



# Upshots of information technology on labour market in Africa: A precursor to unemployment in the Ghanaian banking industry

Abdul Azeez Mikhail \*

*Tamale Technical University, Faculty of Business, Department of Accountancy*

## Abstract

This paper sought to investigate the fundamental factor(s) that underpin the high rate of unemployment in the banking industry in Ghana as a result of improvement in ICT with the view to assessing whether entrepreneurship skill development could be a panacea to the problem. A theory/model of employment alone may not be sufficient to explain the behaviour of unemployment; therefore, this paper adopts an array of models as premises for the research: Boone, Liu and Zeng, Feldmann. The questionnaire was the main instrument used to elicit the views of the general public and the staff members of the three (3) selected banks in this study namely; Barclays, Ghana Commercial, and Agricultural Development. Purposive and convenience sampling techniques were employed which allowed the researcher to select particular banks and the respondents needed for the desired information. The empirical results show that technological breakthrough has a double-edged sword. The banks see technological revolution as advantageous because they enjoy an improvement in productivity, speed, efficiency in service delivery, customer services, security concerns, and reduces the cost of hiring labour. However, the study shows that adoption of information technology has undoubtedly caused unemployment in the banking sector in Ghana with its associated upshots. This study discovered that majority (70%) of graduates are unemployed. The study indicated that 33% of respondents considered modern technology as the causes of unemployment in Ghana. It is discovered that adoption of new technologies has a causal effect on employment in Ghana with (70%) specific emphasis on the labour force. The study in order to solve the employability and job seekers recommends that adequate and conscientious efforts should be made by the government to ensure improvements in education and training of students in tertiary institutions with a greater emphasis on technical education, vocational skills and entrepreneurship.

**Keywords:** Unemployment, Labour Market, Information Technology, Banking Industry, ATM, Entrepreneurship

Published by ISDS LLC, Japan | Copyright © 2017 by the Author(s) | This is an open access article distributed under the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.



**Cite this article as:** Mikhail, A.A. (2017), "Upshots of information technology on labour market in Africa: A precursor to unemployment in the Ghanaian banking industry", *International Journal of Development and Sustainability*, Vol. 6 No. 4, pp. 168-191.

## 1. Background of the study

The emergence and growing use of electronic commerce (E-e-commerce) in the banking industry are presumed to have had negative effects on employment across the globe of which Ghana is not an exception. For example, an E-Banking initiative such as the internet has replaced many people. The Automated Teller Machine (ATM) has also displaced cashier tellers, and this creates unemployment in the banking industry in Ghana (Emmanuel, 2011).

Mouhammed (2011) in his study observed that many countries whether advanced capitalist economies or developing countries have experienced very high rates of unemployment since the Great Recession of December 2007. The America economy faces an unemployment rate of 9.2 percent in June 2011, and Egypt has a rate of unemployment of 19 percent. The Saudi economy faces a rate of unemployment of 10 percent. This problem is very costly economically and politically. Mouhammed pointed out that economically, unemployment represents a loss in the Gross Domestic Product (GDP). Politically, the world witnesses the Arab revolt in Egypt, Tunisia, Syria, Libya, Iraq, and Bahrain, to mention but a few, a revolt that is caused by unemployment, poverty, inequality, and dictatorship. Economic literature provides many explanations for the unemployment problem. Some causes blame the economic systems, and others blame the unemployed workers.

He further asserted that other theories shift the problem to external sources and shocks, or unpredictable events, and others argue that technology and labour market institutions are the causes of the unemployment problem. Other theories think the deficiency in aggregate spending and innovations are the essential factors for explaining the problem (Mouhammed, 2011).

Rotman (2013) contended that automation and digital technologies are partly responsible for today's lack of jobs and this has obviously touched a raw nerve for many worried about their own employment. New technologies are encroaching into human skills in a way that is completely unprecedented. Rotman further affirmed that the rapid acceleration of technological progress has greatly widened the gap between economic winners and losers; the income inequalities that many economists have worried about for decades. Digital technologies tend to favour "superstars". For example, someone who creates a computer programme to automate tax preparation might earn millions or billions of dollars; however, this may lead to eliminating the need for countless professional accountants' labour efforts (Rotman, 2013).

In this increasingly automated economy, technology has replaced much of the need for non-elective human labour: in other words, we increasingly face a situation of technological unemployment. This automation is a double-edged sword. On the one hand, technological unemployment worsens income inequality and wealth disparity. On the other hand, there are purported gains in productivity and economic growth (Swan, 2017).

Suffice therefore to assert that despite its negative implication in the area of employment, technology is still the most extensive means of doing banking transactions in Ghana and in most developing countries. There has been a growing use of the internet for the business transaction by many industries including the banks in the last decades. The use of internet technology is briskly changing the way customers' financial

services are being premeditated and delivered by many banks in Ghana. Ghanaian banks have a presence on the internet platforms and have employed e-banking to offer their products and services to their customers online and this has displaced some class of labour force in the process.

In view of the increasingly automating of this local economy which sought to replace much of human labour and its negative implication in the area of employment, this paper sees this as a knowledge-gap worth investigating, and entrepreneurship is seen as an intervening variable (panacea) to solving this distressing trend.

### 1.1. Problem statement

Today in Ghana, there has been a great concern that technological advancement (especially in the area of Artificial Intelligence) may displace much of the banking work force, creating widespread unemployment, social disruption, and human hardship. It is against this background that this study investigates the challenges brought about by improvement in Information and Communication Technology (ICT) on labour force in Ghana, particularly in the banking industry. The thrust of this study is to ascertain the fundamental factor(s) that underpin the high rate of unemployment in the banking industry in Ghana. Also, this study seeks to assess whether entrepreneurship skill development could be a volunteer as a panacea to the problems created by ICT with a view to arresting these distressing phenomena.

### 1.2. Objectives

The general objective of this study is to find out the challenges brought about by improvement in information technology on labour force particularly in the banking industry and to also determine whether entrepreneurship skill acquisition is a panacea to solving the unemployment menace in the banking industry in Ghana.

### 1.3. Research questions

- i. Would improvement in technology create unemployment in the banking sector in Ghana?
- ii. Would the adoption of new ICT services (e.g. ATM) lead to unemployment in the banking industry in Ghana?
- iii. Do you think entrepreneurship skill acquisition is a panacea to solving the unemployment menace created by modern ICT in Ghana?

## 2. Theoretical models

There is no single unified model of unemployment (Parker, 2010). While employment and unemployment are clearly connected in important ways, Parker postulated that a theory of employment alone is not sufficient to explain the behaviour of unemployment. This paper, therefore, adopts an array of models as

premises for the research. Boone in his model (2000) introduced a model with two types of innovations; product innovation that increases product quality and process innovation that reduces firms fixed labour costs. He showed that with labour market imperfections (such as trade union bargaining or efficiency wages), which raise the wage rate above the shadow price of labour, firms over-invest in process innovation (in order to cut fixed labour costs) and underinvest in product innovation (which would increase product quality). As a result, Boone argued that the market outcome features higher unemployment than the social optimum.

Mortensen and Pissarides as cited in Feldmann (2013) studied a more general equilibrium model in which new technology embodied in capital equipment can be adopted either through the destruction of existing jobs and the creation of new ones or by renovation, that is, updating the job's equipment. They showed that faster productivity growth due to new technology lowers unemployment when renovation cost is low but increases unemployment when the cost is above a critical value.

Liu and Zeng (2008) developed a model of endogenous growth to investigate the determinants of unemployment and growth in the long run. They discovered that both unemployment and growth depend not only on factors typically identified in endogenous growth models, such as the productivity of Research and Development but also on labour market parameters, such as unemployment benefits and hiring costs. Furthermore, they discovered that whereas policies that increase labour market efficiency can reduce unemployment, policies that provide incentives for investment in Research and Development may actually increase unemployment.

In a related development, Manuelli's model (2000) provided perhaps the most direct link between the 1970s and the 1990s. In his model, an anticipated (but not yet realised) improvement in technology reduces the market value of existing firms, which causes firms to cut back on investment and job creation. Thus, the unemployment rate goes up. Once the new technology becomes available, firms begin to increase investment through entrepreneurship innovation and create more jobs, causing the unemployment rate to fall. Manuelli further argued that stock markets fell and unemployment rose in the mid-1970s partly because markets realized that new technologies were coming that would make existing ones obsolete. These new technologies (relating to computers and information technology) began to mature sometime in the 1980s, causing unemployment to fall and productivity to rise over time. His model did not predict a productivity slowdown in the 1970s, though others have proposed similar models that do.

Feldmann (2013) in his paper *Technological Unemployment in Industrial Countries* concluded that an increase in technological change substantially increases unemployment over years and disappears later. His study results corroborated Manuelli (2000) models that technological change substantially increases unemployment over years and disappears later. This assertion also supported Liu and Zeng's (2008) hypothesis that policies which provide incentives for investment in Research and Development (technological change) may actually increase unemployment in the long run.

## 2.1. Literature review

### 2.1.1. Operational definition of unemployment and technology

### 2.1.1.1. Unemployment

Unemployment represents the number of people in the work force who want to work but do not have a job. It is generally stated as a percentage and calculated by dividing the number of people who are unemployed by the total work force. The work force is made up of those people who want to work; it excludes people who are retired, disabled, and able to work but not currently looking for a position; for instance, they may be taking care of children or going to college (Mabry and Sharplin, 1986).

### 2.1.1.2. Technology

The word technology as cited in Mabry and Sharplin (1986) is a combination of two Greek words, *techne* and *logos*. *Techne* means art, craft, or skill. *Logos* means "to speak of". Some have since taken the word *logos* to imply the practical application of *techno*, but others say that it is stretching its etymological roots. Merriam-Webster (2014) said technology is "*application of knowledge to the practical aims of human life or to change and manipulating the human environment. Technology includes the use of materials, tools, techniques, and sources of power to make life easier or more pleasant and work more productive. Whereas science is concerned with how and why things happen, technology focuses on making things happen*".

Technology in the workplace improves the efficiency of screening, recruiting and hiring potential candidates. Businesses utilize the Internet to spread the word about the organisation and advertise job openings. Hiring managers can target candidates by using digital advertising technology that tracks the websites they visit (Mabry and Sharplin, 1986). Mikhail (2017) in his paper posted that information and communication technology has been seen as the next thing to revolutionise countries socio-economically and lead them into the new era of the knowledge based economy.

## 2.2. Types of technology in banking industry

New technology used in the workplace might include a software programme to help facilitate or organise the day's tasks. In addition, some corporations incorporate online technology and electronic technology to increase productivity and keep employees informed. They may post company updates on a corporate blog or website or use social media. Employers might hold video conferences or webinars. What is more, employers might invest in tablet computers in order for their staff to maintain their calendars, email and contacts (Higuera, 2017).

## 2.3. Global technological breakthrough: A causal to unprecedented joblessness

### 2.3.1. Trends of unemployment (joblessness) in Ghana

The high unemployment rate is said to be the most critical problem facing the country currently. It is for this reason that a lot of Ghanaians have called on Government to institute policy reforms that will speed up the rate of transmission of growth impulses into improved living conditions so that this could be released to the masses, especially with respect to employment. Institute of Economic Affairs-IEA (2015) in its Socio-economic and Governance Survey release as reported in *Daily Guide* (2015), made this known and it also

adds that addressing issues of the economy was another area of concern to Ghanaians. A fifth (20 percent) of respondents considered unemployment to be the most critical concerns of Ghanaians (IEA, 2015).

Ghana Statistical Service (GSS) in its survey in 2013 on the unemployment rate in all the 10 regions of Ghana as cited in IEA observed that persons aged 18 years and above as the target population to determine the unemployment rate in Ghana. Selected households and individuals for the survey were randomly sampled from pre-selected primary sampling units. Unemployment Rate in Ghana decreased to 5.20 percent in 2013 from 5.96 percent in 2010. Unemployment Rate in Ghana averaged 8.82 percent from 2001 until 2013, reaching an all time high of 12.90 percent in 2005 and a record low of 5.20 percent in 2013.

Baah-Boateng (2013) observed that higher youth unemployment requires the need for targeted policy intervention to remove the constraints facing them particularly at the entry point of the labour market. The empirical results of this study revealed that individuals seeking self-employment are more likely to be unemployed relative to seekers of other employment confirms the constraints such as skills and start-up supports that inhibit self-employment or entrepreneurial development. Baah-Boateng further argued that the higher probability of unemployment occurring among those with higher education in 2005/06 has rekindled the debate of strengthening vocational and entrepreneurial skill training and start-up support to facilitate youth entry into entrepreneurial business as 'job creators' rather than seekers of jobs.

This researcher after a thorough contemplation agrees with IEA (2015) survey findings which corroborate GSS (2013) report and also supports Baah-Boateng (2013) findings that acquisition of entrepreneurship skills, re-writing, re-evaluating, re-viewing curricula design in teaching vocational and tertiary institution with start-up support facilitating from government would be the panacea to solving this distressing phenomenon in Ghana.

### *2.3.2. History of technology adoption in banks in Ghana*

In Ghana, the earliest forms of internet, electronic and communications technologies used were mainly office automation devices. Telephones, telex and facsimile were employed to speed up and make more efficient the process of servicing clients. For decades, they remained the main information and communication technologies used for transacting bank business (Ackah and Agboyi, 2014).

Ackah et al. (2014) posited that as competition intensified and the PC became proletarian, Ghanaian banks began to use them in back-office operations and later tellers used them to service clients. Advancements in computer technology saw the banks networking their branches and operations thereby making the one-branch philosophy a reality. Barclays Bank Ghana Limited and Standard Chartered Bank Ghana Limited pioneered this very important electronic novelty, which changed the banking landscape in the country. Probably, the most revolutionary electronic adoption in Ghana and the world over has been the ATM.

Ackah et al. (2014) observed that, in Ghana, the Trust Bank, Ghana (now a member of the ECOBANK), in 1995 installed the first ATM. Not long after, most of the major banks began their ATM networks at competitive positions. Ghana Commercial Bank started its ATM offering in 2001 in collaboration with Agricultural Development Bank. Currently, almost all banks in the country operate ATMs. The ATM has been the most successful delivery medium for consumer banking in this country. Customers consider it as

important in their choice of banks, and banks that delayed the implementation of their ATM systems, have suffered irreparably. ATMs have been able to entrench the one-branch philosophy in this 17 county, by being networked, so people do not necessarily have to go to their branch to do some banking.

This is, however, on a more limited scale though, as it has been targeted largely at corporate clients. Banks have recognised the internet as representing an opportunity to increase profits and their competitiveness. Many banks are offering internet banking (E-Banking) in Ghana. Historically, businesses interested in obtaining high levels of customer satisfaction have focused on using knowledgeable, pleasant servers to deliver high-quality products and services to their target markets (Ackah et al., 2014).

Institute of Statistical, Social and Economic Research (ISSER) (2005) in its annual flagship document observed that a National ICT for Accelerated Development policy was introduced in 2003 with the objective of engineering an ICT-led socio-economic development process. The impact of these initiatives is evident in the November 2005 edition of *African Business*. The article on the Ghana profile titled "Cake is bigger but the slices are smaller", it is claimed that "Ghana has the most developed IT sector in West Africa". For a country which hitherto could clearly be described as sitting at the disadvantaged end of the global digital divide, it becomes important to ascertain how ICT is affecting the Ghanaian banking business, which also tends to contribute substantially to Ghana's service sector revenues (ISSER, 2005).

### 2.3.3. Internet and e-banking

#### 2.3.3.1. Internet banking

An internet bank can be defined as a bank that provides account balances and some transaction capabilities to retail customers over the World Wide Web. Technology has created internet banking, also called online banking. The creation of the internet through technology has led to many banking transactions or activity options via the internet. Some of these activities include; paying bills, 24-hour view of accounts, transferring money and many others. Customers access their banking information from a browser-software that runs the banking programmes on the World Wide Web (Stanbic Bank, 2017).

Customers can personally and privately access their account information through the internet via a modem. Technology has allowed us to dial into the bank via the modem system which allows us to download data, and run programmes that make us access a wide range of banking information such as; account balances, number and types of banking transactions, bank statements, among others (Stanbic Bank, 2017).

#### 2.3.3.2. E-banking

Technology has created electronic banking. E-Banking can be defined as the automated delivery of new and traditional banking services and products directly to customers through electronic, interactive communication channels. Technology has affected and changed banking with the many benefits and convenience e-banking has created. It includes the system that enables bank customers to access accounts, transact business or obtain information on financial products and services. Customers can now quickly complete transactions such as 5-10 minute deposits/withdrawals to 30-60secs ATM deposits/withdrawals,

online checking accounts, online transfers and many e-banking transactions (Online banking - Wikipedia, 2017).

The accessibility of e-banking has been possible due to the technological advancement in laptops or personal computers, kiosk, Touch Tone phones, personal digital assistant (PDA) and automated teller machines (ATM). According to industry analysts (BNET.com), electronic banking provides variety of attractive possibilities for remote account access, including: Availability of inquiry and transaction services around the clock; worldwide connectivity; Easy access to transaction data, both recent and historical; and "Direct customer control of international movement of funds without intermediation of financial institutions in customer's jurisdiction (Online banking - Wikipedia, 2017).

### *2.3.4. The competition between labour force and technology*

Yasuharu as cited in Ackah et al. (2014) posited that implementation of information technology and communication networking has brought about a revolution in the functioning of the banks and the financial institutions. The transition to electronic banking has, therefore, become a necessity for banks as it offers major opportunities in terms of competitive advantage and it also allows banks to develop a stronger and more durable business relationship with its customers.

Freeman and Soete (1994), Vivarelli and Pianta (2000), and Edquist et al. (2001), all maintained that innovation in production has a positive influence on employment. On the contrary, some scholars did not contemplate the effect of ICT on employment. As noted by Koellinger (2006), the effect of ICT on employment, on one hand, can be positive by making creativity result in employment, and development growth and on the other hand can be negative due to the replacement of machinery services instead of the human labour force (especially non-skillful workers).

Tomas and Diaz (2002) also examined the effect of technological innovation on the quality and quantity of employment in Spain for the period of 1980-1990. They established that technological innovations led to an increase in the number of technicians in 1990 compared to the same number in 1980.

Harrison et al. (2006), in their study "the effect of ICT on employment rate of France, Germany, Spain and England firms during the years 1998-2000", established that, ICT did not only create a direct and positive change in employing labour force but also created an indirect positive change, following compensatory effects of lowering the prices of the produced commodities.

Feldmann (2013) using annual data on 21 industrial countries from the period 1985 to 2009 and a large number of controls empirically analysed the impact of technological change on unemployment. As a proxy for technological change, it uses the ratio of triadic patent families to the population. The regression results elicited from the study indicate an increase in technological change substantially increases unemployment over three years. The main regression results suggest that technological change, as measured by the 'patents' variable, had a substantial impact on unemployment over the sample period. Specifically, a one standard deviation increase in the 'patents' variable is associated with a rise in the unemployment rate of between 2.3 and 3.0 percentage points, *ceteris paribus*.

Feldmann observed that the regression results indicate that faster technological change is likely to increase unemployment substantially. The study revealed that adverse effect on unemployment appears to persist for three years and disappears later. Thus, with Feldmann's findings, the effect is transitory, not permanent. The results are robust to both endogeneity and numerous variations in specifications. They lend support to the many theoretical contributions (for example, by Schumpeter and Neo-Schumpeterian) according to which faster technological progress may increase unemployment, at least during a transition period.

Vivarelli (2007) in his study, points out effective ways ICT has on the employment rate. This he argued has increased the number of skilled labour force, decrease in production cost, development of the competitive market, developing business atmosphere and finally motivation of self-entrepreneurship, innovation and creativity.

### *2.3.5. The Luddite Fallacy*

Pettinger (2016) explained Luddite Fallacy as the observation that new technology does not lead to higher overall unemployment in an economy. He argued that new technology does not destroy jobs – it only changes the composition of jobs in the economy. He further asserted that a Luddite is a term used (usually pejoratively) to describe people who oppose the introduction of new technology. The idea that new technology leads to job losses has persisted, despite the fact that economists are almost universally united in stating that new technology will not increase the long-term unemployment rate (though there may be temporary structural unemployment).

Research investigation reveals that the Luddites were a group of English textile workers who violently destroyed machines. They broke up power looms because they feared that these new machines were taking their jobs and livelihoods. Against the backdrop of the economic hardship following the Napoleonic wars (from 1803 to 1815), new automated looms meant clothing could be made with fewer lower-skilled workers. The new machines were more productive, but some workers lost their relatively highly paid jobs as a result. It was this unemployment of former skilled workers which led to the industrial unrest and direct action (Pettinger, 2016).

### *2.3.6. Why technological change can increase unemployment*

Pettinger (2015) argued that if labour markets are flexible, then technological change will not cause unemployment. However, if there are labour market inflexibilities, then it can cause unemployment – at least, for a certain time period. He cited that example, due to technological change; coal miners may lose their jobs. However, due to occupational and geographical immobilities, they may be unable to take new jobs in the service sector. (For example, a miner may not have skills to work in computer firm; he may find it hard to relocate). In this case, Pettinger maintained that technological change can cause a temporary increase in unemployment which will last until the coal miners develop greater skills and ability to move. Graham (2016) observed that as technology and artificial intelligence advances, jobs in banks and offices would be replaced by automation.

Graham argued further that according to some scenarios, artificial intelligence will quickly replace many forms of complex knowledge work ranging from lawyers to librarians, professors to policy analysts. In a press release by Spicer cited by (Graham, 2016), there are already robot-journalists which scour news feeds and then automatically generate stories. This could be a serious problem for developed economies where a large proportion of well-paid jobs are forms of knowledge work.

In recent times, Self-Service Technologies (SSTs) are fast changing the conventional way of transacting business by business organisations. The rapid innovation of self-service technologies and its adoption and usages in all facets of human systems is acclaimed to be fast rendering low skilled workers jobless. The major sectors of the economy in advanced economies have reached their peaks and can no longer provide new employment due to an increase in the productivity growth rate as a result of technology advances (Otekhile and Zeleny, 2016). These SSTs have in no small measure brought about an increase in productivity growth rate, cost reduction and an increase in the speed of service delivery to customers. Otekhile et al. (2016) in their paper examine if self-service technologies truly are the cause of persistent unemployment through a study of the long term metamorphosis of the major economic sectors in advanced economies. Their findings revealed that the SSTs present both risks and opportunities.

Trehan (2001) explained that economic theory provides a number of reasons why the unemployment rate might be affected by a surge or a fall in the rate of productivity growth that is due to technological developments. However, at this point, there is no evidence on the relative importance of the different links emphasized by different models. It will take further research to determine the relevant empirical magnitudes

#### 2.4. Future impact of ATMs machine on employment in the banking sector

Mattes (2016) posited that the banking occupation (For example, bank teller) is under threat from bank automation. That in the future, ATMs will be able to perform most of their tasks, such as opening accounts and processing loans. Mattes observed that the ATM of tomorrow is going to replace the teller that ATM can do approximately 90 percent of what the human being can do and it is going to be your branch in a box.

Further research investigation reveals that ATMs will be able to perform these functions at a fraction of the cost compared to human employees: That they will be able to check and process any paperwork. That the new machines will identify oneself and can put your passport on it, they can scan documents, and you can literally do anything online that you would have been able to do in front of a human being.

Georgiou and Miltiades (2009) in their study concluded that unemployment rate due to technology use in production has an optimum (maximum) at a critical point of technology use. They argued that any technology use lower than this critical level the unemployment rate increases as technology use increases, while the opposite takes place if technology use increases beyond this critical level. Their paper refers to the whole manufacturing sector in many western European countries covering annually the period 1995 - 2005. Panel data are elaborated with the views software package.

The U.S. President Obama in an interview with Ann-Curry (2011) talked about one of the reasons he thought employment numbers have been slow to rebound. In this interview, Obama cited by Ann-Curry said that there are some structural issues with the economy where a lot of businesses have learned to become

much more efficient with a lot fewer workers. “You see it when you go to a bank and you use an ATM, you do not go to a bank teller, or you go to the airport and you are using a kiosk instead of checking in at the gate” cited Ann-Curry. It should be noted that all these things have created changes in the economy and what we have to do ... is identifying where the jobs for the future are going to be.



Figure 1. AMT Machine and Bank Tellers

### 3. Methodology

#### 3.1. Research design

##### 3.1.1. Survey instrument: Design and administration

The questionnaire was the main instrument used for the data collection. The main reason for using this instrument was to collect enough firsthand information from respondents. Drawing an understanding from Popper cited in Routledge, Taylor and Francis (2004). They argued that with a questionnaire large amounts of information can be collected from a large number of people in a short period of time and in a relatively cost effective way. The results of the questionnaires can usually be quickly and easily quantified by either a researcher or through the use of a software package. They also argued that quantitative data can be used to create new theories and/or test existing hypotheses.

The questionnaire was used to elicit the views of the staff members of the three (3) selected banks in this study namely; Barclays Bank Ghana, Ghana Commercial Bank and Agricultural Development Bank Ghana. The questionnaire was administered to unemployed job seekers in a random manner with no discrimination as to sex, qualification or position. This was done with the help of a field assistant.

#### 3.2. Population size

The population size for this study was 60 respondents comprising a cross-section of selected banking staff members, management of banks and the general public in Ghana. Three (3) banks in Tamale (Barclays Bank

Ghana, Ghana Commercial Bank and Agricultural Development Bank Ghana) were selected using convenience sampling technique out of twenty-eight (28) banks in Ghana, 10 members of management of the banks, 20 members of staff and the 30 people from the general public were purposively selected. The management and the staff comprised the Head of the Electronic Banking department, the Head of the Card Centre, the IT Manager, the E-Business Manager and 16 members of staff either from the Electronic Banking or from the IT departments. In all, 60 copies of the questionnaire were administered to the respondents to be able to elicit their views on the core variables in this study (information technology, unemployment, banking, labour market, entrepreneurship skills).

### 3.3. Sampling technique

Purposive and convenience sampling methods were employed which allowed the researcher to select particular banks and the following respondents needed for the desired information: Thirty (30) officials of the banks which included (10) of the Group Heads of the Electronic Banking, the Heads of the Card Centre, the IT Managers, E-Business Managers and (20) staff from the Electronic Banking and IT departments as main respondents and also a convenience sampling was applied on selected (30) respondents from the general public for the study.

## 4. Presentation and discussion of findings

Sixty (60) copies questionnaire were administered to respondents to elicit their views. These were administered to bank IT, staff, members of management of the selected banks (Barclays Bank Ghana, Ghana Commercial Bank and Agricultural Development Bank Ghana) and the general public. The researcher retrieved all the copies of the questionnaire administered for immediate analysis.

### 4.1. Findings from bank staff

**Table 1.** Gender Profile of Respondents (Bank Staff)

<b>Gender</b>	<b>Number of Respondents</b>	<b>Percentage (%)</b>
Male	12	60
Female	8	40
<b>Totals</b>	<b>20</b>	<b>100</b>

*Source: Field Data, 2017*

Table 1 shows the number of males and females officials who were provided with copies of the questionnaire. Out of twenty (20) copies of the questionnaire retrieved, twelve (12) respondents representing sixty percent (60%) were males and eight respondents representing forty percent (40%) were females. This indicated that majority (60%) of the respondents were males.

**Table 2.** Age Profile of Respondents (Bank Staff)

<b>Age (In Years)</b>	<b>Number Of Respondents</b>	<b>Percentage (%)</b>
20-30	5	25
31-40	11	55
41-50	3	15
51 and above	1	5
<b>Total</b>	<b>20</b>	<b>100</b>

Source: Field Data, 2017

The frequency distribution of the age profile of respondents is given in Table 2. The table shows that 5 of the respondents, representing 25% are between the ages of 20 – 30 years, 11 of the respondents, representing 55% are between the ages of 31 – 40 years, 3 of the respondents, representing 15% are between the ages of 41 – 45 years and 1 employee representing 5% was 46 years and above. This is an indication that the staff members in these banks are the youthful (55%).

**Table 3.** Educational Background of Respondents (Bank Staff)

<b>Educational background of respondents</b>	<b>Number of respondents</b>	<b>Percentage (%)</b>
Post Graduate Degree	7	35
Graduate Degree	10	50
Higher National Diploma	3	15
Other Levels of Education	0	0
Senior High School	0	0
<b>Total</b>	<b>20</b>	<b>100</b>

Source: Field data, 2017

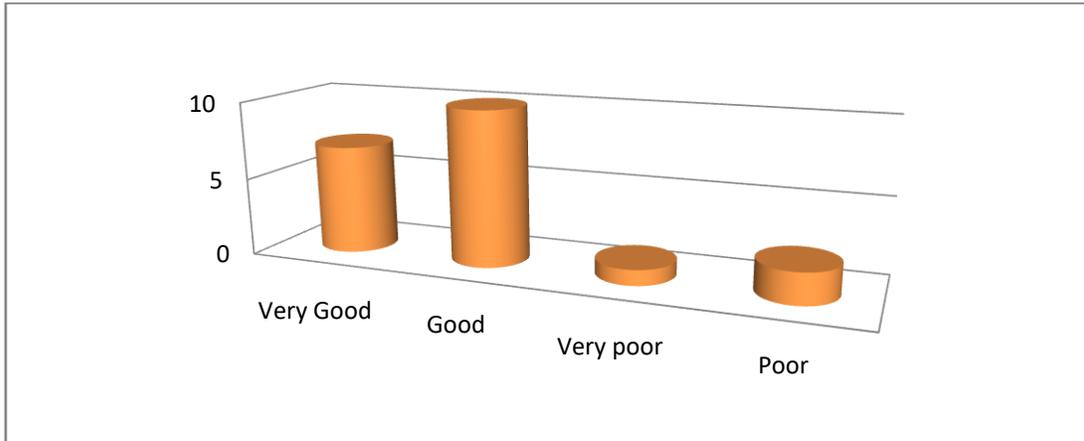
This section gave the educational attainments of the respondents within the studied population. From Table 3, out of the 20 respondents, 7 of the respondents, representing 35% have Post Graduate Degrees (Master Degrees); 10 of the respondents, representing 50% have Graduate Degree; 3 of the respondents representing 15% have High National Diploma (HND). It is striking to note that no employee was employed with lower level certificates. The table shows that all the respondents have at least a first degree.

**Table 4.** Respondents knowledge of technology (Bank Staff)

<b>Respondents knowledge of technology</b>	<b>Number of Respondents</b>	<b>Percentage (%)</b>
Usage of computers in the bank	2	10
Doing money transfer	1	5
Networking of the banking processes and procedures	17	85
<b>Total</b>	<b>20</b>	<b>100</b>

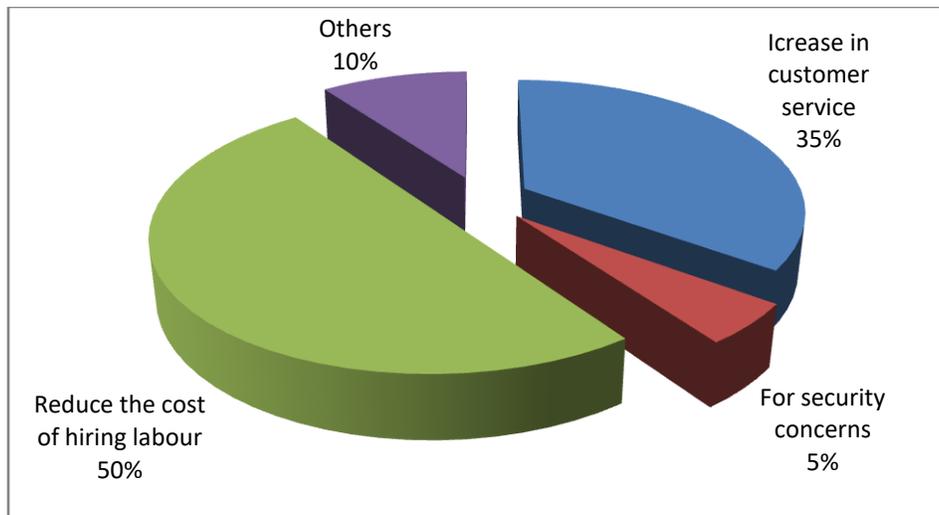
Source: Field Data, 2017

From Table 4, 2 respondents representing 10% said computer technology is used in the banks, 1 respondent representing 5% referred to the technology as operating money transfer and 17 respondents which are 85% said technology is the networking of the banking processes and procedures. It is, therefore, inferred that 85% of the workers have a lot of technological experiences.



**Figure 2.** Respondents’ remarks on the effect of the adoption of technology in the banking sector (Bank Staff) (Source: Field Data, 2017)

From the Figure 2, 7 respondents representing 35% looked at the adoption of technology in the banking sector as very good. Ten (10) respondents which represented 50% said technological adoption is good. One (1) representing 5% said ICT adoption is very poor while 2 respondents which represented 10% said the effect of ICT adoption is poor. The justification is that it created unemployment in the system.



**Figure3.** Why was technology adopted? (Bank Staff) (Source: Field Data, 2017)

In the Figure above, reduce the cost incurred on labour is the most reasonable with 50% out the 100% respondents, followed by an increase in customer's services 35%, 10% respondents from others and 5% said it is for security concerns. From this analysis, it can be inferred that the adoption of ICT has reduced the cost incurred on labour.

#### 4.2. Findings from management

**Table 5.** Respondents' Gender Profile (Management Officials)

<b>Gender</b>	<b>Number of Respondents</b>	<b>Percentage (%)</b>
Male	7	70
Female	3	30
<b>Total</b>	<b>10</b>	<b>100</b>

*Source: Field Survey 2017*

Table 5 shows the number of males and females management officials who were administered copies of the questionnaire. Out of twelve (12), copies of a questionnaire administered to ten (10) were retrieved, 7 respondents representing (70%) were males and 3 respondents representing (30%) were females. This indicated that majority (70%) of the management officials were males.

**Table 6.** Age Profile of Respondents (Management Officials)

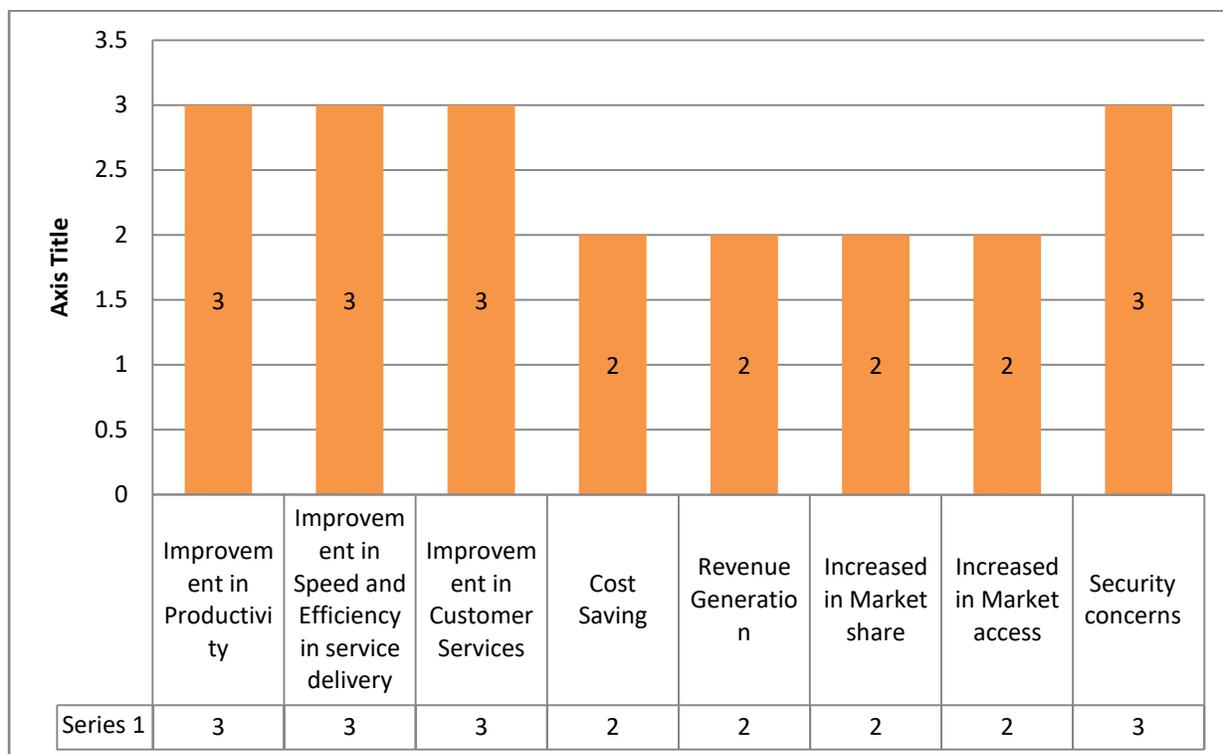
<b>Age (In Years)</b>	<b>Number of Respondents</b>	<b>Percentage (%)</b>
20-30	1	10
31-40	3	30
41-50	5	50
51 and above	1	10
<b>Total</b>	<b>10</b>	<b>100</b>

*Source: Field Survey 2017*

The frequency distribution of the age profile of management officials' respondents is given in Table 6. It shows that 1 of the respondents, representing 10% is between 20 – 30 years, 3 of the respondents, representing 30% are between the ages of 31 – 40 years, 5 of the respondents, representing 50% are between the ages of 41 – 45 years and 1 employee representing 10% were adults. This is an indication that majority of the management officials of banks are adults.

From Figure 4, all respondents representing 100% of the sampled population indicated that banks have benefited from the adoption of technology in terms of improvement in productivity, speed and efficiency in service delivery and improvement in customers service. Two (2) of the respondents representing 10% of the sampled population also stated increase in market share, increase in market access, cost saving and revenue generation as some benefits derived from e-banking. 3 of respondents representing 15% stated that the

Bank’s public image is enhanced, improvement in productivity, improvement in speed and efficiency in service delivery and improvement of customer services through the adoption of E-banking.



**Figure 4.** Benefits derived from adopting e-banking (management officials) (Source: Field Survey 2017)

**Table 7.** Opinion on the statement: Do you support the idea that introduction of technology into the banking sector reduce the human resource base in the banking sector hence creates unemployment?

Opinion	Frequency	Percentage (%)
I disagree	2	6.7
I agree	22	73.3
I strongly agree	6	20.0
I strongly disagree	0	0
<b>Total</b>	<b>30</b>	<b>100</b>

Source: Field Work 2017

Table 7 depicted that without technology more hands will be required in the banking sector. 20% representing 6 respondents strongly agreed, 73.3% representing 22 respondents agreed, 2 respondents representing 6.7% disagreed, 0% representing 0 respondents said they strongly disagreed. 22 respondents representing 73.3% strongly agreed which is a significant representation.

**Table 8.** Opinion on the statement: without technology, more hands will be required in the banking sector

<b>Opinion</b>	<b>Frequency</b>	<b>Percentage (%)</b>
I disagree	4	13.3
I agree	8	26.7
I strongly agree	15	50.0
I strongly disagree	3	10.0
<b>Total</b>	<b>30</b>	<b>100</b>

Source: Field Work 2017

The Table 8 depicted that without technology more hands will be required in the banking sector. 50% representing 15 respondents strongly agreed, 26.7% representing 8 respondents agreed, 4 respondents which are 13.3% disagreed, 10% representing 3 respondents said they strongly disagreed. 50% strongly agreed which is significant.

#### 4.3. Findings from: Bank clients / general public

**Table 9.** Gender Profile of Respondents (Bank Clients / General Public)

<b>Gender</b>	<b>Number of Respondents</b>	<b>Percentage (%)</b>
Male	17	56.7
Female	13	43.3
<b>Totals</b>	<b>30</b>	<b>100</b>

Source: Field Data, 2017

Table 9 shows the number of males and females bank clients and the general public who were administered. Out of thirty copies of questionnaire retrieved, seventeen (17) respondents representing fifty-six percent (56.7%) were males and thirteen respondents representing forty-three percent (43.3%) were females. This indicated majority (57%) of the respondents were males.

**Table 10.** Age Profile of Respondents (Bank Clients / General Public)

Age (In Years)	Number of Respondents	Percentage (%)
20-30	15	50
31-40	11	36.7
41-50	3	10
51 and above	1	3.3
<b>Total</b>	<b>30</b>	<b>100</b>

Source: Field Data, 2017

The frequency distribution of the age profile of respondents is given in Table 10. The table shows that 15 of the respondents, representing 50% are between the ages of 20 – 30 years, 11 of the respondents, representing 36.7% are between the ages of 31 – 40 years, 3 of the respondents, representing 10% are between the ages of 41 – 45 years and 1 employee representing 3.3% was 46 years and above. This is an indication that majority of the respondents were the young and youthful ones.

**Table 11.** Educational Background of Respondents (Bank Clients / General Public)

Educational background of respondents	Number of respondents	Percentage (%)
Post Graduate Degree	5	16.7
Graduate Degree	10	33.3
Higher National Diploma	9	30
Other Levels of Education	2	6.7
Senior High School	4	13.3
<b>Total</b>	<b>30</b>	<b>100</b>

Source: Field data, 2017

This section depicted the educational distribution of the respondents within the studied population. From Table 11, out of the 30 respondents, 5 of the respondents, representing 16.7% have Post Graduate Degrees (Master Degrees); 10 of the respondents, representing 33.3% have Graduate Degree; 9 of the respondents representing 30% have High National Diploma (HND). Other levels of Education were 6.7% representing 2 respondents and 4 respondents which are 13.3% Senior High School Certificate. The findings show that all the respondents have at least a Graduate Degree.

**Table 12.** Are you aware that there is unemployment in Ghana? (Bank Clients / General Public)

Are you aware that there is unemployment in Ghana?	Frequency	Percentage (%)
Yes	25	83.3
No	5	16.7
<b>Total</b>	<b>30</b>	<b>100</b>

Source: Field Data 2017

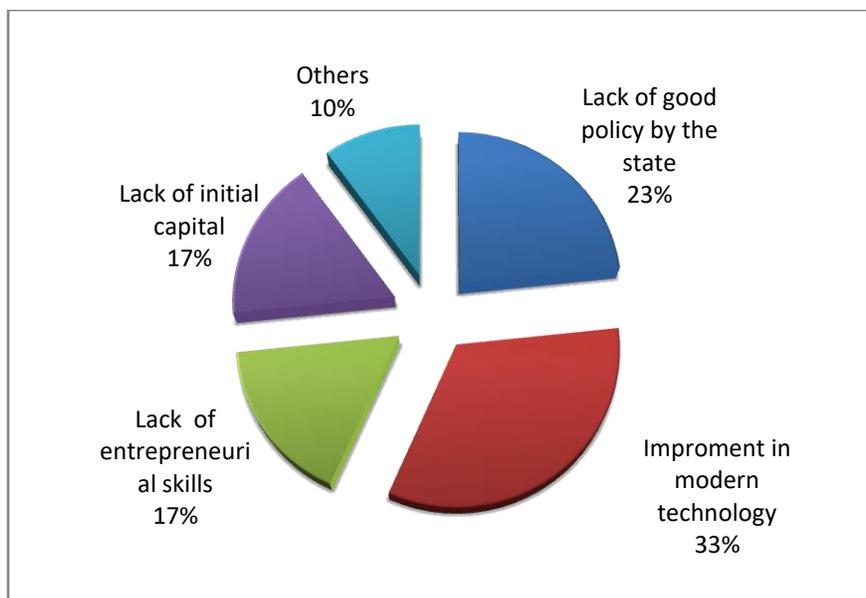
From Table 12, out of the hundred percent (100) respondents with the idea of unemployment, 25 respondents representing 83.3% said (yes) they are aware of unemployment and 16.7% representing 5 respondents said they do not (no). Most of the respondents (83) said they were aware of unemployment. This percentage figure is quite significant.

**Table 13.** Are you currently employed?

Are you currently employed?	Frequency	Percentage (%)
Yes	9	30
No	21	70
<b>Total</b>	<b>30</b>	<b>100</b>

Source: Field Data 2017

From Table 13, out of the hundred percent (100%) respondents, the number of respondents who said “Yes” they were currently employed was 9 representing 30% while 70% of the respondents constituting the majority said they were unemployed. This percentage figure is quite staggering.



**Figure 5.** Which of the following is the cause of unemployment in Ghana? (Bank Clients / General Public) (Source: Field Work 2017)

From Figure 5, 33% said the improvement in modern technology is the cause of unemployment, 23% respondents indicated a lack of good policy by the state, 17% said lack of initial capital and lack of entrepreneurial skills and others were 10%.

**Table 14.** Opinion on the statement: Do you think entrepreneurship skill acquisition is a panacea to solving the unemployment menace created by modern ICT in Ghana?

<b>Opinion</b>	<b>Frequency</b>	<b>Percentage (%)</b>
Yes	26	84
No	4	16
<b>Total</b>	<b>30</b>	<b>100</b>

Source: Field Data 2017

From Table 14, out of the hundred percent (100) respondents with the idea of whether entrepreneurship skill acquisition is a panacea to solving the unemployment menace created by modern ICT in Ghana, 26 respondents representing 84% said (yes) they think that entrepreneurship skill acquisition is a panacea to solving the unemployment menace created by modern ICT while 16% representing 4 respondents said they do not think that entrepreneurship skill acquisition is a panacea to solving the unemployment menace created by modern ICT. Most of the respondents (84) said they think that entrepreneurship skill acquisition is a panacea to solving the unemployment menace created by modern ICT but also added that government should be forthright with start-up support to enable the youth start small businesses. This percentage figure is quite significant.

## 5. Summary of findings

This study adopted a case study approach and an exploratory analysis of the causes of unemployment. It is discovered that adoption of new technologies has a causal effect on employment in Ghana with (70%) specific emphasis on the labour force. This study aimed at providing policy makers and stakeholders with reliable information in order that pragmatic measures are formulated and also re-jig strategies that will reduce unemployment. For improvement in modern technology has replaced and displaced the vibrant workforce in Ghana.

The unemployment rate in America was 9.2 percent in 2011, 19 percent in Egypt, and 10 percent in Saudi. Suffice to say that the Arab revolt in Egypt, Tunisia, Syria, Libya, Iraq, and Bahrain, to mention but a few, was caused by unemployment, poverty, inequality, and dictatorship. Some scholars blame the economic systems, and others blame the unemployed workers. In Ghana, this study discovered that majority (70%) of graduates are unemployed. This finding corroborates IEA (2015) survey which indicated 20% of the respondents considered unemployment to be the most critical and Feldmann's (2013) assessment of the improvement of technology on employment in 21 industrial countries. His result indicated that an increase in technological change substantially increases unemployment over three years. That a one standard deviation increase in the 'patents' variable is associated with a rise in the unemployment rate of between 2.3 and 3.0 percentage points, *ceteris paribus*.

In this study, reduction in cost incurred on labour has been the most rated reason with 50% for the adoption of ICT by the banks. This finding also corroborates Graham's (2016) observation that as technology

and artificial intelligence (A.I.) advance, jobs in banks and offices are set to be replaced by automation according to industry experts.

In Figure 3 of this paper, the highest percentage measurement among other reasons indicated as the causes of unemployment in Ghana is 33%, this percentage considered modern technology as the major cause of unemployment in Ghana. This finding also confirms Mattes's (2016) argument that the banking occupation (For example bank teller) is under serious threat from bank automation. He postulated that ATMs will be able to perform most of the banking tasks in future such as; opening accounts and processing loans. ATMs will be able to perform these functions at a fraction of the cost compared to human employees, as they will be able to check and process any paperwork.

Findings in this study indicate that improvement in ICT ostensibly brings about unemployment in the banking industry in Ghana. This revelation refutes Pettinger's (2016) philosophy of *Luddite Fallacy* (from 1803 to 1815), that new technology does not lead to higher overall unemployment in an economy, hence does not destroy jobs. This *Luddite Fallacy* is obsolete and has no relevance in contemporary times taking into cognizance the Ghanaian experience as discovered in this study.

## 5.1. Conclusion

This study concludes that technological breakthrough has a double-edged sword, for the managers of the banks, sees technological revolution as advantageous. The banks now enjoy an improvement in productivity, improvement in speed, efficiency in service delivery, improvement in customer services, security concerns, and reduce the cost of hiring labour. However, the study, therefore, shows that adoption of information technology has undoubtedly caused unemployment in the banking sector in Ghana. But as a panacea, redesigning curricula in technical, vocational training institutions, and at tertiary levels would enable the trainees to imbibe in them a practical aspect of entrepreneurship with government support so as to solving this distressing phenomenon.

## 5.2. Recommendations

The following are the recommendations drawn; adequate, and conscientious efforts should be made by the government to ensure improvements in the education and training provided to young in the technical and tertiary institutions with a greater focus on vocational skills and training. Academic curricula should be drafted around producing skilled individuals in the technical and vocational field with multiple or varied skills. There should be the provision for more training and education in the area of modern technologies; this could help improve the graduate's computer skills and efficiency at the job. Policy makers should take the study of entrepreneurship very serious. Provision of entrepreneurial training and start-up support would attract these young school leavers/graduates into setting up small enterprises and grow them gradually as 'job creators' rather than jobs seekers. All these interventions have the tendency of arresting these unemployment phenomena which may have political, economic and social negative implications in future as it was witnessed in other countries.

## References

- Ackah, D. and Agboyi, M.R. (2014), "Adoption of Electronic Banking in Ghana Banking System", Munich, GRIN Verlag, Available at: <http://www.grin.com/en/e-book/284721/adoption-of-electronic-banking-in-ghana-banking-system> (accessed 12 January 2017).
- Ann-Curry, R. (2011), "Obama Blames ATMs for High Unemployment", Available at: <http://nation.foxnews.com/president-obama/2011/06/14/obama-blames-atms-high-unemployment> (accessed 18 March 2017).
- Baah-Boateng, W. (2013), "Determinants of Unemployment in Ghana", *African Development Review*, Vol. 25, No. 4, 385-399.
- Boone, J. (2000), "Technological Progress, Downsizing and Unemployment", *Economic Journal*, Vol. 110, No. 465, pp. 581-600.
- Edquist, C., Hommen, L. and McKelvey, M. (2001), *Innovation and Employment: Process versus Product Innovation*, UK: Edward Elgar Publishing, Cheltenham, 214 pp.
- Emmanuel, A.T. (2011), *The Effect of Internet Banking On the Ghanaian Banking Industry – A Case of Cal Bank, Unibank and Prudential Bank*, A (CEMBA) Thesis Submitted to the Institute of Distance Learning, Kwame Nkrumah University of Science and Technology.
- Feldmann, H. (2013), "Technological Unemployment in Industrial Countries", *Journal of Evolutionary Economics*, Vol. 23 No. 5, pp. 1099-1126.
- Freeman, C. and Soete, L. (1994), *Work for All or Mass Unemployment? Computerised Technical Change Into The 21st Century*, London. P.193.
- Georgiou, M.N. (2009), "Does Technology Cause Unemployment?", Available at SSRN: <https://ssrn.com/abstract=1484571> or <http://dx.doi.org/10.2139/ssrn.1484571>.
- Graham, L. (2016), "Man vs machine: A. I. Could put you out of a job", CNBC, Available at: <http://www.cnbc.com/2016/03/17/man-vs-machine-ai-could-put-you-out-of-a-job.html>
- Harrison, R. Jordi, J., Jacques, M. and Bettina, P. (2006), "Does Innovation Stimulate Employment? A Firm Level Analysis Using Comparable Micro Data from Four Countries", available at [www.crest.fr](http://www.crest.fr).
- Higuera, V. (2017), "What Are Some Positive & Negative Technology Training Impacts on An Employee?", Available at: <http://smallbusiness.chron.com/positive-negative-technology-training-impacts-employee-37082.html>.
- IEA (2015), "Socio-Economic and Governance Survey", Institute of Economic Affairs", *Daily Guide (Newspaper)*, Accra-Ghana.
- ISSER - Institute of Statistical, Social and Economic Research (2005), "Cake Is Bigger But The Slices Are Smaller", *2005 Edition of African Business*.
- Koellinger, P. (2006), "Impact of ICT on Corporate Performance; Productivity and Employment Dynamics", *e-Business Watch*, European Commission, DG Enterprise and Industry, Special Report, No. 01/2006, Pp.3- 22.

- Liu, H. and Zeng, J. (2008), "Determinants of Long-Run Unemployment", *Southern Economic Journal*, Vol. 74, No. 3, pp. 775-793.
- Mabry, R.H. and Sharplin, A.D. (1986), "Does More Technology Create Unemployment?", *Policy Analysis*, No. 68, Available at <https://www.cato.org/students>.
- Manuelli, R.E. (2000), "Technological Change, The Labor Market and the Stock Market", NBER Working Paper 8022 (November).
- Mattes, A. (2016), "The Future of ATMs", Available at: <http://www.cnbc.com/2016/03/17/man-vs-machine-ai-could-put-you-out-of-a-job.html>.
- Mikhail, A.A. (2017), "Impact of Information and Communication Technology on Salary Administration by Controller and Accountant General's Department in Ghana: A Study of Tamale Technical University Staff", *ADRRJ Journal of Arts and Social Sciences, Ghana*: Vol. 14, No. 11, pp. 11-25.
- Mouhammed, A.H. (2011), "Important Theories of Unemployment and Public Policies", *Journal of Applied Business and Economics*, Vol. 12 No. 5, pp. 100-110.
- Online Banking - Wikipedia (2017), "Online Banking", Available at: [https://en.wikipedia.org/wiki/Online\\_banking](https://en.wikipedia.org/wiki/Online_banking).
- Otekhile, C. and Zeleny, M. (2016), "Self Service Technologies: A Cause of Unemployment", *International Journal of Entrepreneurial Knowledge*, Vol. 4 No. 1.
- Parker, J. (2010), "Economics 314 Coursebook, Models of Unemployment", Available at: <https://www.scribd.com/document/255009249/Ch14-Model-of-Unemployment-2>.
- Pettinger, T. (2015), "Causes of Unemployment", Available at: <http://www.economicshelp.org/wp-content/themes/EconomicsHelp2015/img/eh-logo.png>.
- Pettinger, T. (2016), "The Luddite Fallacy" Available at: <http://www.economicshelp.org/blog/6717/economics/the-luddite-fallacy/>.
- Popper, K. (1959), *The Logic of Scientific Discovery*, Taylor & Francis e-Library.
- Rotman, D. (2013), "How Technology Is Destroying Jobs", Business Impact, Available at: <https://www.technologyreview.com/topic/business-impact/25/05/2017>.
- Sepehrdoust, H. and Khodaei, H. (2013), "The Impact of Information and Communication Technology on Employment of Selected OIC Countries", *African Journal of Business Management*, Vol. 7 No. 39, pp. 4149-4154.
- Stanbic Bank (2017), "Definition of Internet and e-Banking", Available at: <https://ibanking.stanbic.com.gh>.
- Swan, M. (2017), "Is Technological Unemployment Real? An Assessment and a Plea for Abundance Economics", In: LaGrandeur K., Hughes J. (eds), *Surviving the Machine Age*, Palgrave Macmillan, Cham.
- Tomas, F. and Diaz, M. (2002), "Technological Innovation and Employment: Data from a Decade In Spain", *J. Prod. Econ*, pp. 245-256.
- Trehan, B. (2001), "Unemployment and Productivity", Research Department Federal Reserve Bank of San Francisco, *FRBSF Economic Letter*.

Ukai, Y. (2003), *The Effects of Information System Investment in Banking Industry*, Research Center of Socionetwork Strategies, Kansai Daigaku.

Vivarelli, M. (2007), *Innovation and Employment: A Survey*, Institute for the Study of Labor, Italy .

Vivarelli, M. and Pianta, M. (2000), *The Employment Impact of Innovation: Evidence and Polic'*, Routledge, London.