

Impact of information and communication technologies and employment in the services sector: The case of the Economic Community of West African States (ECOWAS)

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ABSTRACT

The rise of information and communication technologies is nowadays a channel for job creation in the services sector in ECOWAS because they make work more efficient and are a source of innovation. In this article, we analyse the impact of information and communication technologies on employment in the services sector in ECOWAS. In contrast to their ambiguous impact on employment in countries with a fairly high ICT penetration rate, we rather expect the internet to have a potentially positive impact on employment in the ECOWAS services sector. The results of our estimations confirm our predictions and show that the number of internet users positively and significantly affects employment in the service sub-sectors of education, health, distribution, transport & communication and finance & insurance. Furthermore, most of the control variables strengthen our predictions in terms of employment impact.

Keywords: Impact, Information and communication technologies, employment, ECOWAS, services.

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INTRODUCTION

In recent decades, information and communication technology issues have been at the centre of attention in most countries of the world. According to the United Nations Educational, Scientific and Cultural Organisation (UNESCO), information and communication technologies refer to all technology tools and resources for transmitting, recording, creating, sharing or exchanging information, including computers, the internet, live and recorded broadcasting technologies and devices, and telephony¹. In the remainder of this article, the Internet will be referred to as the proxy for ICT.

The emergence and spread of ICTs have radically changed the various production sectors of the economy.

The use of the Internet profoundly affects economic activity. Millions of people around the world use the Internet. At the enterprise level, it enables advertising, production, generation or other regular business functions. ICT is also used to innovate in all sectors of the production of goods and services. In particular, the services sector and its sub-sectors benefit from the development of ICT. The services sector accounted for 32.4% of total employment during 2009-2012 (UNCTAD, 2015).

The growing evolution of information and communication technologies such as the Internet heralds a profound economic and social revolution. Information and communication technologies have played a fundamental role in changing the way we work, exchange and learn. As such, ICTs offer a new perspective, new

¹ICT, in the UNESCO UIS Glossary, accessed on 22 April 2020 under: <http://glossary.uis.unesco.org>

means of production in the service sector. The question now is how to seize this new opportunity to promote employment and reduce youth unemployment. In this respect, the following question seems appropriate and deserves to be answered: How can ICTs contribute to the promotion of employment in the services sector in ECOWAS countries?

To contribute to the formulation of public policies relating to employment and ICT, in particular, to help decision-makers in ECOWAS countries to better understand the dynamics surrounding ICT, the main objective of this study is to highlight the channels through which ICT can contribute to job creation and the integration of young graduates into the labour market. Specifically, this paper i) estimate the contribution/impact of the internet to the promotion and creation of employment in enterprises; and ii) assess the importance of the internet in the service sector. This article is primarily a contribution to the literature on the possible impact of ICT on job creation in ECOWAS countries. However, the results may be useful for the development of sectoral policies aimed at enhancing the role of ICTs in promoting and creating employment and thus also contributing to poverty reduction. The rest of the paper is organized as follows: the first section presents the literature on the impact of technology on employment, the second section discusses some stylized facts on ICT and employment in ECOWAS. The third section highlights the methodology used in this paper. The fourth section discusses the results and interpretations and the last section is devoted to the conclusion and the main policy implications.

IMPACT OF ICT ON EMPLOYMENT

With the wave of globalisation, information and communication technologies (ICTs) are becoming an indispensable element. The intensity of economic activity is increasing and allows people to obtain information quickly at any time and from anywhere in the world thanks to data accessible through networks and software applications.

Internet penetration and access to ICT services are growing and allowing people to control their thermostats, track their exercise and heart rate, monitor their diet, share their home and car, and have groceries delivered to their door. In the private sector, companies can monitor and access a building's energy consumption, find faults in production and, of course, automate many tasks that were previously done by humans, thereby reducing the cost of production (Chorafas, 2011).

The issue of the impact of technology on employment is of increasing interest to policymakers today. Countries with higher ICT penetration are more likely to experience labour disruptions more quickly than those with lower

penetration. Harris (1989) work on the impact of ICT on employment in the United States concluded that technological trends would not have a dramatic effect on employment until the year 2000. Furthermore, their research indicated that employment effects would not have been noticeable because many firms had not yet begun to exploit the full potential of automation tools and high-speed communication networks (Anderson and Harris, 1989). For example, it was found at the time that ICTs were creating new jobs requiring higher skill levels, while low-skill, low-paying jobs were declining in industries that made extensive use of the technologies. More recent empirical evidence shows us that ICTs have an ambiguous impact on employment in industrialised countries where ICT penetration rates are low. Some types of information and communication technologies harm employment in sectors where they are more in demand, while other types have a positive impact on employment (Biagi and Falk, 2016; Garcia-Murillo, 2016).

Most ECOWAS countries are still in the early stages of the transition to more connected and automated societies. The objective of this article is to determine the impact that ICTs may have on employment in ECOWAS countries.

ICT AND JOBS IN ECOWAS: SOME STYLIZED FACTS

Internet access in ECOWAS

ECOWAS has seen dramatic growth in terms of the number of people with access to the internet in recent decades. Referring to data from the International Telecommunication Union, this rate has increased from 9.42% in 2000 to 53.94% in 2017 (Figure 1). In other words, if in 2000, almost one in 10 people had access to the internet, in 2017, it is more like one in two. This reflects the continued investment efforts of governments and operators to extend their networks to previously underserved areas. On the consumer side, demand for services has increased as new locally relevant services emerge and smartphones become more affordable. Also, 4G is starting to gain traction in ECOWAS, which explains the dramatic increase in the region.

Labour force participation and employment in ECOWAS

Statistics from the International Labour Organisation (ILO) present the labour force participation rate in ECOWAS. Overall, we find that the labour force participation rate is stationary in the zone and hovers around 59%. Men show the highest scores with a downward trend (69.85% in 2011 against 65.33% in 2019) against a relatively stationary rate of 59% for

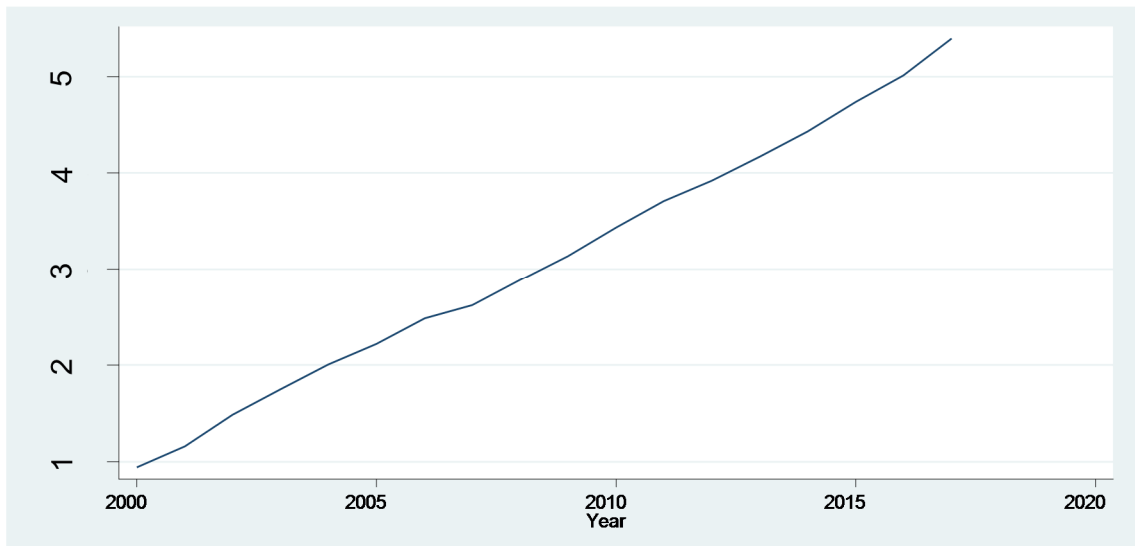


Figure 1. The internet penetration rate in ECOWAS. Source: Based on ITU database, 2020.

women during the period under consideration (Figure 2).

Figure 3 shows a relatively low unemployment rate in ECOWAS. It varies between 4 and 6% during the period 2000 to 2019. The comparative analysis of employment in ECOWAS shows that the issues of economic and professional integration of young people are part of the national priorities of member countries. To reduce unemployment, mechanisms are put in place. This is evidenced by the strategic plans to reduce

unemployment and poverty, which focus on job creation while ensuring stability. Another example is the introduction by some countries of the volunteer programme, which allows young people to be active in socio-professional life and thus gives them experience, but contributes to underemployment to the detriment of stable and decent jobs. The abundant ECOWAS labour force, which fluctuates around 60%, is more concentrated in the informal sector.

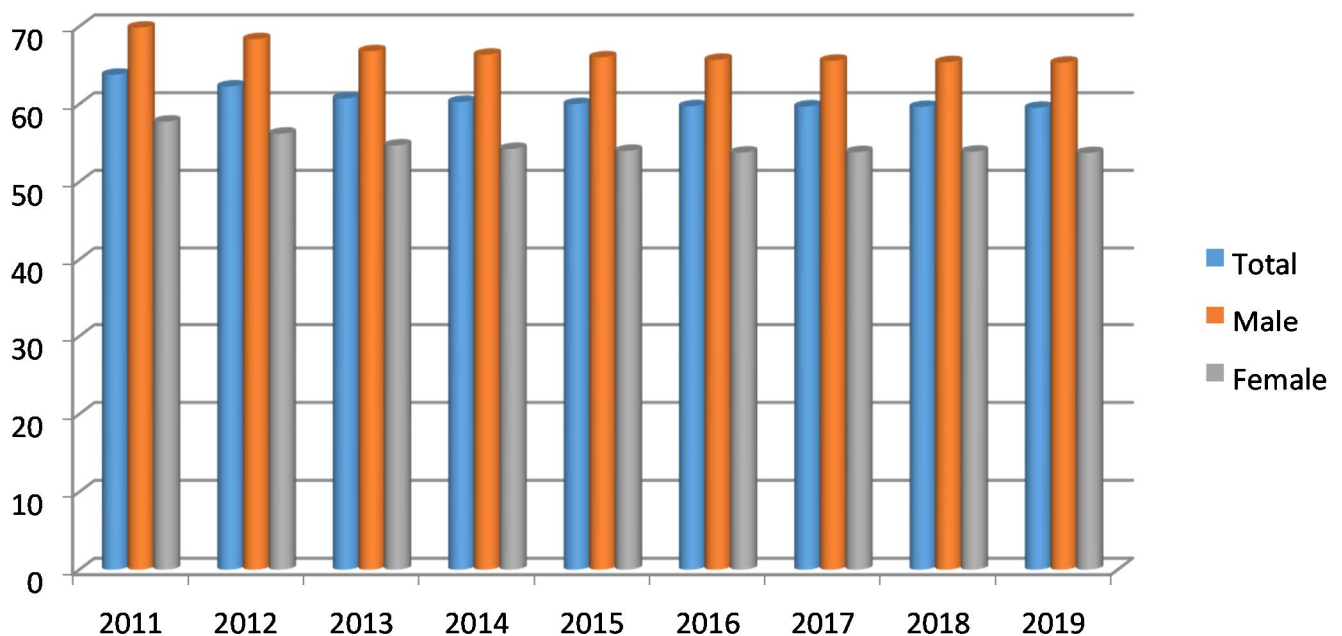


Figure 2. Labour force participation rates in ECOWAS. Source: Based on ILO database, 2020.

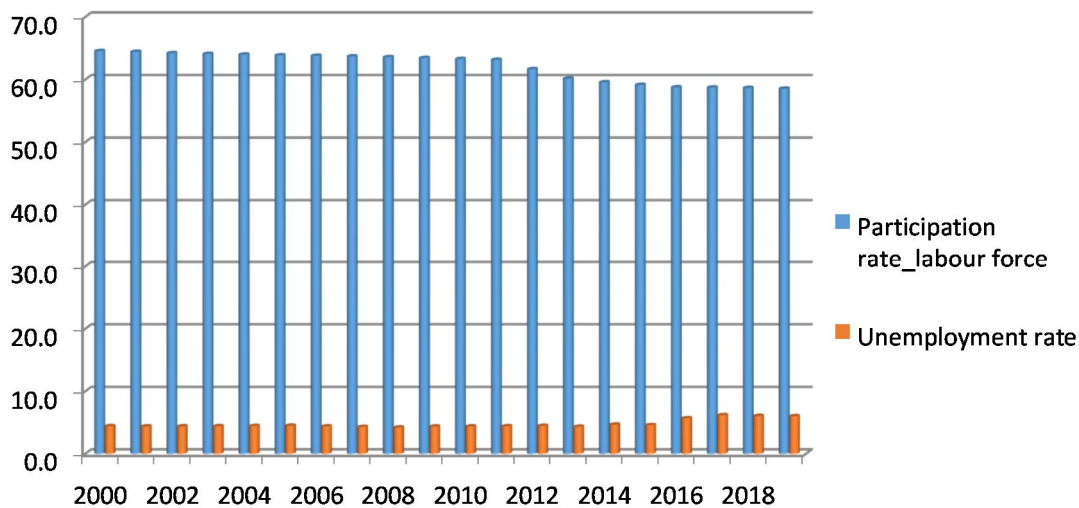


Figure 3. Labour force participation rate and unemployment rate in ECOWAS. Source: Based on ILO database, 2020.

METHODOLOGY, DATA AND MODEL

This article aims to analyse the links between ICT and the labour market. The search for transmission belts between ICT development and job creation is the basis of the methodological approach adopted by this study. To this end, the quantitative method was combined with the qualitative one to identify all the contours of the issue in ECOWAS.

We use data from the World Bank (World Development Indicators, 2020), the International Telecommunication Union (ITU database, 2020) and the International Labour Organization (ILO Stat, 2020). A panel of ECOWAS member countries over the period 2000-2017 is constructed to determine the impact of ICT on employment in this regional economic community.

The fixed-effects regression model to be estimated has as its dependent variable the volume of employment created in service production sectors such as transport & communication, distribution (wholesale and retail), education, health and finance & insurance, due to the large number of people employed in these sectors within ECOWAS. Furthermore, the production of services increasingly requires information and communication technologies. The internet is an essential tool in the design, delivery and promotion of services. Thus, the large-scale use of ICT by service-providing firms leads to job creation. We will estimate the coefficients of five equations that represent the above-mentioned service sub-sectors. The choice of the fixed effects model was decided following the Hausman test. We use the natural logarithm to smooth the values of the variables. The other advantage is that the *log* allows us to obtain elasticities.

The Internet penetration rate is the variable of interest in this study. It represents the number of individual Internet users. The relevance of the choice of this variable is due to its multifunctionality. Also, the internet is used by the majority of service-producing enterprises in ECOWAS countries. We hypothesise that it significantly and positively affects employment in the service sub-sectors indicated in this article.

The control variables are the same for all five equations. These are GDP per capita, gross fixed capital formation, secondary school enrolment and population size. These variables are all expected to significantly affect the volume of employment in the different service sub-sectors covered by the study (Table 1).

RESULTS AND INTERPRETATION

Econometric estimates show that information and communication technologies, as measured in this study by the number of internet users in ECOWAS countries, positively and significantly affect employment in the service sub-sectors of education, health, distribution (wholesale and retail trade), transport & communication and finance & insurance. This empirical evidence confirms the hypothesis that ICT positively influences employment in the services production sector within ECOWAS.

Furthermore, most of the control variables reinforce our predictions in terms of employment impact.

Impact of ICT on employment in the distribution services sub-sector (wholesale and retail trade)

The internet penetration rate in ECOWAS countries has a positive and significant impact on the volume of employment in distribution services. Companies in this sector use the internet to promote their sales, leading to an increase in the supply of jobs, all other things being equal. In addition, the internet has contributed to the emergence of virtual markets (e-market) which constitute a lever for the creation of employment in distribution services (Table 2: (1)).

Impact of ICT on employment in the transport and communication services sub-sector

We find that the internet has a significant and positive impact on job creation in transport and communication

Table 1. Study variables and expected signs.

Variables	Nature of the variable	Definition	Expected signs
Employment in finance and Insurance	Dependent	The volume of employment in the finance and insurance sector	+
Employment in education	Dependent	The volume of employment in the education sector	+
Employment in the health and social sector	Dependent	The volume of employment in the health and social sector	+
Employment in transport and communication	Dependent	The volume of employment in the transport and communication sector	+
Employment in the distribution, wholesale and retail	Dependent	Volume of employment in the distribution, wholesale and retail sector	+
GFCF	Independent	Gross fixed capital formation	+/-
GDP per capita	Independent	Gross domestic product per capita	+
Enrolment	Independent	Secondary school enrolment	+
Internet users	Independent	The number of individual internet users	+
Population	Independent	Total population	+

Source: Authors.

Table 2. Fixed-effects regression results.

Variables	LnEm_wholesale&re	LnEm_tr&com	LnEm_educ	LnEm_health	LnEm_fin&ins
Lngdp_capita	0.00617 (0.19)	0.0223 (0.64)	0.0164 (0.45)	0.00725 (0.15)	0.129* (2.59)
Lnpop	1.038*** (8.23)	1.373*** (10.04)	0.923*** (6.36)	0.677*** (3.55)	0.356 (1.82)
LnEnro_sch	0.0619 (1.75)	0.0474 (1.23)	0.233*** (5.69)	0.251*** (4.67)	0.139* (2.53)
Lngfcb	0.0338 (1.57)	-0.00589 (-0.25)	-0.00626 (-0.25)	0.0563 (1.73)	0.0505 (1.51)
Lnintern_users	0.0293** (2.61)	0.0271* (2.23)	0.0276* (2.14)	0.0387* (2.28)	0.0705*** (4.05)
The following is a list of some of the most important issues that have been raised in the last few years.	-11.33*** (-6.19)	-17.72*** (-8.93)	-11.35*** (-5.39)	-9.716*** (-3.51)	-5.771* (-2.03)
N	252	252	252	252	252

T statistics in parentheses * p < 0.05, ** p < 0.01, *** p < 0.001.

services within the regional economic community. The number of internet users in ECOWAS countries is helping to create employment. Transport is recognised as the most employed service sector in the sub-region. However, the advent of ICTs has allowed for a modernisation of the sector. The use of the internet to promote the sector's products has led to an increase in

demand and consequently an increase in the supply of jobs. Communication services are a provider of employment due to the dynamism of ICT. The Internet is the main raw material of the communication services sector. Companies in this sub-sector are heavy users of the internet and ICT products, which explains this empirical evidence (Table 2: (2)).

Impact of ICT on employment in the education services sub-sector

Employment-related to the education service is positively and significantly impacted by the number of internet users in the countries of the sub-region. Education is an important sector of the economy and employs a large number of people. The Internet contributes to broadening the scope of learners and facilitating access to education for all. Thanks to the Internet, distance education, known as e-learning, is creating new jobs due to the increased demand. It should also be noted that there have been many private initiatives that rely on e-learning platforms for their educational services (Table 2: (3)).

Impact of ICT on employment in the health services sub-sector

ICT has a positive influence on employment in the health services sector in the ECOWAS region. This is because the health sector in developing countries is understaffed and in the process of modernisation (use of ICT). Thus, the emergence of the Internet can contribute to creating employment in this sector. This empirical evidence is contrary to what is observed in developed countries where ICTs are helping to reduce the number of employees and to qualitatively transform work in the health sector (Bonneville, 2003; Hammer and Champy, 1993). The use of the internet in the health sector in West Africa is still in its initial stages due to the low internet penetration rate and the lack of ICT infrastructure (Table 2: (4)).

Impact of ICT on employment in the finance and insurance services sub-sector

Employment in the financial services sector is positively and significantly impacted by ICT within ECOWAS. This sector constitutes an important lever for the economy of the countries in the subregion. It is one of the sectors that adopted, in the early 2000s, ICT as an important tool in the design and promotion of financial products. Innovation in the sector has been driven largely by the internet. This dynamic has led to a considerable increase in the demand for financial and insurance products in the ECOWAS region. Thus, this momentum has led to an increase in the volume of employment in the sector, all other things being equal (Table 2: (5)).

The control variables such as population size, GDP per capita and secondary school enrolment rate have a positive impact on the volume of employment in the different sub-sectors under review. However, the significance of the impact differs according to the type of service concerned (Table 2).

CONCLUSION AND POLICY IMPLICATIONS

The main objective of this paper is to assess the impact that information and communication technologies have on employment in the service sector. To arrive at the empirical evidence, we resort to an econometric analysis based on ECOWAS countries from 2000 to 2017. Contrary to the results of the empirical evidence on the impact of ICT on employment in developed countries where ICT negatively influences job creation (Anderson and Harris, 1989), we find in this study that the internet remains a lever for job creation within ECOWAS. On the other hand, our results confirm the findings of Biagi and Falk (2016) and Garcia-Murillo (2016) who find a positive impact between ICT and employment in the services sector. This positive impact is observed in all five service sub-sectors of the economy of ECOWAS countries. The volume of employment, financial services, educational services, health services, distribution services and transport & communication services is positively impacted by the internet. In addition, the secondary school enrolment rate contributes positively and significantly to job creation in the education, health and finance & insurance services sectors.

Given the above, we recommend that the authorities in charge of ICTs in the countries of the West African sub-region implement policies to guarantee universal access to it. Measures aimed at expanding the internet network will be useful for the promotion and creation of employment. The low level of internet penetration in ECOWAS needs to be improved to boost employment in the service sectors listed in this study. In addition, an improvement in schooling conditions at the secondary level would have a positive impact on employment in education, health and financial services. It is therefore a question of making education accessible to all (free or, failing that, at a fairly low cost and improving school infrastructure). The Internet favours the creation of employment in ECOWAS countries, whereas it contributes to a quantitative reduction in employment in developed countries. However, this empirical evidence in these developing countries cannot be sustained in the long term. Therefore, the authorities in charge of labour market regulations must anticipate a possible negative impact of ICT on job creation in West African countries.

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