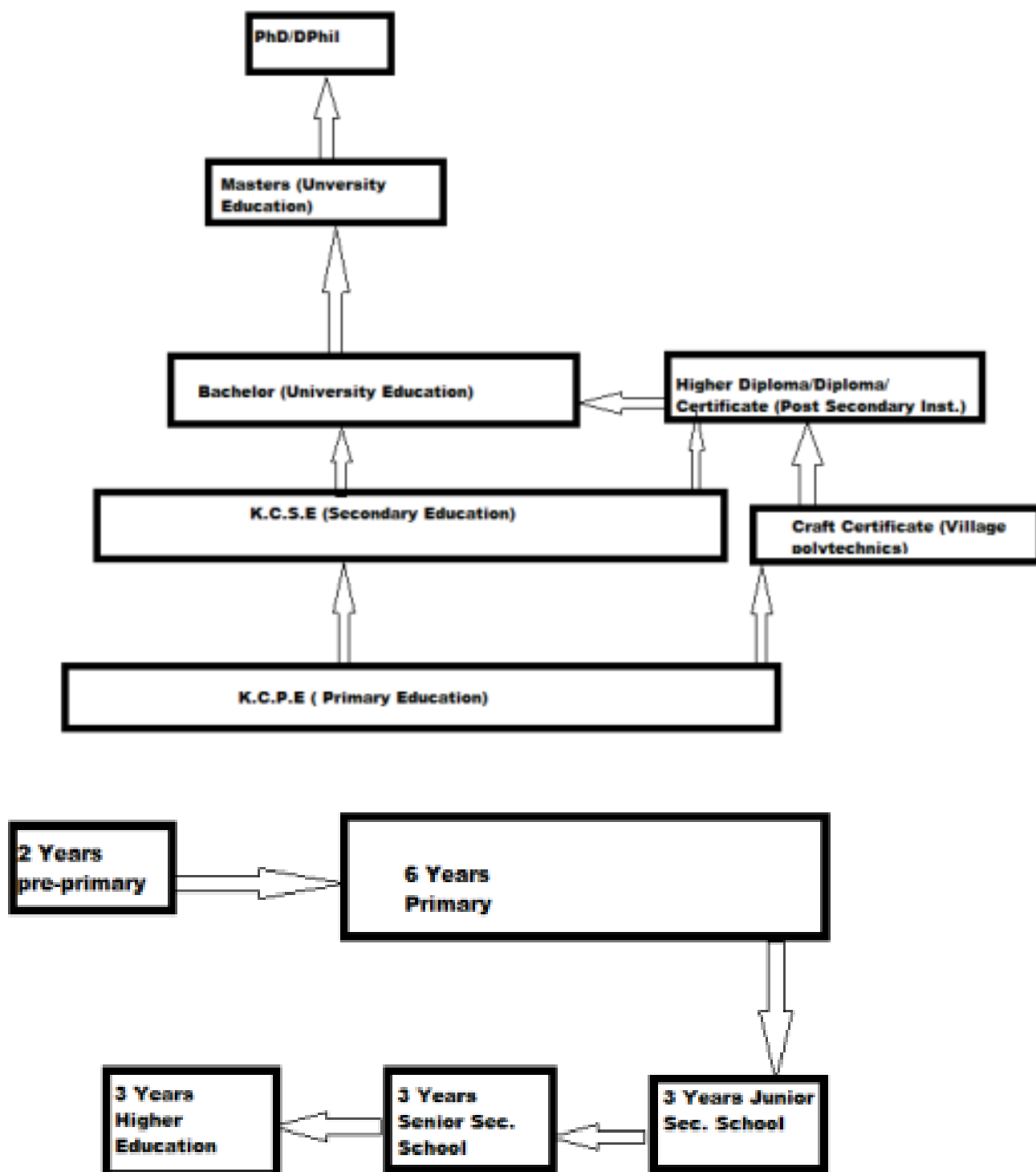
### **1.1.2 Youth**

Kenya is one of the nations that experience youth bulge. In 2017, about 10 million Kenyans were in age bracket of 18-35 years. This was more than 20 per cent of the country's population. In his journal, Hall (2017) stated that the more than 20 per cent of population (being youth) is a major asset for the country's economy [Hall17].

This happens when there are good salaried employment opportunities for youth. According to Hall, a large population dominated by young and energetic people is a potential force for future economic prosperity at both individual and society level. He further, conditionally, says that the achievement of this is dependent on educating the population. Education thus seems to be a key variable in state's future economic prosperity.

One would wonder whether a country can just gain stability as long as the youth are learned. If this could be the case, there could be a solution for a significant number of problems in the society today. However, there is a challenges in the society in the perspective that people are being educated regardless of whether they use knowledge and expertise they gain from class or not. This has however, been worsened by other forces related to job creation and global economic stability

## 1.1.3 RELATIONSHIP BETWEEN EDUCATION, EMPLOYMENT AND YOUTH



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## 1.2 Problem statement

Employment sector in Kenya to a large extent blames the system of education. It is postulated that graduates from institutions of higher learning lack the skills and capacity in addition to lack of experience. It is because of this that most employers claim to prefer experienced people to fresh youths. Hall argued that, for the past years, growth in employment benefitted older people. The reason for this was that the skills and aspirations youth had do not match the demand and realities of the labor market. Even so, Hall noted that the highest percentage of youth who are not active in employment sector are those who lack tertiary education and that transition rate from secondary to tertiary was relatively low (4 per cent) in 2009 when compared to a country like South Africa that had 30.4 per cent. Note that most of the material only give analysis and trends about age, experience, unemployment and education. They do not explain how these factors are related by giving statistical significance on how these factors affect each other.

Thus there is need to conduct research to ascertain association between unemployment, academic qualifications and age among the youth. The research has to test whether or not the graduates who leave institutions of higher learning are not equipped with required skills and expertise, that is why they take long before getting absorbed in employment sector. It is also good for the study to reveal that youth are not easily employed due to lack of experience. Lastly, education is treasured in Kenyan economy. It is prudent to also test whether education is statistically losing essence when it comes to employability.

## 1.3 Study Objective

### 1.3.1 Main objective

The main objective of this study is to analyze factors affecting the employability of youth in Kenya

### 1.3.2 Specific Objectives

The following are specific objectives

1. To determine impact of academic qualification, age category and years of experience on employability using logistic model.
2. To determine whether there is association between dependent variable and individual independent variables using chi square

## 1.4 Significance of study

It becomes hard for investors and planners to make critical decisions without being fully informed about market dynamics and trends. Finding of this research project will assist government in ascertaining whether it is still viable to continue investing in education. Institutions of higher learning will be in position to know whether they have to bear the blames of high unemployment rate among young graduates for not equipping them fully to address the challenges in corporate sector.

Parents understand that success in life is achieved by succeeding in education. This project will help reveal to them whether employment sector is saturated with graduates, thus take other alternative investment options to better their children's future life. It is obvious that educating a child is like family investment. This notion, however, is losing sense by the fact that after educating their children they still go back to parents for inheritance instead of giving back to the family. Even so, young investors who intend to sponsor studies by themselves will be informed before making a wise lifetime investment decision

Moreover, to employers it may sound prudent that they ignore young graduates because of lack of experience, 'half-baked' and low production level; giving competitive advantage to old and experienced graduates. Labor as a production factor is a concern by international investors. From the project finding, foreign business people will learn about labor market in Kenya as a variable (opportunity for production) that is affordable while evaluating investment opportunities in the country.

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## 2 LITERATURE REVIEW

The high rate of unemployment among graduates in Kenya is a major concern for different relevant stakeholders. As a result, many researchers have invested their resources to find out the causes, impacts and possible control for the problem. Various research findings have resulted to publication of hundreds of papers and articles on unemployment. In this chapter, we will review some papers written by different authors who investigated to know why employability among graduates is becoming volatile day by day..

Ponge Awuor (2013) argues that there have been tremendous changes in the graduate-labor market. He further observes that the emergence of new universities has led to an increase in the number of graduates which has in turn led to an increase in the number of people joining the graduate labor market. Ponge states that, fresh graduates have difficulties of becoming employable in the current job market. He further stipulates that any university that wants to gain fame in the global market should enhance relevance to and produce graduates whose vision and mission is to employ not to look for employment. To dig even deeper into this, Ponge sought to have the opinions of graduates (in Kenya and Africa) on unemployment. Their manifestations were that, universities do not utilize many opportunities that exist in Kenya and Africa. They asserted that the institutions have to collaborate with three innovative practices in the country (Kenya) to help in reducing unemployment among graduates. The findings revealed that, Kenyan universities should focus on development of graduates while enhancing employment programs. Moreover, most institutions lack programs that train on employment and replacement skills. They have also not invested much in micro-grants enterprise trainings and small investments.

Ponge highlights that it is devastating that only 125,000 youth within age bracket 18-35 years were employed in formal sector in Kenya by 2012. In his opinion, Ponge argued that the low unemployment rate indicates an unhealthy economy. He insisted that the high unemployment rate among youth is a waste of resources besides social community problems associated with idle young minds.

To address the challenges among graduates, the author advises universities to have a review of their education system. There has to be an increase in the level of practical, relevant and strategic skills applicable to the opportunities available. By saying this, he



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implied that focus has to be put on production of individuals that have intellectual capability that would cause changes, not just large number of graduates that are ready to join employment market.

Lastly, Ponge does not forget to urge universities to replace obsolete facilities and outdated technology with the current ones. It would, however, have been better if he also gave analysis of trends on graduates in relation to employability. No statistical inferences have been given in his paper. Franz and Omolo (2014) had the burden to research on initiatives taken towards addressing youth employability in Kenya. In their paper, they argue that lack of employment is linked to labor demand and the hardest hit in Kenyan population are the youth. According to them, the government has tried various initiatives to address the problem of unemployment but nothing much has been achieved.

The authors, however, discovered that the magnitude of impacts of unemployment to youths varied from one individual to another based on factors like education level, social status, age, gender, place of origin and family status. In their analysis analysis, they discovered that the worst hit group were those who had less than secondary school level of academic qualification

Unemployment among youth compelled government to enact policies that could empower them. The paper referred to 2013 initiatives by Kenyan government (after devolution) to ensure that 30 per cent of state's opportunities are reserved for youth, women and people living with disabilities. By doing this, the government intended to reduce unemployment among them so that they could contribute towards achievement of vision 2030.[Fra14]

Upon conducting studies on initiatives by various stakeholders, the authors discovered that there a number of issues related to public in relation to unemployment among youth. They noted that: financial support should be given to young entrepreneurs, private sector and NGOs to run and regulate fund-drive geared towards youth enterprises empowerment. Also, young people have to receive trainings on entrepreneurship in order to nurture spirit of starting businesses. There also has to be youth-national policies that address constraints and curb challenges that youth experience while trying to stabilize themselves in life

Access to quality and relevant education is limited to the youth from vulnerable families. According to the authors, The Kenyan government has to consider providing access to education among young people from needy families. Lastly, the government should

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emphasize on provision of vocational technical skills to those who do not qualify to join universities. According to this paper, the skills gained could enhance their production in labor market thus increasing their income level.[Fra14]

Danner et. Al (2016), in their book entitled; ‘Youth Unemployment in Kenya’ presents a slightly different view about unemployment among youth. According to them, it is hard to address urbanization challenges without referring to or solving youth’s predicaments related to joblessness. They consider it to be of essence for youth to be empowered with skills from their backgrounds classified into four categories as: foundational, technical, transferable and vocational skills[Dan16].

From employer point of view, these researchers discovered that work ethics cost youth when it is time to be absorbed into labor market. They assert that potential employers have difficult time in finding suitable young employees due to lack of work ethics. This is despite the fact that there are so many jobless young people in the Kenyan Job Market. Moreover, majority of them have low quality life skills that rarely meet available job requirements[Dan16]

Samuel Hall (2017) had something to say about unemployment in Kenya. In the 86 paged-article, the author considers Kenya to be a nation with unutilized opportunities due to the fact that, it is a ‘youth bulge’ state that is not in a position to address high unemployment rate as a challenge. The author is keen to note that with these jobless youth, it implies that dependence ratio is high. He was also concerned about uncontrolled birth rate despite the country’s volatile economy.

Hall also noted that Kenya’s GDP growth rate had been staggering at 5 per cent yet unemployment rate rarely dropped below 22 per cent, a worrying trend for future’s projection in economic growth. When compared to most African countries, Kenya recorded the lowest employment rate in proportion to its economic performance [Hall17].

The paper also highlighted the 100 per cent primary education enforcement yet less 3.5 per cent and about 4.5 per cent transition to tertiary institutions for female and male young people who complete primary education respectively. Compared to other nations in Africa, Hall postulated that Kenyan youth lack skills critically needed in labor market; technical skills that have to be taught in TVET institutions. The challenge is that majority of Kenyans treasure basic education that may lead to formal employment. It is because of

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this that enrolment to TVET was still too low by 2017

Hall reminded us not to forget that all these happen yet there were few opportunities with high competition in labor market, worst being that some potential employees are vulnerable at individual level due to factors like health, poverty and lack of enough resources to prepare for job hunting where labor supply is very high and demand low. Employers thus go for the best, leaving less competent youth unfavorably jobless.

Gitonga (2018) noted a unique trend among degree holders when it comes to securing a job. In his article, he noted that the country continues releasing more graduates into the labor market yet demand for labor force has already fluctuated. Referring to 2018 discussion paper, Gitonga forecasted a bleak future since the percentage of degree graduates of the year who get employed was noted to be dropping drastically from 79 per cent in 2011 to 13 per cent in 2017. For masters' graduates, the proportion changed from 10 per cent to 79 per cent within the same time interval. For the diploma category, the worst was experienced. In their year of graduation, only 0.03 could be employed as compared to 0.2 in 2017 and 2011 respectively [Gito18].

The unemployment trend in the country forces graduates to accept clerical and manual jobs. Even so, Gitonga argued that the government has been trying to cushion the graduates from harsh effects of joblessness by introduction of internship programs. Assurance of one year paid internship in both public and private sector was perceived to be one of the potential solution.

Wambu (2018) discovered a trend that is not impressive. In her article, 'Survey Exposes Mismatch in Jobs', she stated that, degree holders now scramble for low income jobs that were initially meant for secondary and primary school graduates. Such jobs are not limited to: drivers, security guards, messengers, secretaries and casual laborers. Referring to the FKE 2018 report, she revealed that most employers gradually replace diploma and certificate graduates with those having degree certificates. This implies that the Kenyan Economy is heading to the state of underemployment in the short term. In the long term, an economy of high skilled labor force can be projected, thus a more stable labor force in future [Wa18].

Tumuti et al (2013) were curious to understand community perception towards education when it comes to employability. In their paper; *Enhancing Graduate Employability Through Community Engagement*, the team of researchers argue that chances of enhancing em-

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employability is enhanced by higher education. A survey conducted among Kenyatta University students revealed that higher education empowers graduates to gain skills that are critical in enhancing employability skills. The researchers focused only on one program that directly engages students-Student Community Service Programme (SCSP) [Tum13].

In the study, the authors researched to investigate initiatives geared towards improving employability skills. They further listed setbacks against the initiatives. It was evident that constraints on available resources to achieve their objectives in addition to meeting societal expectation, giving back to the community made enhancement of employability skills among students not to be very effective. Even so, SCSP continued touching Kenyans lives by empowering them with skills and knowledge. The paper captured generic skills and gained to the community as CSR initiative that students and residents gained. The paper ends by explaining future improvement that SCSP has to engage in. The paper, however, does not address the current unemployment among graduates in Kenya. [Tum13].

Ali and Farah (2018) discovered high unemployment rate among graduates in the country. They assert that there is high level of demoralization among the many graduates who cannot be absorbed in employment sector. The research objective was geared towards revealing causes of unemployment. According to them, 40 per cent of youth with academic qualifications are jobless. Even so, the authors shift blame to government. They postulated that, successive governments have not been taking serious action to address the problem.

The findings revealed that graduates lack confidence in systems that are in place. Life difficulties with unemployment among skilled young Kenyans enhance societal crimes not limited to corruption, nepotism, drug addiction, smuggling of illegal goods and terrorisms

To address problems linked to joblessness, some measures have to be put in place. Graduates should focus on creation of jobs not looking for employment. Universities have to introduce courses that encourage job creation rather employees mentorship. Even so, the authors emphasize that the institutions be focused on demand driven courses, not just large number of graduates. Lastly, eradication of corruption, nepotism favouritism and tribalism should not be forgotten as far as government opportunities and allocation of resources are concerned [Ali18].

Jaoko A. F (2014) asserts that there is existence of a link between academic qualifications and performance of an employee. In her research project towards award of master of busi-

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ness administration conducted at Mukuru Slums. According to her, most organizations value academic qualification as the key criteria for competent employees. With the objective to determine workers' performance and academic qualifications, Jaoko interviewed an organization in the slum having 48 employees. After data collection and analysis of descriptive statistics of workers, she concluded that positive correlation between academic qualifications and career performance seems to exist. She finally, advised employers to consider academic qualifications as key factor when recruiting employees depending on duties and responsibilities to be executed. She further urges employers to support and encourage workers to go for further studies for successful performance in their jobs [Jao14].

Abdulrahamon, Adeleye and Adeola (2018) also had findings to share about education and professional expertise and experience. Just like Jaoko's, the authors were to determine the role of education and professionalism when it comes to career performance. Unlike the former, this paper investigated staff in financial accounting department in a Nigerian university and rated their performances. The survey conducted captured opinions from bursary section. Information about accounting roles in relation to normative and professional qualities they had in their socio-demographic profiles. At 5 per cent significance level, multiple linear regression and analysis of variance, it was evident that the staff having professional qualifications.

The results showed that staff with higher academic qualifications tend to perform better than those with lower education. The authors of the paper conclude by saying that there is direct relations between performance at place of work and academic performance. To improve production level, they advise management of companies, organizations and government parastatals to upgrade academic levels of employees. This may be of economic gain as well as gaining competitive advantage in the market [Abd18].

Ng and Feldman (2009) also had something to say about academic qualification and employability. In their paper titled, 'How Broadly does Education Contribute to Job Performance', it was of interest to unravel significances of education level on career performance. In their studies, they considered 9 types of behaviors when it comes to work. They include: nature of work, kind of citizenship, education, creativity, absentism among others. The level of job, race, marital status and gender were also not forgotten.

It was discovered that, if a certain behaviour is specifically defined, education level may not have impacts on performance. Even so, performance rated in relation to absenteeism shows a positive correlations. With keen observation in managerial skills, it was observed that there is tendency of higher cost of acquiring educated labor force as compared to

those with less education. However, when it comes to productivity, the authors justify hiring employees who are highly learned since they tend to be efficient and cost effective in production. It was, although, noted by human resource that there is no correlation between training of educated employees and the cost. The authors, however, admit that they were not in position to measure some parameters that affect employment and performance. For instance, they were not in position to analyze data to reveal relationship between career performance and academic qualifications in terms of gender [Ng09].

All the literature material written about youth and unemployment in Kenya relies on social research findings. They have very shallow analysis. It thus becomes hard to ascertain that high unemployment among youth is related to not being fully prepared to face labor market as well as statistically confirming that chances of a graduate getting employed is higher than someone who lacks education beyond secondary level [Kan15].

## 3 METHODOLOGY

### 3.1 Introduction

This chapter presents, research design, source of data and its description, study variables, Exploratory data analysis and statistical models which will be applied in data analysis.

### 3.2 Research Design

#### 3.2.1 Data Source and its description

The study used routine data collected and stored in the database of the Kenya National Bureau of statistics (KNBS) in the 2019 demographic and economic survey. The survey explores the employment rates among youths across various levels of education. The data is recorded in excel.

#### 3.2.2 Study Variables

The variables are classified as dependent variable which is Employability which costs of whether you are employed=1, or not employed=0 and independent variables which consist of education Qualification, Age and Years of Experience

#### 3.2.3 Exploratory Data Analysis(EDA)

EDA is the technique is the technique used to visualize the pattern of data ion relation to research interests. Therefore, exploratory data analysis can help us discover more information regarding raw data obtained from the employability of the youth in Kenya by carrying out descriptive statistics and plotting curves to examine the data before undertaking any inferential statistics.

### 3.3 Generalized Linear Model( GLM)

Generalized linear models represent the class or family of regression models which models the response variable,  $Y$ , and the random error term ( $\epsilon$ ) based on exponential family of distributions such as normal, Poisson, Gamma, Binomial. GLM assumes that the distribution of the response variable is a member of the exponential family of distribution. This is different from the general linear models (linear regression / ANOVA) where response

variable,  $Y$ , and the random error term ( $\varepsilon$ ) have to be based solely on the normal distribution. Linear models can be expressed in terms of expected value of response variable as the following

$$g(\mu) = \beta_0 + \sum_{i=1} \beta_i X_i \quad (1)$$

where  $\mu$  can be expressed as  $E(Y)$  but for generalized linear models  $g(\mu)$  takes the link function associated to the exponential family distribution i.e for logistic model

$$\log\left(\frac{\mu}{1-\mu}\right) = \beta_0 + \sum_{i=1} \beta_i X_i \quad (2)$$

Therefore our logistic model is given by

$$\log\left(\frac{\mu}{1-\mu}\right) = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 \quad (3)$$

where

$X_1$  :education qualification

$X_2$  :Age category

$X_3$  : years of experience

$X_4$ : employment sector

$\beta_i$ 's is the regression coefficient

### 3.3.1 component of Generalized linear model

GLM has three components namely

- **Random Component** - specifies the probability distribution of the response variable; e.g., normal distribution for  $Y$  in the classical regression model, or binomial distribution for  $Y$  in the binary logistic regression model. This is the only random component in the model; there is not a separate error term.
- **Systematic Component** - specifies the explanatory variables ( $x_1, x_2, \dots, x_k$ ) in the model, more specifically, their linear combination; e.g.,  $\beta_0 + \beta_1 x_1 + \dots + \beta_k x_k$ , as we have seen in a linear regression, and as we will see in the logistic regression in this lesson.
- **Link Function**  $g(\mu)$ , specifies the link between the random and the systematic components. It indicates how the expected value of the response relates to the linear combination of explanatory variables; e.g.,  $g(\mu) = g(E(Y_i)) = E(Y_i)$  for classical regression, or  $g(\mu) = \log\left(\frac{\mu}{1-\mu}\right)$  for logistic regression.



### 3.3.2 Assumptions of GLM

The following are assumptions of the generalized linear models

- The data  $Y_1, Y_2, \dots, Y_n$  are independently distributed.
- The dependent variable  $Y_i$  does NOT need to be normally distributed, but it typically assumes a distribution from an exponential family (e.g. binomial, Poisson, multinomial, normal, etc.).
- A GLM does NOT assume a linear relationship between the response variable and the explanatory variables, but it does assume a linear relationship between the transformed expected response in terms of the link function and the explanatory variables.
- Explanatory variables can be nonlinear transformations of some original variables.
- The homogeneity of variance does NOT need to be satisfied. In fact, it is not even possible in many cases given the model structure.
- Errors need to be independent but NOT normally distributed.
- Parameter estimation uses maximum likelihood estimation (MLE) rather than ordinary least squares (OLS).

## 3.4 Chi-square Test

Chi-square test is carried out to determine the association of dependent variable and independent variables since both are categorical variables. That is association between employability and academic qualification, employability and age category, employability and employment sector

Person's chi-square formula is given by

$$\chi^2 = \sum_{k=1}^n \frac{(O - E)^2}{E} \quad (4)$$

where

$\chi^2$ : is the chi-square test statistic

$O$ : is the observed frequency

$E$ : is the expected frequency

### 3.5 Diagnostic Tests

We carry out Normality test to determine whether the details normally distributed or not, the study will employ Shapiro Wilk test (Ghasemi and Zahedias) and also the normality plot

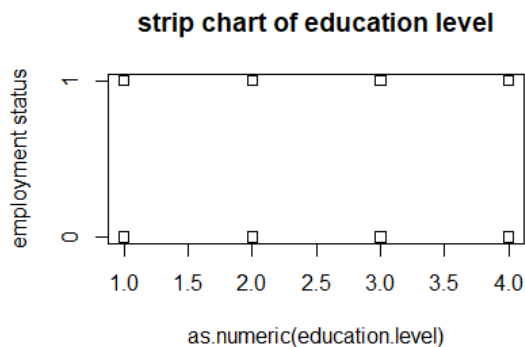
## 4 Data Analysis and Interpretation

### 4.1 Introduction

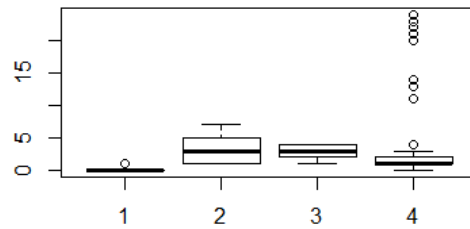
This chapter describes the findings and discussion of results. We employed statistics techniques both descriptive and inferential statistics to analyze the data from employability of youth in Kenya. Exploratory data analysis was employed to help us visualize the data through box plot. QQ plot was also employed to check normality of the data and the residuals. The inferential statistics was achieved through fitting the logistic models and the chi-square test to the impact of age category, level of education, years of experience and employment sector on employability of youths in Kenya and association between independent variable and dependent variables respectively.

### 4.2 Exploratory Data Analysis

The strip chart plot and bx plot is used to present employability, age category, years of experience, level of education data



Box plot of the variables



### 4.3 Normality test

We carryout Normality test to determine whether the data are normally distributed or not, the study will employ Shapiro-wilk test (Ghasemi and Zahedias, 2012) and Normality plot



From the figure above, we conclude that the data is not normally distributed hence justify why we apply generalized linear model instead of ordinary least square model.

#### 4.3.1 Shapiro Wilk's test

Table 1:Shapiro Wilk's test

Data type	W-value	p-value
employment status	0.976	0.003
age category	1.42	0.001
years of experience	1.2	0.043
level of education	0.85	0.512

At level of significance 5%, we can conclude from table1 above that the data is not normally distributed since p-values are less than 5% hence confirmatory from normality plot

#### 4.4 Generalized Linear Model

In this section, logistic model is fitted to data and the results is obtained as shown in the table 2 below

```
glm(formula= ~, family="binomial", data=db1a, subset=db1a$employment)

```

Deviance Residuals:

Min	1Q	Median	3Q	Max
2.627	-0.866	-0.639	1.149	2.079

Coefficients:

	Estimate	Std. Error	z	value	Pr> z
(Intercept)	-3.98998	1.13995	-3.50	0.00047	***
22-21	0.00226	0.00109	2.01	0.03847	*
28-32	0.80404	0.33182	2.43	0.01539	*
32 and above	0.70404	0.23182	3.04	0.01539	*
Year of exp	0.67544	0.31649	2.13	0.03283	*
secondary	1.34020	0.34531	3.88	0.00010	***
tertiary	1.55146	0.41783	3.71	0.00020	***
degree	2.5146	0.451783	-5.65	0.0000***	

Sigif. codes: 0'\*\*\*'0.001'\*\*\*'0.01'0.05'.0.1'1

(Dispersion parameter for binomial family taken to be 1)

Null deviance: 499.98 on 31979 a degrees of freedom Residual deviance:  
458.53 on 319788 degrees of freedom

AIC:470.5

Number of Fisher Scoring iterations:4

#### 4.4.1 Interpretation of logistic model result

##### Age category

Interpretation of results

The age variable is categorical variable with 4 categories. We notice that in the regression we have 3 categories and the age category 18-22 years as reference group.

Age 22-27

$\beta_1 = 0.00226$ ,  $\text{Exp}(0.0026) = 1.02$ . thus, the odds of being employed as a youth is 0.002 times that of being employed in the age category 18-22 years.

Age 28-32

$\beta_2 = 0.80404$ ,  $\text{exp}(0.80404) = 2.234$ , this implies that the odds of being employed as a youth in this age category 28-32 is 2.234 times being employed in the age category 18-22 years

Age 32 and above

$\beta_3 = 0.70404$   $\text{exp}(0.70404) = 2.023$ . this implies that the odds of being employed in the age category 32 and above is 2.023 times that of being employed in the age category of 18-22 years.

##### Years of Experience

$\beta_4 = 0.67544$   $\text{exp}(0.67544) = 1.965$ . holding other variables of age and academic qualification constant, the odds of being employed with each additional year in experience is 1.965.

##### Education

In the Education level, we have 4 categories which are primary, secondary, and tertiary and above. In our modelling, primary education is taken as the reference group.

Secondary

$\beta_5 = 1.34020$   $\text{exp}(1.34020) = 3.820$ . This implies that the odds of being employed as a youth with secondary education is 3.820 times as compared to those with primary education.

Tertiary

$\beta_6 = 1.55146$   $\text{exp}(1.55146) = 4.7184$ . This implies that the odds of being employed as a youth with tertiary education is 4.7184 times as compared to those with primary education.

Degree  $\beta_7 = 2.55146$   $\text{exp}(2.55146) = 12.8258$ . This implies that the odds of being employed as a youth with degree education and above is 12.8258 times as compared to those with primary education.

## 4.5 CHI-SQUARE TEST

In this section, the chi-square test was deployed to investigate whether there was association between the response variable and individual independent variables. In this section we use 5% to test the following hypotheses.

$H_{01}$ : there is association between employability and level of education

$H_{02}$ : there is association between employability and age category

The results obtained from chi-square test are presented in the table 2 below

Table 2: Pearson's chi-square test

Variable(s)	df	X-squared	p-value
employment status:age category	3	7161.4	$< 2.2e^{-16}$
employment status:level of education	3	1950	$< 2.2e^{-16}$

From the table 2 above, we conclude that there was association between employment status and age category and also with the level of education since the p-values  $< 0.001$

## 5 Conclusion and Recommendations

### 5.1 Conclusion

Unemployment rate has been high among new graduates and young people. Arguments from different sources have put blames mostly on unpreparedness of graduates, economies underperformance and educational skill development issues. This, however, does not statistically stand out in the analysis of conducted in the previous chapter.

The analyses have revealed that various aspects of youths have statistical relations in recruitment of employees. This is indicated with correlation between age categories, experience and education level of youths. This applies in most of the professional sectors in Kenya.

We know well that trainees are most of the time inexperienced graduates who have to undergo training. It may appear possible for employment sector to be sustained in short term by only using experienced employees with building the capacity of youth who are young, ambitious and energetic. Moreover, employees' productivity may be determined by experience and expertise gained through trainings.

The labor sectors thus ruthlessly act in favor of experienced people expecting higher output without serious consideration to youth who may sustain the labor force in the long run. Lastly, the fact that unemployment among youth is high does not imply that the graduates are not ambitious. There is need for policy direction and implementation towards energizing youth to identify specific areas in the workforce and build capacity towards it. This can include customization of skills to both formal and informal sectors and building of talents.

### 5.2 Recommendation

It is prudent that most employers focus on firms' productivity. While targeting experienced and highly skilled people and most youth do not fall in this category. If not careful, the knowledge and skills owned by the experienced leave the industry through natural processes. There is a need to build the skills, expertise and ethics of the youth by the experienced and specialized training sessions so as to enhance their employability. This can also ensure that the skills gained from the team trained previously can be transmitted to young people in the youth category.



As companies and the government create opportunities for experienced to maximize efficiency while minimizing training period, they should consider the reality in long term. It would be better if they also create rooms for youth. This will be of essence for smooth flow and transition of labor force and sustainability. To reduce unemployment, they should be planning about how the youths and new graduates will be absorbed in the labor force; whether directly or indirectly. Counting numbers of skilled jobless is not the solution to joblessness but clarifying existence of a problem; shortage of jobs.

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