

## Use of ICTs: What Effect on the Quality of Youth Employment in Cameroon?

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# Use of ICTs: What Effect on the Quality of Youth Employment in Cameroon?

## Abstract

The objective of this article is to evaluate the effects of Information and Communication Technologies (ICTs) on the quality of youth employment in Cameroon. The study uses data from the Cameroonian Household Survey (CHS 4) carried out by the National Institute of Statistics of Cameroon (NIS) in 2014. The quality of employment is apprehended here by five of its dimensions: income by sector of activity, the nature of the contract, regularity of employment, job satisfaction and length of employment. Our results suggest that young active workers in the formal sector and the informal agricultural sector, demonstrating ICTs skills.

JEL-Codes: J130, J240, J640, J180.

Keywords: ICTs, youth, job quality, heckman model, Cameroon.

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## 1. Introduction

The emergence of studies on youth from the 1980s and the current renewed interest in youth employment issues are to be linked to the context of the crisis that has affected the countries of the South over the past 40 years (Boyer and Guénard, 2014). The global financial and economic crisis of 2007 and 2008 notably generated a social crisis characterized by a sharp rise in the unemployment rate, particularly among young people (Diallo 2015). Youth employment therefore occupies center stage in development policies worldwide, particularly in Africa (Lefeuvre *et al.* 2017). Responding to the eighth objective of sustainable development (SDG <sup>2</sup>8), on access to decent jobs, the issue of youth employment is at the heart of Agenda 2063 (Aspiration 6) adopted by the African Union.

The International Labor Organization (ILO, 2020) notes that in Africa, youth represent more than a third of the population (34.2%). We are thus witnessing a marked increase in the young active population, which almost doubled over the period 1990-2020, rising from 61.8 million to 115.8 million. In addition, it is supposed to increase by more than 25% (i.e., nearly 30 million young people) by 2030, the date on which the continent should have 144 million active young people, which therefore requires the need for the availability of jobs, and in particular decent jobs, for all these newcomers to the labor market. The ILO (2018) points out that this segment of the African population is stuck in informal jobs, i.e., 95% of young workers.

Cameroon is a good illustration of this situation with the sharp increase in the issue of youth employment. Indeed, according to the National Institute of Statistics (2014), young

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<sup>2</sup> The Sustainable Development Goal (SDG 8.6) is linked to the promotion of employment, education and training for young people. Specifically, target 8.6.1 predicted that by 2020, countries should “significantly reduce the proportion of young people (aged 15-24) not in education, employment or training [NEET]”. In other words, it is a question of significantly reducing the rate of exclusion of young people from the labor market

people represent 65.37% of the population of working age, 59.43% of the active population and 37.53% of the entire population. The latter are also characterized by an extended unemployment rate (10.5%) higher than that of the population as a whole (5.2%). This rate fell from 8.9% to 10.5% between 2010 and 2016. Overall, these statistics seem to show the preponderance of the young fringe within the total population, emphasizing the perennial nature of the problem of their jobs. More than employment as a whole, this issue has shifted since the 2000s towards the qualitative aspect and is now the subject of ever-growing interest.

Job quality has been a concern since the end of the 1990s, particularly through the efforts of international institutions<sup>3</sup> (Guergoat-Larivière and Marchand, 2012). The analysis of the quality of employment raises many theoretical and empirical questions, relating in particular to its definition<sup>4</sup> and its determinants (Davoine and Erhel, 2007). In fact, job quality generally refers to working conditions, to the satisfaction that the individual feels with regard to the job that he exercises. The analysis of this concept is thus situated at the crossroads of three main theories, in particular the standard, subjective and socio-economic approaches. The first uses wages as the main factor and quantitative measure of job quality (Rosen, 1986; Fernandez - Macias and Hurley, 2008). The second, which is more subjective, highlights the satisfaction declared by the workers (Clark, 2005, 2010; Davoine, 2007). These unidimensional approaches prove to be effective from an empirical point of view because they require the use of a single variable. However, they have significant limitations<sup>5</sup>. It is in this perspective that the third multidimensional approach combines the two previous ones and retains all the factors having consequences on the situation of workers and their career prospects (Munoz de Bustillo *et al.*, 2011; Green, 2006; Oatmeal *et al.*, 2008; Erhel and Lariviere, 2016). It is this latter multidimensional approach, widely developed by the institutions, that will be used in this study.

In view of the foregoing, the problem of the determinants of the quality of employment, in particular from the point of view of demand, arises. In this regard, several factors have been

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<sup>3</sup> The work of the International Labor Office (ILO) on decent work or that of the European Commission on job quality.

<sup>4</sup> The definitions of job quality used vary depending on the dimensions chosen but also on the points of view adopted (employee, employer and public authority) (Lizé and Prokovas, 2012). However, studies are generally based on the ILO report, which adopts a broad definition of job quality, which includes not only the extrinsic aspects (salary, job security, career opportunities, working conditions), but also the intrinsic aspects (possibilities for personal fulfillment, etc.), and the impact of employment on other spheres of life (Davoine and Erhel, 2007). The number of dimensions retained varies from one institution to another. Thus, the International Conference of Labor Statisticians (CIST) retains eleven (11) dimensions; the European Commission (10) dimensions and seven (07) dimensions for the United Nations Economic Commission for Europe (2010).

<sup>5</sup> Indeed, the restriction of the definition and measurement of job quality to the wage variable alone is based on an assumption of the theory of compensating differences, which implies that the risks and inconveniences associated with employment must be compensated by a high salary (Rosenthal., 1989). However, this measure underestimates the quality of employment because it neglects many other dimensions allowing an analysis of the concept.

put forward, including level of education, place of residence, age, sex, family background, etc. However, the development of Information and Communication Technologies (ICTs<sup>6</sup>) and their effects on the economy in general and on employment in particular are more perceptible. For example, in the Cameroonian context, ICTs have experienced a gradual diffusion in society since the reform of the telecommunications sector following law 98/014 of July 14, 98. Thus, between 2011 and 2015, the number of subscribers to internet (fixed and mobile) has increased considerably, from 47,581 to 11,604,676 for a penetration rate rising from 0.24% to approximately 52.32% over the same period (ART<sup>7</sup>, 2017). According to the Cameroon strategic plan (2020), the percentage of households using the internet increases from 6% in 2016 to 20% in 2020. The same is true for the proportion of households using a computer, which increases from 1.7% in 2005 to 14.2% in 2017. In addition, between 2000 and 2016, the penetration rate of mobile telephony also increased, rising respectively from 0.66% in 2000 to 12.26% in 2005 and then from 43.96% in 2010 to 82.87% in 2016. Similarly, the proportion of households using a telephone (fixed and/or mobile) has increased over time, to 30.2% in 2005 and 89.4% in 2017. However, this strong diffusion and use of ICTs does not seem to be accompanied by an improvement in the quality of employment for young people, who nevertheless constitute the segment of the population that uses these tools the most (Tamokwe, 2013; ITU, 2021). This contrasts with human capital theory which considers the acquisition of ICTs skills as an important factor that can influence job quality (Yedder and Peretti, 2009).

Examination of the existing empirical literature indeed shows that the effect of ICTs on the quality of youth employment is ambiguous, but with a generally positive sign. Some authors obtain a positive (Rubery & Grimshaw, 2001; Greenan *et al.*, 2012; Guergoat-Larivière, 2016; Teresina & Darya, 2019), whereas others report a negative impact (De Coninck, 2006; Colombier, 2007; Klein and Govaere, 2012). It is then a question of conducting a similar study in the Cameroonian context where most of the work has focused on the only quantitative dimension of employment (Njikam *et al.*, 2005; Fomba, 2008; Ekamena and Abessolo, 2014; Piame, 2018; Miamo *et al.*, 2020) thus abandoning the qualitative dimension and the numerical factor as a determinant of the latter. This study will thus make it possible to fill this gap in the

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<sup>6</sup>According to Dieuzeide (1994), ICTs refers to all instruments carrying immaterial messages (images, sounds, character strings). He then subdivides ICTs into three categories: audiovisual (sound and image), computing and telecommunications. For Castells (1998), Information Technology (IT) brings together all the technologies of computing, microelectronics and telecommunications. We propose the following definition: Information and Communication Technologies (ICTs) designate all the instruments carrying immaterial messages and allowing the collection, recording, storage, sharing and dissemination of information. In other words, it is the combination of four technologies, namely the telephone, the computer, the television and the Internet.

<sup>7</sup>Annual report of the Telecommunications Regulatory Agency (2017).

Cameroonian context by addressing this qualitative dimension of employment which arises today with acuity and seems to punctuate with the diffusion of ICTs tools.

This paper proceeds with a review of existing literature, the methodological framework of the study, presentation and discussion of the results and concludes

## **2. Literature review**

This section deals with the determinants of job quality **(2.1)** emphasizing the influence of ICTs **(2.2)** and ends with an empirical review of the literature on the link ICTs, job quality **(2.3)**.

### **2.1. The determinants of job quality**

Several determinants of job quality are highlighted in the literature by both theoretical and empirical work.

According to the theory of human capital developed since the work of Becker (1964), the importance of the level of training for the individual in obtaining a quality job has not suffered from any major dispute, apart from a few paradoxes often linked to the lack of correlation between level of education and employability (N'Gratier, 2017). Proponents of this theory thus postulate that human capital is the main determinant of job quality. Indeed, an educated and trained individual is predisposed to a high salary, the main determinant of job quality according to the standard approach of this concept. It is in this perspective that De La Fuente and Ciccone (2002) argue that a fairly high human capital also allows employees to stay in business for as long as possible.

Subsequently, various other factors likely to explain obtaining a quality job are identified in the literature. N'Gratier (2017) shows that the socio-professional category of the individual is an important determinant of job quality: executives are more likely to benefit from a quality job compared to non-executives. Indeed, executives are those who benefit the most from training (general or specific) in the company compared to non-executives. It is also generally accepted that executives are design agents<sup>8</sup> and as such must be constantly aware of the latest changes.

In addition, worker's marital status and sector of activity positively influence the probability of obtaining a quality job (N'Gratier, 2017). In addition, according to the Institute of Statistiques to Québec (ISQ, 2015), it is less advantageous to live in a semi-urban or rural

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<sup>8</sup> Unlike other categories such as workers and other subordinate agents who are enforcement agents.

area of residence in terms of job quality than to live in an urban. Urban center, which are more populated, thus offer a greater probability of obtaining better jobs.

Job seniority is also a determinant of job quality. Indeed, people who have been working in an organization for a short time (less than a year) have a lower job quality than people who have been working for the same employer for at least four years. Also, no significant difference is observed between people working in an organization for less than a year and those working in the same place for one to three years (ISQ, 2015).

Establishment size is also an important determinant of job quality. Indeed, working in a smaller establishment (50 employees or less) is associated with lower job quality. For their part, people working in medium-sized establishments (51-199 employees) have lower job quality than those working in large establishments (500 employees and more).

For supporters of the standard approach (Rosen, 1986), the level of salary is the primary determinant of job quality. Thus, " *low wages* " would in this case reflect jobs of poor quality (*Bad jobs*), i.e., which combine many unfavorable criteria, beyond the single level of salary (poor working conditions). Other authors in favor of the economics of happiness emphasize satisfaction as a determinant of job quality (Davoine, 2006; Larivière *et al.*, 2012).

However, with the advent of ICTs, the world of employment has experienced many upheavals affecting both the quantitative and qualitative dimensions of employment.

## **2.2. ICTs as a determinant of job quality**

The increase in ICTs is expected to have a considerable impact on the number and quality of jobs (ILO, 2018). One of the main themes of the literature on work in the future concerns the links between digitization (ICTs) and the quality of employment (Lévesque *et al.*, 2020). However, the impact of ICTs on the quality of employment is unequal and diversified. Indeed, according to Lévesque *et al.* (2020), digitalization has a polarizing effect in that it eliminates routine and repetitive work thus bringing about a profound change in the nature and character of work (Peetz, 2019). Other authors posit that there may be an increase in job quality through a reduction in hazardous tasks (Stroud *et al.*, 2020). In the most extreme cases, such as online work platforms, ICTs reconfigure the very nature of work and weaken traditional forms of labor regulation.

Beyond the traditional determinants mentioned above, ICTs are emerging more today as a determining factor in obtaining a quality job. This influence of ICTs on the quality of employment also involves its various dimensions. Indeed, according to Colombier (2007) ICTs and the organizational changes they induce tend to give greater autonomy and more



responsibility to employees. The latter therefore have more freedom to organize their work and easily choose their schedules and tasks (Crifo *et al.*, 2004). This freedom of choice of schedules can have the effect of reducing the separation between private and professional life and therefore improving the quality of employment.

Furthermore, the effect of ICTs use on job satisfaction is positive overall. As shown by Lindbeck and Snower (2000) by comparing the returns associated with the specialization of employees on a task with those linked to the complementarity of tasks, the authors show that the diffusion of ICTs makes it possible to increase the returns associated with complementarity and therefore promotes the versatility of employees and the quality of their jobs. Several studies highlight the effect of ICTs on the quality of employment.

### **2.3. ICTs and job quality: empirical review**

Although the potential effect is related to many dimensions of the employment relationship, Rubery and Grimshaw (2001) in their work come to the general conclusion that ICTs represents both a threat and an opportunity to develop job quality. Indeed, these technologies develop new jobs, increase wages, reduce the work effort, lead to more individual flexibility and freedom of choice and allow a real reconciliation between family life and professional life. Nevertheless, they add that ICTs isolates and imposes stress (information overload).

By placing particular emphasis rather on job quality<sup>9</sup> regimes in relation to innovation regimes, a principal component analysis (PCA) made by Erhel and Guergoat-Larivière (2016) allows the authors to validate the existence a strong and positive correlation between innovation and job quality in Europe, distinguishing four dimensions of job quality and four innovation regimes. For this purpose, they combine three databases from the European Survey on Working Conditions, the Labor Force Survey and the Survey on the Structure of Wages and European Statistics on accidents at work. This study is also conducted by Hunt *et al.* (2018) in the same context and on the same data. But the authors instead use a bivariate analysis to examine whether innovation tends to reduce job quality. Their results suggest the existence of a virtuous circle between innovation and job quality.

In their study conducted in France, Greenan *et al.* (2012), De Coninck (2006) want to be more precise. Indeed, based on data from the COI (Organizational Changes and Computerization) coupled survey system, the authors rather adopt a descriptive approach to

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<sup>9</sup>Salary, working condition, work safety and training.

show how ICTs influence working conditions. They show that digitalization diversifies and strengthens the links between workers, thus concurring with the conclusions of Rosanvallon (2012). Following Licoppe (2007), they find a positive and significant link between digitalization, autonomy and control of employees, given that the current computerization associated with managerial tools makes it possible to frame the autonomy delegated to employees. In the same vein, Azza Aziza and Adel Ben Youssef (2010) using COI 2006 data, highlighted a positive correlation between the different dimensions of job satisfaction and the intensity of ICTs use in France. It seems in particular that ICTs generate positive externalities on the skills of colleagues and promote a good working atmosphere, which is logical when it comes to communication tools. It is moreover this effect that had already been highlighted by Askenazy and Caroli (2006); and which helped to limit the negative effects of intensification by reducing isolation, all things being equal.

Teste (2003) and Klein and Govaere (2012) limit themselves to a unidimensional and quantitative analysis of job quality, and arrive at a positive correlation between ICTs and wages in France and the USA, respectively.

In order to study the effects of the use of ICTs (telephone, computer and internet) on the working conditions of employees (job satisfaction), Colombier (2007) adopts both a methodology and a different database in the French context. The author applies the Probit model to data from the Permanent Survey of Household Living Conditions carried out by INSEE in 2005. The results of this study show that the use and intensity of use of each of these technologies have overall positive complementary effects on job satisfaction. However, the author points out that the mobile phone has ambivalent effects insofar as it can be perceived as a tool for promotion, recognition and responsibility or, on the contrary, as a tool of control or pressure and therefore be a source of stress.

The positive relationship between ICTs and job quality is still not established in the literature. De Coninck (2006) finds a negative correlation between ICTs use and work intensification. On this point, the author evokes the question of the existential porosity between employment and the private life of the users of these tools. Indeed, companies ICTs equipment protects employees who do not use connected technologies from an extension of working hours beyond the usual hours on the one hand, and on the other hand, do not upset the organization of their working time, with the exception of on-call duty. But by considering the users of connected technologies, he arrives at the result that the latter more often declare that they work in several places and in particular take work home, exceeding their working hours and consequently are victims of the interference of the private and professional spheres.

Klein and Govaere (2012) focus on well-being and health at work (dimension of job quality) in relation to digitalization. They lead to negative effects of ICTs on health, effects that can be direct or indirect. In particular, the best identified direct effects only concern electromagnetic waves, to which is added visual fatigue, etc. Indirect effects refer to stress and psychosocial risks (PSR), particularly in cases of low decision latitude.

Unanimity is far from being reached on the effects of ICTs on the quality of employment. A relevant analysis of the question depends on the appropriate methodological choices.

### **3. Study methodology**

This section reviews the conceptual model and the estimation techniques (3.1) then presents the variables and the database of the study (3.2) and finally, proceeds to the statistical analysis (3.3).

#### **3.1. Conceptual model and estimation techniques**

The dependent variable describing ICTs competence is binary and exogenously determined while it is potentially endogenous. This means that the decision to use ICTs tools is conditioned by certain unobservable individual characteristics (the motivation for using ICTs, learning abilities, etc.), which poses a problem of endogenous selection of individuals. This problem of endogeneity is well known in the econometric literature, because it is likely to affect the quality of the estimates, especially when using an OLS or the simple probit model (Coromaldi *et al.*, 2015).

In the absence of a randomized experiment, the methodology based on iterative regression uses a two-step framework to model the impact of a qualitative variable (use of ICTs) on another qualitative or continuous variable (salary, job satisfaction, etc.). The first evaluates the explanatory factors of the selection and the second stage evaluates the impact of the use of ICTs on the indicators of the quality of employment retained in this study, estimated through information to which is added the term error from the first step.

##### **3.1.1 The Selection Equation**

The selection equation expresses the probability of ICTs use. It allows us to select the ICTs users in the population. It is specified as follows:

$$U_i^* = \beta_1 + \beta_2 X_i + \eta_i \quad (1)$$

$$U_i = \begin{cases} 1 & \text{si } \beta_1 + \beta_2 X_i \geq \eta_i \text{ (Use ICTs)} \\ 0 & \text{si } \beta_1 + \beta_2 X_i < \eta_i \text{ (not use ICTs)} \end{cases} \quad (2)$$

Where  $U_i$  represents the decision to use ICTs by individual  $i$ . However, this variable is unobservable and can only be observed in an ex-post situation. In this case, we can associate a truncated latent variable with the decision to use ICTs  $U^*$ , which is observed only for employed workers who have actually used ICTs tools ( $U_i$  takes the value 1, and 0 otherwise);  $X_i$  vectors of explanatory variables,  $\beta_i$  is the vector of the coefficients to be determined and  $\varepsilon_i$  the error term.

### 3.1.2 Equation of interest and estimation method

The substantive equation allows us to analyze the quality of employment by taking into account only the individuals using ICTs. In this practice, the selection bias of ICTs users is taken into account by including the dependent variable of the selection equation among the explanatory variables of the substantial equation. The latter is specified as follows:

$$IQE_{ij} = \begin{cases} 1 & \text{si } U_i > 0 \\ 0 & \text{si } U_i \leq 0 \end{cases} \quad (3)$$

$IQE_{ij}$  is the dimension  $j$  of job quality for employed person  $i$  and is observable.  $IQE_{ij}^*$  corresponds to a latent variable of job quality, given that  $IQE_{ij}$  is observed only beyond a certain threshold. This variable is distributed according to a centered normal distribution reduced to error term  $\mu_i$ . Furthermore, all non-employed workers who do not use ICTs in the performance of their daily tasks are excluded from the regression, which could cause a bias induced by these “omitted variables” (Heckman, 1979). To overcome this problem and obtain robust estimates, the author proposes the two-step estimation method based on the maximum likelihood technique with limited information (HTS). Specifically, if  $U$  is positive, the regression equation becomes:

$$E[IQE_{ij}/X, U = 1] = \alpha + \theta T_i + E[\eta_i/\mu_i > -\beta_2 X_i] \quad (4)$$

Under the assumption that  $E[\eta_i/\mu_i] = 0$  and of the bivariate normal distribution of errors <sup>10</sup>.

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<sup>10</sup> That is if,  $\begin{pmatrix} \eta \\ \mu \end{pmatrix} \sim N \left[ \begin{pmatrix} 0 \\ 0 \end{pmatrix}, \begin{pmatrix} \sigma_\eta^2 & \rho\sigma_\eta \\ \rho\sigma_\eta & 1 \end{pmatrix} \right]$ , the estimate of (4) by the OLS is unbiased

Then, the resulting left truncated conditional normal distribution is:

$$E[IQE_{ij}/T, U = 1]^{11} = \beta T + E[\eta/\mu > -\beta_1 X_i] = \alpha + \beta T_i + \rho\sigma_\eta(-\alpha X_i) \quad (5)$$

$$IQE_{ij} = \alpha + \beta T_i + \rho\sigma_\eta\lambda_i + \mu_i \quad (6)$$

To estimate this model, the maximum likelihood technique generally used proved to be more complex to implement because convergence is sometimes difficult to obtain. Thus, the approach proposed by Heckman (1979) which is based on a two-step procedure is an effective alternative to overcome this problem. It consists of estimating the selection equation using a simple Probit model, testing the hypothesis of the presence of selection bias from the MRI value, and, if necessary, introducing it into the equation of interest which is estimated by OLS/Probit.

### 3.2. Presentation of the variables and the study database

This first section presents the data and then the different variables used in this study.

#### 3.2.1 Data

The data used in this study come from the Fourth Cameroonian Household Survey (ECAM 4) conducted by INS in 2014. This survey, carried out at the national level (urban and rural), covers a representative sample of 13,000 households for a total of 46,560 individuals. This data should be noted however that it provides information on the conditions of activity, the quality of jobs, as well as information relevant on the link between ICTs skills and job quality in Cameroon.

#### 3.2.2 Study variables

The explained variable Quality of job is a qualitative and multidimensional variable. It is measured based on the definition proposed by the ILO, which is also used by the INS. In the light of the theoretical and empirical literature and the available data, we retain several indicators for measuring the quality of employment. But unlike the work that uses synthetic indices<sup>12</sup>, the estimates will be made here for each of the dimensions retained and independently

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<sup>11</sup> Where the error term  $\mu_i$  verifies:  $E(\eta_1/U = 1) = 0$  and  $\text{Var}(\eta_1/U = 1) = \sigma_\eta^2(1 - \rho^2\lambda_i^2 - \rho^2\lambda_i\beta X_i)$ .  $E(U = 1) = E(IQE_{ij}/U^* > 0) = \hat{\alpha} + \hat{\beta}_1 T_{1i} + \rho\sigma_\eta\hat{\lambda}_i$  Where  $\hat{\lambda}_{1i}$  represents the inverse of the Mills ratio (IRM) such that:  $\hat{\lambda}_{1i} = \frac{f(\hat{\alpha} + \hat{\beta} X_i)}{F(\hat{\alpha} + \hat{\beta} X_i)}$

<sup>12</sup> According to Munoz de Bustillo and Coll (2001), the synthetic index approach to the quality of employment is a long process to carry out and can be costly, leading to an overall picture of the worker's situation. Furthermore, Péna-Casas (2013) also recalls that this tool “masks the diversity” of the elements found in the measurement of

of each other (N'Gratier, 2017). This approach is justified by the fact that it is less costly and provides an accurate picture of the situation in which the worker finds himself. Thus, this variable will be measured using the following proxies: the **income**<sup>13</sup> received by the worker according to the sector formal., sector informal and non-agricultural informal sector; **job security**<sup>14</sup>(nature of the contract), which refers to the type of contract signed by the worker and includes the **fixed term contract (FTC)** and the **indefinite term contract (ITC)**. FTC is dichotomous, it takes the value 1 if the individual signs an FTC contract and 0 otherwise. Similarly, ITC is dichotomous and takes the value 1 if the individual signs an ITC contract and 0 otherwise; **regularity of employment** is a dichotomous variable that takes the value 1 if the job is part- time and 0 otherwise. **Job satisfaction**<sup>15</sup>is a dichotomous variable that takes the value 1 if the worker is satisfied with his job and 0 otherwise. The duration of employment is also dichotomous and takes the value 1 if the employment is of regulated duration (40h/week) and 0 otherwise.

ICTs is a dichotomous variable referring to the use of two tools, namely the cell phone and the internet. It takes the value 1 when the individual uses it and 0 otherwise.

### 3.3. Descriptive statistics

This sub-section presents the descriptive statistics table for the different variables used in the study.

**Table 1: descriptive statistics of the variables**

Variable	Mean	Std. Dev.	Min	Max
<b>Dependent variables</b>				
Permanent contract (ITC)	0.092	0.289	0	1
Fixed-term contract (FTC)	0.023	0.149	0	1
Income	1.135e+08	1.059e+09	3	1.000e+10
Satisfaction	0.276	0.447	0	1
Length of employment	0.032	0.177	0	1
Regularity of employment	0.313	0.464	0	1
<b>Variable of interest</b>				
ICTs Use	0,172	0.219	0	1
<b>Independent variables</b>				
Man	0.488	0.5	0	1
household size	1.726	0.62	0	3.401
Primary	0.364	0.481	0	1

job quality. Moreover, certain interpretation problems may arise with such indicators, as pointed out by Greyling (2013) citing Sharpe (2004): the indicators may be poorly constructed and therefore produce invalid results or include a weighting approach that is not clear or transparent.

<sup>13</sup> Test, 2003; Klein and Govaere (2012).

<sup>14</sup>N'Gratier, 2017.

<sup>15</sup>Colombier, 2007.

Secondary	0.383	0.486	0	1
Superior	0.047	0.211	0	1
Area of residence	0.497	0.5	0	1
Marital statut	0.349	0.477	0	1
Age1(15 to 24 years old)	0.358	0.479	0	1
Age2 (24 to 35 years old)	0.27	0.444	0	1

**Source:** *Author's calculations*

This table (1) shows that barely 27% of young working people in our sample are satisfied with their job, only 31% with full-time work. Moreover, very few (work at the normal hourly volume (48 hours per week). In addition, 34% of the individuals in our sample use ICTs (telephone or internet).

Table (7) in the appendix presents the correlation matrix between the different variables of our model. This table shows that there is a positive and significant correlation at the 1% level between ICTs and the types of contracts (FTC and ITC) and positive but not significant correlation between ICTs and regularity of employment. However, the table shows that ICTs is negatively (1%) related to job satisfaction and job tenure.

It should be remembered, however, that while some authors (Colombier, 2007 ; Klein et Govaere, 2012 ; Klein et Ratier, 2012 ; Baumeister *et al.*, 2021) believe that the use of ICTs is dependent on the job situation because each job requires a certain level of ICTs skills to which individuals should conform, others support the idea that the use of ICTs is independent of the job situation (Tamokwe, 2013 ; Bakehe *et al.*, 2017). Indeed, this is justified by the fact that the individual, aware of the level of competence that jobs require, ex-ante acquires ICTs skills in order to obtain a good job quality. It is first conception that we retain in the framework of this study.

#### **4- Presentation of results and discussions**

It is a question of presenting here the results of the econometric analysis in particular, the preliminary results (4.1) and the results from the HTS method (4.2).

##### **4-1 Preliminary results: OLS/Probit approach**

The quality of employment is captured by the following dimensions: income of workers by sector of activity, job security, regularity of employment, job satisfaction and duration of employment. According to the table (2) below, we find that the OLS regression of the effect of ICT on the income of young workers regardless of the sector of activity is significant and negative at the 1% level. This result is opposed to that found by Klein and Govaere (2012) in the French context. Similarly, the influence of ICTs on job security captured by the type of

contract, table (2) below using the same method is significant and negative at the respective threshold of 1% for fixed-term jobs, not significant for jobs with permanent contracts, and significant and positive at the 1% threshold over the duration of employment. Indeed, these results are explained by the fact that individuals with ICTs skills tend to opt for a periodic provision of their service in order to increase its income and generally refuse to be owned entirely by a company through an ITC.

Moreover, the OLS regression reports an absence of significance of ICTs not only on the regularity of employment (full-time employment and part-time employment) but also on the individual's job satisfaction. This result can be explained by the fact that, generally, the level of income received by a worker is proportional to its productivity, which depends on its skills. This result joins those found by Teste (2003) and De Coninck (2006). In addition, these tables (2), (3) and (4) report that the chances of possessing ICTs skills increase with the level of education of the workers. Overall, the age, level of education, area of residence and sex of the individual also significantly determine the quality of employment of an individual with a certain level of ICT skills. These results corroborate those found by N'Grantier (2017) in the Ivorian context.

While it is true that these results converge with those of certain studies cited above, they are nevertheless questionable. In effect, the estimate based on the OLS does not take into account the selection bias existing in the sample. Regression using Heckman's procedure (1979) corrects this bias. In addition, the Inverse of the Mill's Ratio (IRM) is very significant at the 1%. It means that the equation of interest cannot be estimated by the OLS, and that the selection equation (results in the appendices) and the equation of interest are strongly linked and therefore the errors of said equations are auto-correlated. We can therefore validate the relevance and the robustness of the results resulting from the procedure of estimation in two stages of Heckman.

#### 4.2. Estimation by the Probit and the HTS method of the effect of ICTs on the quality of employment

**Table 2: The effect of ICTs on income by sector of activity**

ICTs Selection equation: Determinants of ICTs			
	Formal sector (HTS)	Informal agricultural sector (HTS)	non-agricultural informal sector (HTS)
Area residence	0.00617** (0.00813)	0.219*** (0.0047)	0.0315 0.105
Sex	0.0734 (0.0811)	0.0734 (0.0811)	0.0734 (0.0811)
Primary	0.438** (0.209)	0.438** (0.209)	0.438** (0.209)
Secondary	0.838***	0.838***	0.838***



	(0.208)		(0.208)		(0.208)	
Superior	1.196***		1.196***		1.196***	
	(0.217)		(0.217)		(0.217)	
Household size	-0.264**		-0.264**		-0.264**	
	(0.103)		(0.103)		(0.103)	
	Revenue (Formal sector)		Revenue (Informal agricultural sector)		Income (non- agricultural informal	
	OLS	HTS	OLS	HTS	OLS	HTS
ICTs	-0.149*** (0.0226)	0.105*** (0.7643)	-0.317*** (0.0477)	0.125*** (0.4532)	-0.249*** (0.0418)	0.116 (0.986)
Marit statut	0.0409*** (0.00232)	0.0630 (0.0724)	0.308*** (0.00491)	-0.0115 (0.0650)	0.125*** (0.00430)	-0.0115 (0.0650)
Sex	-0.0241*** (0.00180)	-0.0948 (0.0720)	-0.0343*** (0.00381)	-0.0102 (0.0648)	-0.0464*** (0.00334)	-0.0102 (0.0648)
Primary	0.0179*** (0.00216)	-0.0471 (0.232)	0.140*** (0.00457)	0.0304 (0.209)	0.0952*** (0.00400)	0.0304 (0.209)
Secondary	0.156*** (0.00323)	-0.0767 (0.350)	0.00415 (0.00684)	-0.00271 (0.314)	0.0604*** (0.00598)	-0.00271 (0.314)
Superior	0.423*** (0.00557)	0.0224 (0.469)	-0.205*** (0.0118)	-0.0530 (0.421)	-0.0890*** (0.0103)	-0.0530 (0.421)
House_size	-0.00135*** (0.000239)	-0.00203 (0.0106)	-0.00828*** (0.000505)	-0.0202** (0.00952)	-0.0057*** (0.000442)	-0.0202** (0.00952)
Urban	-0.00936*** (0.00188)	-0.00617 (0.117)	0.119*** (0.00397)	-0.0315 (0.105)	-0.122*** (0.00348)	-0.0315 (0.105)
(MRI)		-0.120* (0.350)		-0.120* (0.850)		-0.120* (0.350)
Obs	18,036	18,036	18,036	18,036	18,036	18,036

Source: authors, \*, \*\*, \*\*\* respectively reflect the significance at 10, 5 and 1%; in parentheses are the standard deviations; MRI: Inverse of Mill's Ratio.

The effect of ICTs on wages may vary depending on whether the individual works in the formal sector, the informal sector or the non-agricultural informal sector.

Because of the shortcomings noted in the probit approach, the two-step procedure of Heckman (1979) corrects the bias and reports a significant and positive influence of ICTs on the income of young workers in the formal and informal. This effect becomes not significant in the non-agricultural informal sector.

Several reasons may explain these results. Indeed, the formal sector is a demanding sector in terms of skills. According to the results found by Gollac and Kramars (1997), this result could be explained by the fact that young people who have ICTs skills are more in demand in the formal sector but also tend to develop their own activity and therefore, they benefit from the high incomes linked to the good quality of the services they perform.

Overall, it appears that ICTs have a significant effect on the income of workers, both in the formal sector and in the informal sector. This could be explained by the fact that, in the two sectors, the level of remuneration seems to be associated with the productivity of the individual, which depends to the level of education and skills. As a result, individuals who possess ICTs

skills are more productive and predisposed to benefit from high incomes and salaries. This result corroborates that found by Teste (2003) in the French context.

**Table 3: Probit and HTS regression of the effect of ICTs on job security (job quality proxy).**

Selection equation: Determinants of ICTs				
HTS				
	FTC		ITC	
Urban	-0.211***		-0.194***	
	(0.00813)		(0.0208)	
Man	0.0734		0.0734	
	(0.0811)		(0.0811)	
Primary	0.438**		0.438**	
	(0.209)		(0.209)	
Secondary	0.838***		0.838***	
	(0.208)		(0.208)	
Superior	1.196***		1.196***	
	(0.217)		(0.217)	
Household size	-0.264**		-0.264**	
	(0.103)		(0.103)	
Probit		HTS		
Equation on interest				
Employment Security				
	FTC		ITC	
Variables	Equation of interest			
ICTs	-0.0431***	0.0345	-0.119***	0.1945*
	(0.0152)	(0.1745)	(0.0262)	(0.5647)
Marital status	0.0118***	-0.0111	0.0628***	0.0742***
	(0.00141)	(0.0343)	(0.00242)	(0.0838)
Man	-0.0122***	-0.0353**	-0.0379***	-0.0389
	(0.00122)	(0.0341)	(0.00210)	(0.0834)
Primary	0.00789***	-0.0116	0.0255***	0.00167
	(0.00145)	(0.110)	(0.00250)	(0.269)
Secondary	0.0375***	-0.0217**	0.147***	-0.0158*
	(0.00218)	(0.166)	(0.00375)	(0.405)
Superior	0.0814***	-0.0831	0.333***	0.0734
	(0.00376)	(0.222)	(0.00646)	(0.543)
House size	-0.000779***	-0.00478	-0.00303***	-0.0120**
	(0.000161)	(0.00503)	(0.000277)	(0.0123)
Area residence	-0.00500***	-0.00366	-0.0310***	-0.0415
	(0.00127)	(0.0554)	(0.00218)	(0.135)
MRI		-0.0542***		-0.141***
		(0.185)		(0.452)
Obs	18,036	18,036	18,036	18,036

Source: authors, \*, \*\*, \*\*\* respectively reflect the significance at 10, 5 and 1%; in parentheses are the standard deviations; MRI: Inverse of Mill's Ratio.

After examining the effect of ICTs on the choice of the sector of activity, our attention will be focused on workers of the formal sector, especially, the nature of their contract. This is to highlight the effect of ICTs on the quality of employment, which is captured here by the type of contract (FTC and ITC) signed by the individual. Good quality employment referring to ITC-type jobs.

By correcting for selection bias using the Heckman (1979) method, we find a significant and negative effect of ICTs on fixed-term contracts at the 1% significant level. On the other hand, this effect is significant and positive on permanent contracts at the 10% significant level. These results show that ICTs reduces the probability of signing fixed-term contracts. This could be explained by the fact that, as the labor market is undergoing major changes, companies are massively seeking individuals with ICTs skills. In this context, these companies have a strong incentive to be sustainable with employees with ICTs skills; hence the proposal of permanent contracts. This result corroborates the one found by Youssouf (2010) in the French context. It should be noted that there are certain characteristics of the workforce that have a very important effect on the type of contract they have. These include marital status, level of education, place of residence and age.

With regard to the level of education, it should be noted that the influence is much greater (1%) on fixed-term jobs. This means that the higher the level of education of individuals, the more they tend to prefer fixed-term contracts. This result contradicts the one found by Ben Halima (2005) showing a preference for fixed-term contracts in the French context.

**Table 4: Probit and HTS regression of the effect of ICTs on regularity of employment, satisfaction and duration of employment.**

Selection equation: the determinants of ICTs						
Variables	Regularity of employment		Job satisfaction		Duration in employment	
	HTS		HTS		HTS	
Urban	-0.214***	(0.00913)	-0.193***	(0.00898)	0.161***	(0.0108)
Household size	-0.0762***	(0.00164)	-0.0755***	(0.00161)	-0.0109***	(0.00196)
Man	-0.0210**	(0.0252)	-0.0352*	(0.0148)	0.0833***	(0.0216)
Primary	0.118***	(0.0133)	0.0774***	(0.0131)	1.432***	(0.0156)
Secondary	0.0958***	(0.0211)	0.0272	(0.0204)	3.522***	(0.260)
Superior	0.345***	(0.0425)	0.131***	(0.0378)	6.206	(0.354)
Equation of interest						
	Probit	HTS	Probit	HTS	Probit	HTS
ICTs	-0.194 (0.343)	-0.223** (0.395)	0.0668 (0.153)	0.0523 (0.355)	0.480*** (0.0462)	0.488* (0.273)
Marital_statut	0.386*** (0.0161)	0.206*** (0.0216)	-0.0420*** (0.00720)	-0.188*** (0.0200)	-0.112*** (0.00421)	-0.0171 (0.0215)
Man	-0.0310** (0.0152)	-0.0252* (0.0148)	-0.00576 (0.00676)	0.0147 (0.0136)	0.0912*** (0.00403)	0.0933*** (0.0216)

House_size	0.0397*** (0.00196)	-0.0308*** (0.00362)	0.000746 (0.000875)	-0.0691*** (0.00344)	0.00955*** (0.000528)	0.00217 (0.00313)
Primary	-0.325*** (0.0203)	-0.232*** (0.0214)	0.0280*** (0.00905)	0.106*** (0.0205)	0.0208*** (0.00566)	1.441*** (0.0430)
Secondary	-0.315*** (0.0264)	-0.245*** (0.0301)	0.0641*** (0.0118)	0.104*** (0.0290)	0.0822*** (0.00768)	1.836*** (0.0577)
Superior	-0.275*** (0.0385)	-0.0633 (0.0478)	0.0313* (0.0172)	0.137*** (0.0456)	0.0459*** (0.0121)	1.823*** (0.0798)
Urban	-0.00669*** (0.00137)	-0.00478 (0.010)	-0.00401*** (0.0213)	0.0453* (0.0034)	0.0455** (0.00312)	0.00478** (0.00213)
<b>MRI</b>		<b>1.293*** (0.0464)</b>		<b>1.353*** (0.0207)</b>		<b>1.795*** (0.0119)</b>
<b>Obs</b>	<b>18,036</b>	<b>18,036</b>	<b>18,036</b>	<b>18,036</b>	<b>18,036</b>	<b>18,036</b>

Source: authors, \*, \*\*, \*\*\* respectively reflect the significance at 10, 5 and 1%; in parentheses are the standard deviations; MRI: Inverse of Mill's Ratio.

From the results of table (4), it appears that ICTs have a positive but non-significant effect on the individual's job satisfaction. On the other hand, its impact on the regularity and on the number of working hours per week. In the first case, this effect is negative and significant at the 10% threshold, while in the second case, the threshold is set at 10% and the sign of the coefficient is positive. Indeed, this result shows that young workers who have ICTs skills make more use of jobs for which the duration is regulated (40h/week). This result calls into question the hypothesis of “blurring of the boundary” between professional and private life of working people defended by De Coninck (2006).

Furthermore, like Klein and Gardavaer (2012), we obtain a negative correlation between ICTs and regularity of employment. The acquisition of ICTs skills is a cause of the instability of workers in employment; this would be due to the fact that the latter, aware of their potential., tend to be more mobile for self-employed workers or to be more demanding of their employees, particularly with regard to working conditions. In this context, the strong competition on the labor market and the preponderance of the informal sector on the formal sector can be a springboard for these workers to regularly apply for jobs of better quality. It could be explained by the fact that young people between of 15 and 35 have just left the education system and are without stable employment. Based on this, the new skills acquired in ICTs on the labor market could predispose them to regular (full-time), satisfactory and regulated jobs and therefore to good quality jobs. These results corroborate those found by Dero (2008); Aziza and Ben-Youssef (2010) in a French context.

Regarding job satisfaction, the level of education and age both have a very significant and positive effect at the 1% level. Indeed, regardless of the level of education of individuals and the age group to which they belong, they feel more satisfied with their job. This found result

matches that of Colombier (2007) in a French context. On the other hand, the size of the household and the area of residence each exert a very significant effect at the 1% threshold, but negative. This means that workers residing in urban areas are 18.8% less likely to experience job satisfaction compared to their counterparts in rural areas. Similarly, the addition of one more individual in the household reduces the chances of job satisfaction by 6.91%. These two results can be explained by the fact that jobs in urban areas are more restrictive, more demanding, which is therefore a source of stress and depression leading to the deterioration of workers satisfaction (Colombier, 2007).

Regarding the duration of employment, sex and level of education each have a very significant effect at the 1% level. Indeed, regardless of level of education, male workers are 93.3% more likely to hold a regulated job than female workers, all other things being equal. This result can be explained by the fact that male workers are subject to the requirements linked to their traditional responsibility as head of the family and female workers are divided between family life and professional life given their responsibility as housewives, therefore, generally cannot work the regulated number of hours.

## **5. CONCLUSION**

This study examines the effects of ICTs on the quality of youth employment in Cameroon. To do this, the paper presents the theoretical and empirical debate on the relationship between ICTs and job quality. Job quality is apprehended according to five of its dimensions, in particular, income, job satisfaction, job security, regularity and duration in employment.

The empirical examination of the relationship was based on Heckman's (1979) two-step model, which choice is justified by the existence of a selection bias in our sample. The results of the regression suggest that employed workers in the formal sector and in the informal agricultural sector showing ICTs skills record a significant increase in their income of around 34% and 57% respectively. Similarly, by using these technologies, these workers have a better chance of signing fixed-term contracts and occupying jobs that respect the legal weekly duration. On the other hand, it appears that the use of ICTs is a risk factor for workers in the formal sector because it is likely to impact up to 25% on their income. Moreover, these tools constitute a factor of instability in the employment of young people. Our estimates confirm our predictions and show that the role of ICTs in promoting quality employment is mixed, but that it remains a decisive tool that should be used by policy makers to combat the precariousness of youth employment in the Cameroonian context.

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## APPENDICES

**Table 5: Correspondence between job quality indicators used by the various international institutions.**

Dimensions	ILO (2008)	EC-Laeken (2001)	UNECE (2010)
Occupational health and safety and working conditions	5. Forms of work required first. 7. Equal Opportunity and Treatment in Employment 8. Workplace Safety.	3. Equality between men and wife 4. occupational health and safety 9. diversity and no discrimination	1. Workplace safety and ethics
Remuneration	2. Adequate earnings and productive employment	1. Intrinsic quality employment.	2. Employment-related income and benefits
Working time and reconciliation between professional	3. Decent hours 4. Ability to balance work, family and private life	7. Work organization and work-life balance	3. Working time and work-life balance.



life and family life.			
Job security and social protection	6. Job stability and safety 9. Social Security	5. Flexibility and security	4. Employment security and social protection
Social dialogue and collective representation.	10. Social and employer dialogue	8. Social dialogue and worker participation	5. Social dialogue
Lifelong training		2. Lifelong learning and career progression.	6. Access to training and skills development
Other dimensions	1. Job Opportunities 11. Economic and social context of decent work	6. integration and access to the labor market 10. general work performance (productivity).	7. Workplace relationships and work motivation

*Source: Authors*