Assessment of factors influencing youth employment in Rwanda cross sectional analysis

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The present study has examined the determinants of youth employment in Rwanda by using the data collected in August 2018 RLFS by national institute of statistics of Rwanda. Both binary and multinomial logistic regression analysis were used in this study. The results revealed that youth mobility and living in household owned a computer were both positively associated with youth employment while being a female and attending TVET were negatively associated with youth employment. We have initiated multinomial model for examining the factors influencing the choice of youth employment to a particular economic sector. The study found that gender, computer literacy, English proficiency, TVET, Residence, access to internet, owning a computer and access to electricity were both associated to the choice of youth employment to a particular economic sector in Rwanda. Therefore, there is still a need of creating more jobs, motivating youth to work without neglecting any available jobs on labor market and improving Rwandan youth skills and knowledge about how to use modern technology as opportunity for self-employments.

INTRODUCTION: Youth face many obstacles to reach the labor market; mostly they straggle because of insecure working conditions. This conditions do not enable them to achieve their full potential in life, do not allow them to integrate fully in society and to enjoy, to the full extent, their basic human right (European Youth Forum, 2013). Young people are more likely to be unemployed compared to the adult. The ratio of youth to adult unemployment rates has changed globally very little in recent years, which pushing to provide the particularly unfavorable situation of young people in the labour market (ILO, 2017). In 2017, There was expectation of youth unemployment rate to rise slightly globally, by reaching 13.1 per cent, although the expected 70.9 million young unemployed was well below the crisis peak of 76.7 million in 2009. In Latin America and the Caribbean, the youth unemployment rate is expected to continue increasing, while they expected improvement in youth unemployment for European countries, both trends being present since 2013. In sub-Saharan Africa, Youth unemployment rates are likely to persist, and Eastern and Southern Asia. They will increase slightly in other parts of Asia and the Pacific and Northern America while falling slightly in Northern Africa and the Arab States. While Northern Africa remain the region with the highest youth unemployment rate which estimated to be 30.0 per cent in 2017(ILO, 2017) Youth in Africa have many obstacles to get secured employment. Every year, about 10 to 12 million of young people, both men and women in Sub-Sahara Africa enter the labor market. As they present a large number of the labour force participants, they have low skills based to what required by the employers. Because of lacking formal job, young Africans are mostly employed in informal economy. Youth employment are mostly discussed by research institutes and presented on the agenda at African conferences and seminars (Filmer & Fox, 2014).

Overall, unemployment among East African youth was highest among rural women (62-66%), with the exception of Tanzania, where unemployment among urban women was higher compared to rural women. Unemployment was highest (76-83%) among youth aged 18-20. Moreover, their participation in self-employment was also very low (7-10%). Employment among youth with university education was ranging between 28-38% Unemployment rates tend to be higher among the educated compared with the uneducated youth (Awiti & Scott, 2016).

In Rwanda, unemployment rate was 16.7% in 2017, meaning that among six labor force participants, one of them was unemployed. It was higher among women with 17.5% than among men with 16.1% and higher among young people with 21.0% than among adults with 13.3%. By considering location, unemployment rate was higher in the urban regions with 18.1% than in the rural regions with 16.2%(NISR, 2017). Our study seeks to examine the determinants of youth employment in Rwanda and provide the possible solutions for youth employment. It provided the information on the determinants of youth employment, which is crucial to the government and policy maker for filling the policy gaps relating to labor market in Rwanda for addressing the issue of youth unemployment. The Findings of the study are also crucial to the employers and other labor market players, for understanding the source of persisting unemployment rate in Rwanda. On the other side, it provided the information to the youth themselves in Rwanda

to understand factors that influence employment. The study also adds to the literature by filling the knowledge gaps on the roots of youth employment and how the problem related to the unemployment can possibly be addressed in the country. The Government of Rwanda has initiated different interventions related to business support services, access to finance and human capital development (such as BDF, Business advisory services, startup tool kits, TVET etc.). For supporting youth to enter the labor market but unemployment rate persists(MINICOM, 2013). Most previous studies find that several factors may be behind the increase in youth unemployment rates. However, several studies have associated the youth employment by location, age, family income, gender etc..., but they ignored languages proficiency, computer skills, and access to electricity, internet penetration, disability and youth mobility to be the most factors related to youth employment. These variables have a potential effect on working conditions and environment. Additionally; in Rwanda, most previous researchers have been using EICV data, This study has been introduced both binary and multinomial logistic regression to examine at which extent the new variables (languages proficiency, access to electricity, internet and mobile phone etc.) influencing youth employment and their choice for particular economic sector (Agriculture, Industry and Services) in Rwanda under new employment definitions by ILO.

OBJECTIVES: The study aims to establish the key determinants of youth employment in Rwanda, assess the factors influencing youths' choice of employment within specific economic sectors, and propose practical measures to address the challenges affecting youth employment in the country.

MATERIALS AND METHODS: Our analysis draws data from Rwanda Labour force Survey (RLFS) carried out in whole country by National institute of statistics (NISR). This survey conducted in August 2018. Generally, RLFS was conducted twice per year (February and August) from 2016 to 2018 and 4 times per year from 2019. The scope of this survey covered all persons living in private households, except the population living permanently in places such as hostels, health resorts, correctional establishments etc., as well as persons living at their work-sites and in seasonal dwellings.

Area of Study, study population and sample design: The survey is nationwide covering the whole districts of Rwanda. This study is based on sample for the August, 2018 RLFS The aim of the survey is to collect data on the structure and trends of labour force, employment and unemployment as well as other needed labour market statistics for the implementation and evaluation of economic and social policies related to employment creation, income generation, skills development, and related decent work policies. The data collected in this survey covered all persons living in private households, except the persons who residing permanently in places such as hostels, health resorts, correctional establishments etc., as well as persons living at their work-sites and in seasonal dwellings. The study employed a rotation sampling scheme with a sample size of 9,344 households per round, selected by means of a stratified two-stage probability design based on information from the 2012 Population and Housing Census; This information was restructured at the second stage of sampling with fresh listing of new enumeration areas. The resulting estimates of the main labour force indicators at the national level have standard errors of about 0.6

percent (NISR, 2018). In this study, we have selected only youth who are aged between 16 and 30 age from RLFS, which took place in August 2018, then we had a sample size of 10,770youth. Among selected youth, there were 5,108 males and 5.662 females. Researcher did not do any other sampling methods since it has done by National Institute of Statistic of Rwanda. Results was accepted at the 95% confidence level. The full regression model was also tested for goodness of fit or the coefficients of the logistic model were estimated by the method of maximum likelihood. The null hypothesis under the goodness of fit is that the model is a good fit, implying that probabilities greater than 0.05 using the 95% level of confidence was taken to be a good fit. The researcher also investigated the correlations between the study's variables to check for co-linearity.

The general equation for binary logistic model is presented in the following equation: The binary logistic regression model has been employed because the dependent variable (During the last 7 days, did (NAME) do any work for wage, salary, commissions, tips or any other pay, in cash or in kind, even if only for one hour? (Including paid internees) is binary in nature, means that it has two levels yes for employed youth and no for unemployed youth. Also this model have been used in analysis of generational progress of ethnic minorities in Britain by analyzing four labor market outcomes: economic inactivity, unemployment, access to salaried jobs and self-employment(Cheung, 2015)

$$\log it\,(p) = \log(\frac{p}{1-p}) = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \ldots\ldots + \beta_n X_n$$

Where logit (p) is the log of the odds $(\frac{1}{1-p})$

This can also be expressed in terms of probability, P, as

Our model became $Z = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \ldots\ldots + \beta_{10} X_{10} + \varepsilon$

Z represent employment status, which is the outcome dummy variable indicating whether the individual has a job, or not. Youth language proficiency(X_1) used in this model to estimate the contribution of proficiency in languages as it has not used in previous studies in Rwanda, We considered also owning or living in the household with mobile phone (X_2) to estimates effect of mobile phone on employment, owning a computer(X_3) has been used to estimate the contribution of computer on employment, access the internet at household level(X_4) used to verify if there is a relationship between internet and youth employment, youth mobility(X_5) used to see if a youth who moves more have a high probability of being employed, access to electricity(X_6) used to capture the effect of basic infrastructure on youth employment, TVET or trade course(X_7) used to measure the effect of youth capacity building on their employment, disability status(X_8) used to estimate the effect of disability on youth employment in the country, natural characteristics including geographical location(X_9), we controlled for location to capture locational heterogeneity in employment status among the youth, gender(X_{10}) used to captured any gender gap in the labor market. The error term (ε) is appended to capture any measurement error in the employment status and left out variables.

$$P(Y=1/Z) = \frac{\exp(\beta_0 + \beta_1 X_1 + \ldots + \beta_{10} X_{10})}{1 + \exp(\beta_0 + \beta_1 X_1 + \ldots + \beta_{10} X_{10})} \quad \textbf{Or}$$

$$P(Y=1/Z) = \frac{e^z}{1-e^z} \text{ when youth is employed}$$

$$P(Y=0/Z) = 1 - \frac{1}{1-e^z} \text{ When youth is not employed}$$

P denotes the probability of a youth who are working for salary in Economic activities (employed youth) and 1- p is the probability of a youth who are not working (unemployed youth).

β_0 is the intercept term while β_1, β_2, β_3 ..., β_n are the regression coefficients of the explanatory variables X_1, X_2, X_3... X_{10}, respectively.

Multinomial model: To find out the factors that are associated with the choice of youth employment to a particular economic sector. Our dependent variable have four categories, which are agriculture, industry, services and including those youth who are unemployed used as reference group. We initiated the same covariates as that used for binary logistic regression model. The following model describe the empirical model that used for this analysis.

$$\text{Main}_{sector} = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \beta_7 X_7 + \beta_8 X_8 + \beta_9 X_9 + \beta_{10} X_{10} + \varepsilon_i$$

The main source of data on the determinants of youth employment in Rwanda is the

National Institute of Statistics in Rwanda (NISR). We used the STATA 15.0 software for data analysis.

RESULTS: The figure 2 depicts the key diagnostic features that are used in the identification of the snake *P. mucosa*. In the figure as labeled (a) the figure depicts by labeling the key morphological characters of the P. mucosa's head. The characters depicted include prenasal, postnasal, preocular, eyeball, supraocular, postocular, supra labials and infralabials with in the snake's head, (b) is referring to the ventral scutes that stretch across the abdomen, (c) is depicting the broad rostral, its concave projection and deep groove below, (d) is showing the symmetrical scales on the head of the snake, (e) is depicting the large spherical eye pupil and the pointed rostral, (f) showing that the scales on the dorsal side of the sanke are smooth, (g) is showing that the subcaudals of this snake is divided, (h) is showing dorsal side and (i) is showing ventral side of *P. mucosa*.

RESULTS AND DISCUSSION

This chapter contain descriptive and inferential analysis; we started by presenting data descriptively and graphically to have general summary characteristics of youth employment in Rwanda. We have used the cross tabulation and graph to compare youth characteristics and other employment characteristics. Then we used Chi-square test to check if there was an association between dependent variable and independent variables. We included the associated variables from bivariate analysis in the model by using both binary and multinomial logistic regression. The output interpreted for only significant variables in the model by using odd ratio. For all categorical variables, the comparison has been made by using referencing system for better analysis and data interpretations.

The table 1 illustrates the distribution of youths (16-30 years old) during Rwanda Labor Force Survey conducted in February 2018. It is clear that majority of Rwandan youths aged between 16 and 30 years old were female 52.6% while male were only 47.4%. From the same table, we saw that employed youth aged between 16 and 30 years old were 45.7%; unemployed youths were 10.9% while youth who are out of labor force was 43.4%. This shows that unemployment rate among youth is very high. Looking at the distribution of youth according to provinces and/or Kigali city is also important as it highlights the dominant provinces in youth distribution. According to the information displayed in table 1 above, Kigali City is very dominant in having many youth (45%), Eastern Province with 14.4%, Western Province at the third place with 16.8%, Southern Province with 13.5% and Northern Province with 10.3%. According to Rwanda Labor Force Survey (2018), it is clear that the majority of youth 46.6% had primary education while 20.3% of youth aged between 16 and 30 years old had upper secondary education. 19.8% of youth aged between 16 and 30 years old were lower secondary educated, 10.7% of youth were tertiary educated, and 2.5% were illiterate, only 0.0% of youth had pre-primary education.

By looking on the figure 1, the female youth are more employed in Agriculture than male while 56.23% of female are working in agriculture activities. Also there is inequality in employment in industry while only 24.52% of female are employed in industry and 75.48% are young male. The same case in services, there are a shortage of young female and are 47.44% while 52.56% are young male employed in services. Actually young females are still concentrating in agriculture more than in other sector.

By using labor force status, males are more employed than female and female are high out of labour force. By looking on the table above male who are employed are 54.6% and female are 45.4%. For youth who are unemployed, males are 43.8% and 56.2% are female. Among the youth who are out of labour force, females are 59.2% and 40.8% are male who are out of labour force.

By using the figure 2, we are able to identify where most of youth are employed. 91.15% of employed youth are working in informal sector, only 7.65% of youth are employed in formal sector and 1.20% of youth they don't know whether they are working in formal or informal employment.

| Variables	Response category	Frequency	Percent
Sex	Male	5108	47.4%
	Female	5662	52.6%
	Total	**10770**	**100.0%**
Labour force status with 16+	Employed	4917	45.7%
	Unemployed	1176	10.9%
	out of labour force	4677	43.4%
	Total	**10770**	**100.0%**
Province	Kigali city	4848	45.0%
	Southern Province	1450	13.5%
	Western Province	1814	16.8%
	Northern Province	1109	10.3%
	Eastern Province	1549	14.4%
	Total	**10770**	**100.0%**
Location	Urban	4336	40.3%
	Rural	6434	59.7%
	Total	**10770**	**100.0%**
What is the Highest educational level you are attending / attended?	None	270	2.5%
	Pre-primary	4	0.0%
	Primary education	5024	46.6%
	Lower secondary education	2129	19.8%
	Upper secondary education	2190	20.3%
	Tertiary education	1153	10.7%
	Total	**10770**	**100.0%**

Table 1: Summary statistics about youth distribution in Rwanda.
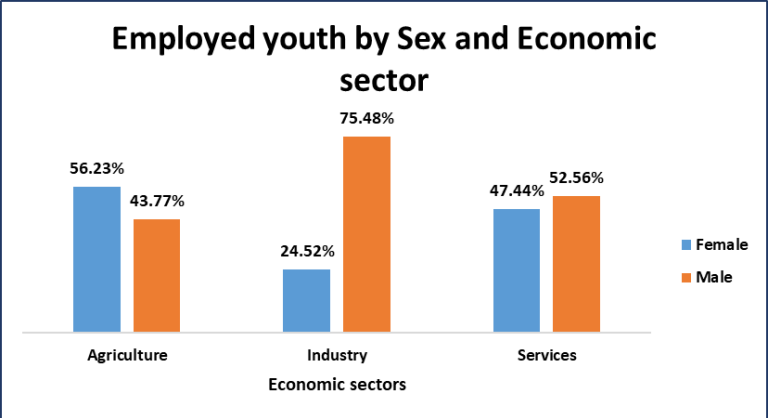
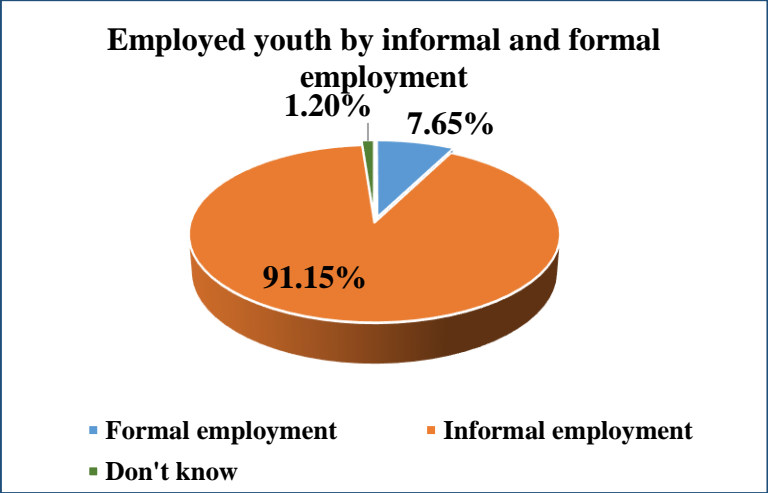Figure 1: Employed youth by sex and economic sector.

Figure 2: Distribution of employed youth by informal and formal employment

	Sex	
Labour force status	**Male (%)**	**Female (%)**
Employed	2685 (54.60)	2232 (45.40)
Unemployed	515 (43.8)	661(56.2)
Out of labour force	1908 (40.8)	2769(59.2)
Total	5108 (47.42)	5662(52.25)

Table 2: Labour Force status among youth.

By comparing sex to the employment status, the males are more employed in formal employment while male are 55.8% and 44.2% are female. In informal employment also male are more than female where 54.5% are male and 45.5% are female (table 3).

Formal and Informal employment for main job	Sex	
	Male (%)	Female (%)
Formal employment	210(55.8)	166(44.2)
Informal employment	2442(54.5)	2040(45.5)
Don't know	33(55.9)	26(44.1)

Table 3: Employed youth by sex and employment status.

The table 4 is indicating employed youth by institutions, statistics shows that 75.57% of all employed youth are working in private/VUP. 19.02% of employed youth are working in household activities (including Maid etc). 3.84% are employed in public institution/enterprise. While the remaining institutions including Mixed public and private enterprise, International/ Local NGO, Religious organizations, Cooperatives and Others has employed youth at percentage which is less than 1%.

Institutions	Freq.	Percent
Public institution/enterprise	189	3.84
Mixed public and private enterprise	25	0.51
Private/VUP	3716	75.57
International NGO/International organization	17	0.35
Local NGO/Religious organization	11	0.22
Cooperative	22	0.45
Household	935	19.02
Others	2	0.04

Table 4: Employed youth by Institutions.

The table 5 showed that, 71.6% of employed youth are employee, 22.82% are employed as own account workers/self-employment. 4.49% are working as contributing family workers, 0.20% are working as paid apprentice/intern. 0.75% are working as employers, and 0.14% working as member of cooperative.

Employment classification	Freq.	Percent
Employee	3520	71.60
Paid apprentice/Intern	10	0.20
Employer (with regular employees)	37	0.75
Own account worker(without regular employees)	1122	22.82
Member of cooperative	7	0.14
Contributing family worker	221	4.49

Table 5: Employed youth by employment classification.

Among employed youth, 56.50% of youth reported that their jobs don't require any level of education to do it. 17.14% of youth reported that their jobs require a primary education level to do it. 9.52% of employed youth reported that their jobs require vocational training to carry it out. 5.76% of employed youth reported that their jobs require tertiary education to carry it out. 3.05% of employed youth reported that their jobs require a lower secondary education level to carry it out. 7.89% of employed youth reported that their jobs require upper secondary education level and 0.14% of employed youth reported that their jobs require pre-primary educational level (table 6).

What do you think could be the minimum level of education to carry out your current job?	Freq.	Percent
None	2778	56.50
Pre-primary education	7	0.14
Primary education	843	17.14
Â Vocational training	468	9.52
Â Lower secondary education	150	3.05
Upper secondary education	388	7.89
Tertiary education	283	5.76

Table 6: Minimum education level required to carry out their job.

Among none educated youth, 85.3% are employed and 14.7% are not employed. For the youth with primary education, 14.6% are not employed while 85.4% are employed. By comparing youth with lower secondary education, 19.1% are not employed and 80.9% are employed. Among youth with upper secondary education, 34% are not employed and 66% are employed. Youth with tertiary education has low level of employment while 80.7% are employed and 26% are not employed (table 7).

The Highest educational level attended	Employed (%)	Unemployed (%)
None	1915 (85.3)	331 (14.7)
Primary education	1495(85.4)	256(14.6)
Lower secondary education	454(80.9)	107 (19.1)
Upper secondary education	683(66)	352(34)
Tertiary education	370(74)	130(26)
Total	4917(80.7)	1176(19.3)

Table 7: Employment by education.

This part of data analysis, used to find out the association between dependent variable and covariates by using chi-square test. The significance level is 95%. The p.value, which is less than 5% indicating the significance of the association between them and the covariate selected to be used in final model have the p.value less than 5%. The covariates, which are not statistically significant were not used in the final model (table 8).

Covariates		Employment status					
		Employed		Unemployed		Total	
		n	%	n	%	N	
Gender	Male	2685	83.9%	515	16.1%	3200	
	Female	2232	77.2%	661	22.8%	2893	0.000
Having trade and technical vocational course (TVET)	Yes	832	77.2%	246	22.8%	1078	
	No	3980	81.7%	891	18.3%	4871	0.001
Residence	Urban	2200	80.0%	550	20.0%	2750	
	Rural	2717	81.3%	626	18.7%	3343	0.210
Disability	No	4890	80.7%	1168	19.3%	6058	
	Yes	27	77.1%	8	22.9%	35	0.593
level of using Computer	Very well	184	77.6%	53	22.4%	237	
	Well	534	66.8%	266	33.3%	800	
	Less	639	74.1%	223	25.9%	862	
	Don't know	3560	84.9%	634	15.1%	4194	0.000
Level of speaking English	Very good	155	78.7%	42	21.3%	197	
	Good	661	68.9%	298	31.1%	959	
	Fair	1110	77.7%	319	22.3%	1429	
	Don't Know	2991	85.3%	517	14.7%	3508	0.000
Level of speaking French	Very good	58	80.6%	14	19.4%	72	
	Good	327	71.6%	130	28.4%	457	
	Fair	794	73.4%	288	26.6%	1082	
	Don't Know	3738	83.4%	744	16.6%	4482	0.000
Level of speaking Swahili	Very good	72	82.8%	15	17.2%	87	
	Good	206	74.9%	69	25.1%	275	
	Fair	575	72.3%	220	27.7%	795	
	Don't Know	4064	82.3%	872	17.7%	4936	0.000
Has usual place of residence always been in this district?	Yes	2754	82.0%	605	18.0%	3359	
	No	2163	79.1%	571	20.9%	2734	0.005
Living in household that own Computer and accessories	Yes	844	83.5%	167	16.5%	1011	
	No	4073	80.1%	1009	19.9%	5082	0.014
living in household that own Mobile phone	Yes	4215	80.5%	1021	19.5%	5236	
	No	702	81.9%	155	18.1%	857	0.331
Living in household that own internet connection	Yes	1854	81.1%	431	18.9%	2285	
	No	3063	80.4%	745	19.6%	3808	0.502
Living in household own/accessing to electricity	No	1996	81.2	462	18.8	2458	
	Yes	2921	80.36	714	19.64	3635	0.411

Table 8: Association between social-economic characteristics and youth employment.

Employment has different determinants, the table above, illustrates different determinants of employment considered in our study which are: gender, having trade and technical vocational course (TVET), place of residence (Urban and rural), Disability, level of using computer, Level of speaking English, level of speaking French, level of speaking Swahili, owning computer and accessories, access to internet connection, and access to electricity. The association between employment and its determinant is justified by P-values which are equal to 0.000. The table above shows that 83.9% of male

youth were employed while 16.1% of female were employed (p-value= 0.000). It is clear that gender is associated with employment as there is a significant association between gender and employment indicated by its p-value. Having attended the trade and technical vocational course (TVET) is associated with employment too. Having a look at table 2 above, we see that 77.2% of youth who had attended trade and technical vocation course are employed while 81.7% youth who had not attended TVET are employed. The significant association between employment and TVET is approved by its p-value (P-value= 0.001). Looking on the side of residence; a youth like other person can live in rural or urban areas, this is not also significantly associated with employment as its p-value approves (p-value= 0.210). The researcher also examined the association between employment and disability; the study revealed that there is no a significant association between disability and employment as p-value indicates (p-value=0.593). Nowadays the world is dominated by information and communication technology (ICT) where every individual is called to attend same ICT trainings as world is governed by technologies. These trainings include computer literacy especially for youth. The study proved that there is a significant association between employment and level of using computer (computer literacy) as approve by p- value (P-value=0.000). The statistics show that 77.6% of youth who knew computer very well were employed, 66.8% of those who use well computer were employed, 74.1% of those who knew computer at low level were employed and finally 84.9% of those who do not know to use computer were employed. Having knowledge on international languages is also a key to employment. The international languages considered in this study are English, French and Swahili. The level of speaking each of these three languages has a significant association between language and employment as approve by p-value on English, French, and Swahili (p-value=0.000). The statistics show that 78.7% of those who are very good in English were employed, 68.9% who are goo in English were employed, 77.7% of those who are fair in English were employed and 85.3% of those who don't know English were employed. On the side of French, for those who are very good in French 80.6% of them are employed, 71.6% of those who are good in French were employed, 73.4% of those who are fair in French were employed, and 83.4% of those who don't know French were employed. On the side of Swahili, 82.8% of those who are very good in Swahili were employed, 74.9% of those who are good in Swahili were employed, 72.3% of those who are fair in Swahili were employed and 82.3% of those who don't speak English were employed. Owning computer and accessories determines how everyone can search for new job openings and get informed about job requirements. The study reveals that there is a significant association between employment and owning computer and accessories as its p-value approves (p-value=0.014). The findings reveal that 83.5% of those owning computer were employed or self-employed while 80.1% of those who do not have computer were employed. Having access to internet connection is not associated with employment as p-value affirmed (P-value=0.502). Having access to electricity is not also associated to employment as it is approved by p-value, (p-value =0.411).

The table 9 contained the chi-square test results; we have computed this bivariate analysis to identify the relationship between economic sectors as a particular choice for youth and social-economic characteristics. This analysis helped us to identify also the variables to include in multivariate analysis by using multinomial logistic regression. By looking on the results, all variables were selected since the p-value=0.000 which is less than 5%. Means that there is a significant relationship between selected covariates and economic sector. However, we identified that there is a relationship, it is not enough, and the next step was to estimate the degree of the available relationship by using multinomial logistic regression.

Multivariate analysis: This section contains the analysis for only variables that were statistically significant (p-value<0.05) during bivariate analysis, all significant variables was combined in one model to estimate the final estimation of odd ratios among youth employment factors.

This part including two sub-part which are binary logistic regression analysis which used to identify the factors of youth employment and multinomial logistic regression which used to determine the factors of youth choice for economic sector to work with.

social-economic characteristics	Economic sector	

		Jobless	Agriculture	Industry	Services	Total	P.value
		n	n	n	n	n	
Sex	Male	515	513	671	1501	3200	
	Female	661	659	218	1355	2893	0.000
Did you learn any Trade or Technical vocational course (TVET)?	Yes	246	91	290	451	1078	
	No	891	1072	564	2344	4871	0.000
person with disability	No	1168	1160	882	2848	6058	
	Yes	8	12	7	8	35	0.024
At what level could you use of computer?	Very well	53	5	25	154	237	
	Well	266	14	82	438	800	
	Less	223	59	141	439	862	
	Don't know	634	1094	641	1825	4194	0.000
At what level could (Name) speak English	Very good	42	3	19	133	197	
	Good	298	29	113	519	959	
	Fair	319	191	238	681	1429	
	Don't Know	517	949	519	1523	3508	0.000
At what level could (Name) speak French	Very good	14	0	10	48	72	0.000
	Good	130	11	46	270	457	
	Fair	288	80	149	565	1082	
	Don't Know	744	1081	684	1973	4482	
At what level could (Name) speak Swahili	Very good	15	2	12	58	87	0.000
	Good	69	11	42	153	275	
	Fair	220	55	105	415	795	
	Don't Know	872	1104	730	2230	4936	
Has usual place of residence always been in this district?	Yes	605	323	417	2014	3359	0.000
	No	571	849	472	842	2734	
Living in household that own Computer and accessories	Yes	167	12	56	776	1011	0.000
	No	1009	1160	833	2080	5082	
living in household that own Mobile phone	Yes	1021	783	738	2694	5236	0.000
	No	155	389	151	162	857	
Living in household that own internet connection	Yes	431	54	208	1592	2285	0.000
	No	745	1118	681	1264	3808	
Living in household own/accessing to electricity	No	462	994	432	570	2458	0.000
	Yes	714	178	457	2286	3635	
	Total	**1176**	**1172**	**889**	**2856**	**6093**	

Table 9: The relationship between economic sector and social-economic characteristics.

Determinants of youth employment in Rwanda: In this analysis, we have used binary logistic regression, to estimate the coefficients and odd ratios to identify the factors related to youth employment in Rwanda. The command logit was used to estimate the coefficients of independent variables while logistic command was used to estimate the unique effect of each determinant on employment. Dependent variable coded in the following way: yes=1 if a youth is employed and No=0 if a youth is not employed. We have also using referencing groups for categorical variables the command ib# has been introduced to identify which level must be considered as reference. In addition, in the following table the reference groups are written in bracket.

Based on binary logistic model results, the outcomes of the model identified the determinants of the employment in Rwanda and it contribution to the employment. The interpretation of the findings is formulated in the following way: The model results indicate that the iteration log show how quickly the model converged. The log likelihood in the model is (-2841.9825) can be used in comparison to nested models; The likelihood ratio Chi-square of 293.95 with a p-value < 0.000 tells us that our model as a whole fits significantly better than an empty model (that is, a model with no predictors); Based on the model output, we have enough evidence to confirm that the model is in line with expectations: that employment among youth is determined by Gender, youth mobility computer literacy, attending TVET course and living in household that owns a computer. The odd ratio 0.59[95% Cl: 0.521-0.680] of being employed for a female is less 41% than that of Male, means that the female has less chance of being employed compared to Male. The odd ratio 0.78[95%Cl: 0.667-0.917] of being employed for the youth without any trade or TVET course is more 22% than that of youth with trade or TVET courses. Simply this indicating that the youth who have never attended trade or TVETs courses are more likely to be employed. Computer literacy is among the significant determinants of youth employment, the odd ratio for those who know very well computer is 0.43 [95%Cl: 0.267-0.708]. For those who know computer well is 0.34 [95%Cl: 0.249-0.478].and for those who know less computer is 0.57[95%Cl: 0.445-0.722]. All those level of computer skills are negatively related with employment. The odd ratio of being employed for youth who knows very well computer is less 57% than that of youth who doesn't know to use computer, for those who knows computer well is less 66% than that of youth who doesn't know to use computer and for who knows less computer is less 43% than that who doesn't know. By looking on youth mobility from their districts of origin, the odd ratio for those who have moved is 1.32[95%Cl: 1.151-1.512]. The odd ratio of being employed for the youth who have moved from their districts of origin is more 32% than those who have never moved from their district of origin. This means that the youth who have ever moved have a high chance of being employed. Contrary to the computer literacy, to own computer is positively related to the employment, the odd ratio is 0.55[95%Cl: 0.449-0.677]. The odd ratio of being employed for youth who doesn't own a computer is less 45% than that of youth who own a computer. Means that the youth who doesn't own a computer have less chance of being employed.

Determinants influencing choice of youth employment to a particular economic sector in Rwanda: We have included this section, to determine the factors influencing a youth employment to a particular economic sector. We have set unemployed youth as base outcome, means that the relative probability for economic sector have compared to unemployed youth. Based on the model results (table 10), we have enough evidence to conclude that the outcomes of the model and the conclusions about youth's choice are concerned by: Since the prob.(chi2) is <0.0000, would lead us to conclude that at least one of the regression coefficients in the model is not equal to zero. This indicating that our model fit better than an empty model. We have enough evidence to confirm that the determinants that affect the youth's choice about economic sector in Rwanda including sex, residence, language proficiency, learning TVET and trade course access to electricity, internet penetration and mobile phone, disability, and computer literacy. The multinomial logit for females relative to males is 1.37 unit less for being employed in industry than being jobless, if other variables in the model are held constant. In other words, females are less likely than males to be employed in industry.

Covariates	Odds Ratio	Std. Err.	T.test	P. Value	[95% C.I]	
Gender[Male]						
Female	0.595555	0.040381	-7.64	**0.000**	0.521443	0.680201
TVET[Not Attended]						
Attended TVT	0.782026	0.063538	-3.03	**0.002**	0.666903	0.917023
Level of Speaking English[Don't know]						
Very good	0.963952	0.256229	-0.14	0.89	0.572528	1.622984
Good	0.78697	0.130911	-1.44	0.15	0.568018	1.09032
Fair	0.851898	0.090257	-1.51	0.13	0.692156	1.048506
Level of Speaking French[Don't know]						
Very good	1.146626	0.412042	0.38	0.703	0.566945	2.319011
Good	0.99006	0.150119	-0.07	0.947	0.735524	1.332681
Fair	0.998991	0.105711	-0.01	0.992	0.811875	1.229233
Level of Speaking Swahili[Don't know]						
Very good	1.528969	0.476054	1.36	0.173	0.830562	2.814656
Good	1.037449	0.165992	0.23	0.818	0.758184	1.419577
Fair	0.868755	0.0892	-1.37	0.171	0.710394	1.062418
Ever moving from his/her district of origin[No]						
Yes	1.319252	0.091707	3.99	**0.000**	1.151216	1.511816
Level of using computer[Don't know]						
Very well	0.434983	0.108137	-3.35	**0.001**	0.267217	0.708077
Well	0.345679	0.057209	-6.42	**0.000**	0.24992	0.47813
Less	0.566787	0.070067	-4.59	**0.000**	0.444829	0.722182
Living in the household owning a computer[Yes]						
No	0.551405	0.05782	-5.68	**0.000**	0.448968	0.677215
Cons	12.16103	1.526876	19.9	0.000	9.508191	15.55402

Table 10: Binary logistic regression results.

	Agriculture			Industry			Services		
	Base outcome(unemployed)								
Covariates	Coef.	T-test	P-Value	Coef.	T-test	P-Value	Coef.	T-test	P-Value
Female	0.132	1.44	0.15	-1.37	-13.7	0.000	-0.5	-7.28	0.000
disable	0.047	0.09	0.93	0.24	0.44	0.662	-0.8	-1.54	0.12
TVET	-0.79	-5.52	0.000	0.62	5.74	0.000	-0.5	-5.14	0.000
Rural	1.781	10	0.000	0.35	2.87	0.004	-0.3	-3.45	0.000
Own computer	0.126	0.36	0.72	-0.26	-1.37	0.169	0.55	4.79	0.000
internet	-0.47	-2.46	0.01	-0.07	-0.54	0.588	0.63	6.39	0.000
know computer	-0.76	-5.14	0.000	-0.36	-3.46	0.001	-0.5	-5.93	0.000
English	-0.21	-1.74	0.08	-0.07	-0.64	0.525	-0.2	-2.58	0.01
French	-0.23	-1.49	0.14	0.01	0.1	0.922	0.06	0.81	0.42
Swahili	0.142	1.06	0.29	0.03	0.36	0.721	-0	-0.49	0.63
Mobile phone	-0.11	-0.9	0.37	-0.06	-0.4	0.688	0.5	3.8	0.000
Electric	-0.83	-6.65	0.000	0.16	1.27	0.203	0.66	6.39	0.000
Constant	0.401	1.53	0.13	0.51	2.5	0.012	1.19	6.99	0.000

Table 11: Multinomial logistic regression results.

Prob. > chi2 = 0.0000, Log likelihood = -6299.8968, Number of obs.= 6093, LR chi2(36)=2883.59.

This the same case for being employed in services, while the multinomial logit for females relative to males is 0.5 unit less for being employed in services than being jobless. Indicating that female are less likely to be employed in services compared to male. The multinomial logit for youth with training in TVET relative to youth with no TVET training is 0.62 unit high for being employed in industry than being jobless, given all other predictor variables in the model are held constant. In other words, youth with TVET training are more likely to be employed in industry. However, it is not the same case in services sector while relative log odd of being employed in services decreased by 0.5 unit for youth who took TVET related courses. The multinomial logit for residing in rural relative to urban is 0.3 unit less for being employed in services than being jobless, by held other variables in model constant. In other words, youth who reside in rural area are less likely than youth in urban to be employed in services. However, the relative log odds for being employed in both industry and agriculture increase respectively by 0.35 and 1.78 unit than being jobless. Means that youth who reside in rural area are more likely to be employed in industry and agriculture sector than those who reside in urban. The multinomial logit for youth from the household owned a computer relative to youth from non-owned computer household is 0.55 unit higher for being employed in services than being jobless, by held other variables in model constant. Means that youth who come from household owned a computer are more likely to be employed in services sector than those who come from non-owned computer household. The multinomial logit for accessing internet to non-internet access is 0.55 unit higher for being employed in services than being jobless by held other variables in model constant. In other words, youth who lives in household accessing to internet are more likely to be employed in services than youth who lives in household without internet. However, the relative log odds for being employed in both industry and agriculture decreased respectively by 0.07 and 0.47 unit than being jobless. Means that youth who come from the household with access to the internet are less likely to be employed in industry and agriculture sector. One unit of increase in computer skills decreasing the relative log odds by 0.5 unit for being employed in services than being jobless, by held other variables in model constant. In other words, youth who has a high level of computer literacy are less likely than youth with low level of computer literacy to be employed in services. This is the same case for being employed in industry and agriculture while the relative log

odds for being employed in both industry and agriculture decreasing respectively by 0.36 and 0.76 unit than being jobless. Means that youth who has a high level of computer literacy are less likely to be employed in industry and agriculture sector than those who has low level. One unit of increase in English proficiency decreasing the relative log odds by 0.2 unit for being employed in services than being jobless, by held other variables in model constant. In other words, youth who has a high level of English proficiency are less likely than youth with low level of English proficiency to be employed in services. This is the same case for being employed in agriculture while the relative log odds for being employed in agriculture decreasing by 0.21 unit than being jobless. Means that youth who has a high level of English proficiency are less likely to be employed in agriculture sector than those who has low level of speaking English. The multinomial logit for youth who come from household own a mobile phone to youth is 0.5 unit higher for being employed in services than being jobless, given all other predictor variables in the model are held constant. In other words, youth who come from household owned a mobile phone are more likely to be employed in services than youth who lives in household without phone.

The multinomial logit for accessing electricity to non-electricity access is 0.66 unit higher for being employed in services than being jobless, by held other variables in model constant. In other words, youth who lives in household accessing to electricity are more likely to be employed in services than youth who lives in household without electricity. However, the relative log odds for being employed in agriculture decreased by 0.83 unit than being jobless. Means that youth who come from the household with electricity are less likely to be employed in agriculture sector.

The studies done by joseph in 2018, about the determinants of youth employment in Rwanda by using multinomial regression model found that youth employment in Rwanda is determined by gender, age, education and geographical location(Ndagijimana, Nzasingizimana, & Heshmati, 2018). This was the same results to what Robert et al. found in 2013. They also have been used multinomial logistic regression. then study found that gender, geographical location, education, skills and marital status are all significant factors in explaining the difference in youth employment status in Tanzania(Msigwa & Kipesha, 2013). On the other side, Shita in 2018, conducted a research to identify and examine the demographic and socio-economic determinants of urban youth unemployment in East Gojjam Zone of Amhara Region, Ethiopia. He used primary data from 397 sample urban youths and logit model was employed to analyze the data. The study found that age, work experience, skill match, social network and family prosperity have significant negative relationship to urban youth unemployment. However education and migration status have significant positive relationship with unemployment (Shita, 2018). Riza conducted a study in 2018, the study with the aim to determine some of the key factors affecting youth employment for the period from 2000 to 2015. Panel Data Analysis was used to analyze the data. The study found that growth, inflation, and savings affect youth unemployment negatively while labor productivity affects youth employment positively. Study concluded that growth, inflation, savings and labor productivity including in the key determinants of youth unemployment(Bayrak & Tatli, 2018). The study done by Gocer et al., (2015) has analyzed the relationship between youth unemployment and economic growth, the study employed new generation panel and cointegration analysis. The study used the data from 18 Central and Eastern European countries under condition of having youth unemployment rate above the EU-28 average (25 %) for the period start from 2006 to 2012. The study find that if youth unemployment is quite severe; even an exclusive economic growth will not be enough to reduce the youth unemployment rate in the country(Gocer & Erdal, 2015). Based on the study conducted by Mwambari in 2015 which aimed to determine the impact of ICT on Employment in Rwanda. Mwambari used time series data for the period which start from 1985 to 2014. The study found that mobile subscriptions have effect on youth employment and on employment promotion in Rwanda. The study also indicated the impact of internet penetration on both youth employment and employment promotion in Rwanda. These are the same finding s to what Ebaidalla found in 2014. His study investigated the impact of ICT on youth unemployment in the Sub-Saharan African (SSA) for the period which start from 1995 to 2010.

The study used also dynamic panel data method for 30 SSA countries. The study findings showed that mobile subscriptions have a negative effect on youth unemployment in SSA countries. Also the internet is found to be negative but it is not significant, confirming the weakness of internet infrastructure in SSA(Ebaidalla, 2014). Brixiová and Kangoye done a study in 2014, on youth employment in Africa and he found the new evidence on the effects of policies in Swaziland from 2007 to 2010. They used a multinomial logit regression analysis. The study found that it should be better to learn from the experienced countries as they can get more for designing effective interventions for youth employment in Swaziland(Brixiová & Kangoye, 2014). The previous literature reviews show that most of researchers have been interested in finding the determinants of youth employment in different countries but they ignored to use a model contain natural characteristics estimated at household level like Language proficiency, disability status of youth, owning a mobile phone, computer and accessing to the internet, Access to electricity, being trained about trade and vocational training(TVET) and mobility of youth within the country, we have also included in the model, variables such as geographical location and gender to find out the determinants influencing youth employment. Therefore, our research seeks to fill this gap in literature by considering a number of key variables. We have considered also these variable in multinomial logistic regression to determine the key factors affecting the choice of youth for a particular economic sector.

CONCLUSION AND RECOMMENDATION: Since the findings of this research ascertained that gender, English language proficiency, access to electricity, access to the internet, computer literacy and learning any trade or TVET course all are associated with employment in Rwanda, we made the following recommendations that will lead to the improvement of employment and job creation policy in Rwandan youth. The government of Rwanda and private sector are recommended to continue emphasizing on gender equality so that boys and girls will be subjected to job competition equally. This will help females finding job with the same chance like males. The government of Rwanda is called to motive or encourage female to study TVET courses as these courses are identified to be one of the factors leading to employment easily. Language proficiency is associated to employment in Rwanda. English language is negatively associated with employment; this means that the available jobs on the labor market do not require any level of English proficiency. This is related to the high number (91.15%) of employed youth are working in informal sector. Given to this, the government of Rwanda, private sector and policy makers is recommended to work and supervise the implementation of new job creation policy established in Rwanda. Creation of new jobs other than agriculture helps youth to use all knowledge and language proficiency acquired as the education for all policy has raised the knowledge and language proficiency of Rwandan youth, but the available jobs do not allow them to use language proficiency they had. The ministry of education and their partners should formulate and update existing language curriculum which enable graduate to be able to compete on both local and regional labor market since Rwanda has joined the East African Community. Electricity as one of basic infrastructures is needed for economic development as it facilitates in new job creation. The government and partners should increase the investment by spreading the electricity mostly in rural areas to reinforce new job creation in these areas. The importance of internet penetration on youth employment has been highlighted in this study. Thus, there should be an emphasis on internet spread as youth can use it for job creation, accessing job information and application, and skills development in addition. Computer literacy is negatively associated with employment in Rwanda because most available jobs do not require computer literacy. Nowadays most employers need employees with enough skills in using computer. Owning computer is an advantage to speed up the use computer, accessing job information and skills development. The government should avail all facilities to all youth accessing computer easily and provide trainings to them to enable them developing their skills in computer usage. The government and their partners should increase TVET schools and hire qualified teachers to teach TVET courses as these courses have been identified to be positively associated with employment in Rwanda. Females are called to attend massively the TVET course as those who studied trade and TVET course are getting a job more than those who did not.

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