

Technological Unemployment galore in Ghana: The spotlight on the Digital Photography Industry

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ABSTRACT: *In recent times it is perceived technology is contributing to high levels of unemployment among graduate workers in the photography industry in Ghana. The study aimed to explore the impact of technology on employment opportunities in the industry and assess the consequences of this for Ghana. A comprehensive review of existing literature was conducted to inform the research design, which involved both qualitative and quantitative approaches to gather quality data from participants. The study involved interviews and questionnaires with a total of 23 participants, including directors of photography studios, graduate workers, and unemployed graduates seeking employment. The findings suggest that the rise of modern technology is leading to the displacement of digital photography skilled workers, with photography directors being hesitant to expand their businesses and hire more workers due to the challenging economic climate. Participants also reported facing financial constraints when trying to start their photography businesses. Based on these findings, the study provides suggestings for assuaging the impact of technological unemployment in digital photography industry in Ghana.*

KEYWORDS: digital photography industry, unemployment, technological, outcomes, job

INTRODUCTION

Gone are the days when cameras and their related activities were executed manually with stressful aptitudes. Digital Photography had come to replace analogue photography. In this modern world, technology propels many economies at a higher speed. Today, inside numerous developed countries, technology has become the electricity for giving reliable supremacy to many production firms and business entities for maximum output of efficiency and efficacy to advanced stages. “In many countries, technology has become the fuel for driving several economic activities to a higher level. Modern technology has become part of daily activities and is used to enhance production in many sectors of Ghana's economy” (Enninful et. al., 2022).

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Currently, technology is making headway at an expeditious pace, affecting many changes in individuals, entrepreneurs, groups and industries landscape. Modern technology has become part of daily activities and is used to augment production in many sectors of Ghana's economy. Several industries are embracing new technology for efficiency expediency. "Technology is transforming micro, small and medium enterprises in Ghana" (World bank, 2021).

In the last decade, there has been an unparalleled unemployment rate in Ghana. According to Sackey and Osei (2006), Ghana has a high rate of unemployment. The high rate of unemployment has affected many sectors of Ghana's economy to which Photography Industry is no exception. The Photography Industry which falls under the Ministry of Creative Arts and Tourism plays a vital role in Ghana's economy. The outcomes of technology in the Photography profession in areas such as videography, image editing and shooting are countless. Technology via photography has enhanced the perceptions and the aptitudes with which photographers shoot images. The 21st century photography is gradually changing and the dynamics in the profession is also fast evolving. "With digital technology, you can preview and edit captured images immediately after they appear on the list. Any photography techniques demand considerably more ways before you can edit and process the photos, and each time costs extra money" (Nicholes, 2020). "Better sensors, bigger phone memories, and the advent of computational photography have all contributed to this proliferation of pixels — and in turn the ability for millions of us to capture high-quality photos of everyday moments" (Team, 2021). In the past, only photographers were seen with cameras for shooting. Today, due to advanced technology, most smart phones come with in-built cameras for users for taking pictures. Some of these smart phone cameras can compete with professional cameras as a result of the megapixel treasured in them. This development could give a serious threat to photography.

In the early part of the 21st century, most Photography studios in major parts of Ghana implemented new trends of technology in the photography industry to offer enhanced practices and services to their clients. "Technology is the application of scientific knowledge to the practical aims of human life or, as it is sometimes phrased, to the change and manipulation of the human environment" (*Technology Services / Pixel506*. (n.d.). Technology affects all scopes of life, including health, the academy, businesses, agriculture, the motorised industry, manufacturing companies, showbiz, the vacation industry and many others. Communication between these sectors of the economy peradventure will cease if technology does not exist. "Simply allowing for the unfettered advancement and dissemination of technology runs the risk of large-scale unemployment. At the same time, stopping technology may halt the progress of humankind" (Borchowsky, 2019).

It will affect the production and day-to-day activities of these industries in Ghana's economy. "For instance, the potential of Ghana's capital city has always been an epitome of technological growth in Africa" (Mensah, 2018). "Digital technologies could offer a source of productivity growth and accelerate firm upgrading and spur innovation and entrepreneurship, driving the growth of higher quality jobs in Ghana" (World bank, 2021). "With technology such as email,

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instant messaging, video conferencing and social media, businesses can communicate and collaborate more easily and effectively than ever before. This can lead to better decision-making, faster project completion and improved customer service” (Deepika, 2022). “Digital photography enables the individual to assess the quality of the image immediately after it's been taken and allows for easier photo editing as well, ensuring that a perfect picture is produced every time” (DiJiFi, 2020). More so, “today, these largely plug-and-play cameras come equipped with powerful image sensors that allow them to track movement and capture photos all on their own — then upload them straight to your phone” (Team, 2021). While SAV, the flexy and one-way vision came to replace the colour paper print jobs in the graphic design profession, technology has also substituted many facets in the photography industry including drones for shooting Wi fi connected cameras, storage and sharing capabilities.

In Ghana, the Photography Industry largely includes Photography editors, Photojournalists, Photo bloggers, Photo sharers, Cinematographers and others. In the western world, the dynamic and structured team in the photography industry is quite different. “The Photography industry encompasses companies and individuals that offer a range of photographic services, including still photography and videography for private events. Commercial and portrait photography studios are also included in this industry. This industry excludes all photography related to movies, TV and video production” (*IBISWorld*, 2022). The industry also designs and produces packages with accessories to contain various products. Eventually, the industry also shoots for portrait services, weddings and commercial or industrial photography services for the general public. “The Photography industry is labour intensive because photographers perform many service-oriented tasks, in addition to taking, editing and selecting photographs....” (*IBISWorld*, 2022).

“Advanced technologies like Digital Technology transformed all the technology into digital mode. The field of photography underwent several developments in terms of camera quality, image quality, image clarity, image transfer, image storage, and other sensitive surfaces” (Liu & Bai, 2022). Perhaps, the results of these developments made some follows of photography jobless while others embraced it with awe. The technological aspects involved with photography cannot be stripped off and turned to the former. This is the reason why it seemed technology is gradually putting photography graduates, professionals and amateurs out of job. Typically, the covering of a wedding could have involved at least 4 to 6 workers from a photography firm in the late 20th century. Now, the dynamic is different. Due to fast technological facets, a photographer can employ an assistant rendering the remaining ones unemployed. The rapid advancements in technology within the photography industry in Ghana have significant impacts on graduates of photography.

The Digital Photography Industry in Ghana has been experiencing a lot of changes due to technological advancements. The industry has witnessed a significant increase in the use of digital cameras, smartphones, and other digital imaging devices. This has led to the emergence of new job opportunities but also a significant threat of technological unemployment. Technological advancements in the digital photography industry have led to a significant threat

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of technological unemployment in Ghana. The high cost of equipment and software required to operate in the digital photography industry has made it challenging for individuals to start and sustain their businesses. Accordingly, only a few individuals can afford to invest in this industry, leading to increased competition and the need for specialization. The emergence of digital cameras, smartphones, online photo-sharing platforms, and photo editing software has disrupted the traditional photography business model, leading to the displacement of workers and a decrease in demand for their services. It is, therefore, essential for stakeholders in the industry to develop strategies that will help ease the negative impacts of technological advancements on employment opportunities.

There have been several studies carried out on unemployment in Ghana and perhaps inconsequential in the photography industry. The sporadic studies shepherded stressed unemployment in other sectors of the economy. This research is unique and novel because there have been very few, if any, practical studies conducted on the issue of technological unemployment in Ghana, particularly in the context of the Digital Photography Industry.

Statement of the Problem

The problem of technology unemployment in Digital Photography in Ghana has become a major concern, as the introduction of advanced technology is leading to the displacement of skilled workers and causing high rates of joblessness, thereby hindering the growth and development of the industry and Ghana's economy as a whole. The increasing adoption of technology in digital photography in Ghana has resulted in a significant rise in unemployment among the skilled workforce, leading to a surge in the number of jobless graduates. The phenomenon of technological galore presents a critical problem that requires urgent attention to explore the extent of joblessness, and identify the root cause and potential solutions to lessen the negative impact on the industry and the country's economy.

Research Objectives

- a. To investigate the level of unemployment galore with the dawn of technology in the Digital Photography Industry in Ghana.
- b. To appraise the consequences of technology on the Digital Photography Industry in Ghana.

LITERATURE REVIEW

Structural change theory is a field of economics that focuses on how economies transform over time, particularly in response to changes in technology and industrial structure. According to this theory, technological advancements can lead to unemployment in certain industries, as new technologies displace workers in traditional jobs. The phenomenon is known as technological unemployment. In the case of Ghana, the digital photography industry provides a relevant example of how technological change is affecting the labour market. "The advent of digital photography and the widespread availability of affordable digital cameras has led to a significant decline in the demand for traditional film photography" (Munir, 2005). The shift in consumer preferences has had a profound impact on the employment prospects of those who

previously worked in the film photography industry. “While the widespread adoption of digital photography has brought many benefits, such as lower costs and improved image quality, it has also resulted in significant job losses for those who previously worked in the film photography industry” (Autor, 2010). This is a clear example of how technological change can lead to structural unemployment, as workers in traditional industries are forced to transition to new, technology-driven industries. “The rise of digital photography in Ghana highlights the importance of structural change theory in understanding the impact of technological change on employment and the economy” (Matthess, & Kunkel, 2020). While technological advancements can bring many benefits, they can also result in significant job losses for workers in traditional industries. As such, policymakers must be proactive in addressing the challenges posed by technological unemployment, through measures such as training programmes, unemployment benefits, and incentives for businesses to invest in new technology-driven industries.

Definition of Technology

“Technology is the set of knowledge, skills, experience and techniques through which humans change, transform and use our environment to create tools, machines, products and services that meet our needs and desires” (Technology, 2016). Technology is helping to increase productivity behind many scenes of the economy in most countries around the world. “Technology is the application of knowledge to reach practical goals in a specifiable and reproducible way” (Wikipedia, 2022). “A collection of tools, including machinery, modifications, arrangements and procedures used by humans. In the context of this chapter, technology refers specifically to digital technology, which includes computers, software applications, and Internet technologies” (Smith, 2022). “Technology has affected society and its surroundings in a number of ways. In many societies, technology has helped develop more advanced economies (including today's global economy) and has allowed the rise of a leisure class” (Wikipedia, 2010). Currently, technology is making headway at an expeditious pace, affecting many changes in individual and industry spaces. “Technology is the use of scientific knowledge for practical purposes or applications, whether in industry or our everyday lives” (Watson, 2017). “We apply technology in almost everything we do in our daily lives; we use technology at work, we use technology for communication, transportation, education, manufacturing, securing data, scaling businesses and so much more” (MOHITE, 2021).

“During the industrial age, companies with large sums of capital had the potential of employing expensive technological tools to gain a competitive advantage; small businesses had less potential because they could not afford expensive manufacturing or processing technology tools. However, advancement in technology has created a new economic environment that depends on information, and that is what we call the ‘information age’. The information age provides a different work environment, and this has helped small businesses gain position in highly competitive markets” (Smith, 2022). The understanding of technology can be very modest but sophisticated looking at its optimum functions in industries, workplaces and individual lives daily. As cited by Javaid *et al.* (2022), “the above could be the major types of

technology in the world today. There's medical technology, industrial and manufactured technology, communications technology, mechanical technology and electronic technology.” “The term can either be applied generally or to specific areas: examples include construction technology, medical technology, or state-of-the-art technology.” (Javaid *et al.* 2022), Digital Photography is a typical model of electronic technology.

Unemployment rate in Ghana

The economy of Ghana is significantly affected by high levels of unemployment, with annual figures continuing to increase. According to Ghana Statistical Service (2021), the unemployment rate in Ghana is 13.4 percent among the population aged 15 years and over, and it is 19.7 percent among those aged 13-35 years. The unemployment rate is even higher for young adults aged 15-24 years, with 33% of them unemployed, meaning that for every three young adults in Ghana, one is without a job. The situation is upsetting as it poses national security threat, especially considering examples from other countries in Sub-Saharan Africa and Sri Lanka. The GSS (2021) report also reveals that over 46% of the unemployed are discouraged from seeking jobs, despite their youthful exuberance and willingness to work. It is a disturbing situation that requires immediate attention from policymakers, stakeholders and government to critically assess the structure of the economy and allocate resources accordingly in the country. “The government needs to examine the economic structure and allocate resources accordingly to ensure that the economy not only grows but also generates jobs for the unemployed, including recent graduates” (World Bank, 2020).

The report further highlights the public sector employs only 2% of the total employed population, while 13% are employed in the formal private sector. The data indicates that there is a significant number of unemployed individuals in the country, and the structure of the economy is not changing to respond to the need for more jobs. The informal sector which dominates employment in Ghana, has its challenges, while the private sector, which is the engine of growth, employs only a small proportion of the population. Currently, the Ghanaian economy performs poorly in terms of growth, it also grapples to generate enough jobs to reduce unemployment. The high unemployment rate in Ghana can be attributed to several factors. One of the main reasons is the slow growth of the economy, which is not creating enough job opportunities to absorb the growing labour force (El-Megharbel, 2007). The informal sector, which employs a large portion of the population, is also facing challenges due to declining economic activity and reduced demand for informal goods and services (El-Megharbel, 2007). In addition, the mismatch between the skills of the unemployed and the demands of the labour market is also a contributing factor to the high unemployment rate in Ghana. Many individuals lack the technical skills and education required for the available jobs, leading to a lack of employment opportunities (World Bank, 2020). The high unemployment rate in Ghana has far-reaching implications for the country's economy and society. “Unemployment leads to reduced income and increased poverty, which can have a negative impact on the overall well-being of individuals and families” (Bhebhe, Zororo, Sifile, & Chavunduka, 2015). High levels of unemployment can also lead to increased crime and social unrest, posing a threat to stability and security (World Bank, 2020).

To address the issue of unemployment in Ghana, it is necessary to implement policies and programmes that promote economic growth and job creation. This can be done by investing in education and training programmes to increase the skills of the labour force and make them more competitive in the job market. Additionally, the Ghanaian government needs to prioritize the manufacturing sector to fully benefit from the African Continental Free Trade policy. However, challenges such as infrastructure, limited credit access, high energy costs, and an unfavourable business environment make it more attractive for businessmen to engage in buying and selling instead of manufacturing. The government needs to create a stable macro-economic environment, support agriculture, and promote entrepreneurship among graduates to combat unemployment in Ghana. “Policies aimed at promoting economic growth and job creation, as well as investing in education and training programmes, can help to reduce the unemployment rate and improve the overall well-being of the population” (World Bank, 2020).

Analogue and Digital Photography in the new era

Chemical processing technology (analogue) of photographs in the past was cumbersome. The trend of film development for positive print images sojourned with photographers for years. “Analogue Photography describes a style of photography that utilizes chemical processes to capture an image on film, paper, or even a plate” (Blurb, 2021). The manually operated type of cameras dominated the industry for long. Many photographers were involved in the business for their daily bread. Employment generation in the photography industry was superb. They had clients they served on a daily, weekly, monthly and yearly basis. Analogue Photography gave employment to many youths and the aged across many parts of the country. On weekends, both amateur and professional photographers were seen at birthdays, engagements, weddings, parties, speech and prize-giving days, funerals and the like. The following week saw photography lab technicians, printers, developers, and frame designers busily working on images captured over the weekend. With clients chasing some photographers for lost/disappeared images and undeveloped films. In Ghana, employment generation was at its peak. Its dominance in the industry was cut short with the penetration of Digital Photography in the late 20th century.

“Digital photography is the process of using electronic and computing appliances to capture, create, edit and share digital images/photographs. It encompasses several different technologies to provide electronic or computer-based photography services” (Peck and Dorricott, 1994).

The benefits of digital photography in the early 21st century industry were countless. According to (Smith, 2022), “the 12 digital photography benefits include instantaneous satisfaction, the film is expensive to buy and process, massive storage, space for photos, multiple functions, video camera, easy to share, smaller and lighter, easy editing, more display options, home printing, point and shoot technology, quicker operation.” Many photographers were skeptical about the new trend. Soon most professional photographers became interested in Digital Photography with its dazzling advantages over the former. “People become interested in photography – serious photography, not just the occasional snap or selfie – for many reasons. It might be a major life event, such as a new baby, a wedding, or a special birthday” (Jones, 2023). The genesis of digital photography gave birth to various specialized professions in the

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industry including videographers, Photo sharers, Photo bloggers, and photo editors with various editing software to manipulate their images for clients. “There are countless different photo editing software options, from better-known systems like Adobe’s Photoshop and Lightroom to simple but effective choices like Canva” (Batman, 2023).

“Photographers in the early 21st century began to use digital technology in many different ways.” Some scanned photographic negatives or prints and digitized them into data that could be manipulated with software and printed with inkjet printers” (Bilyeu, 2022). Digital photography with its phenomenon found its way into the online industry with great awe. Today, many images by photographers are found online for numerous uses and purposes. Employment generation is perceived to be high in this era with tremendous improvement in the industry due to the dawning of technology. With massive merits over the former, it is believed that there should be more avenues of employment available to industry players. “The photography industry is more vibrant than ever before and there’s never been a better time to be a photographer” (Bilyeu, 2020).

The outcomes of technology on Industries in Ghana and globally

Over the past few decades, technology has and keeps changing many things in our daily activities, professions and major sectors of the world’s economy including Ghana. In the communication industry, more competitive brands are launching modern devices to clients for accessibility and flexibility. “Canon is taking further steps into the world of virtual reality with Kokomo Solution – VR software that enables face-to-face communication in a virtual space with live-action video” (Smith, 2023). In the photography industry, there are new updates of technological innovations on cameras and their accessories. “Alongside today’s 20-70mm f/4 G lens launch, Sony has also announced that they are developing a 300mm f/2.8 GM lens and targeting its launch in early 2024. Sports, event, and wildlife photographers have asked for a Sony 300mm f/2.8 lens for a long time” (Car, 2023). “Indeed, while the best Sony lenses comprise an impressive 70 first-party E-mount optics, the Sony 300mm f/2.8 GM OSS remains one of the main requests of indoor sports photographers, who currently are not best served by the Sony FE 400mm f/2.8 GM OSS and Sony FE 600mm f/4 GM OSS, the two G Master telephoto prime lenses in Sony's lineup” (Bevan, 2023).

With respect to the Film and Cinematography industry, manually operated equipment and their accessories hitherto were dominant. “Pan-tilt-zoom (PTZ) cameras are all the rage right now, offering new ways to film smoothly and from challenging angles without having to manually move the camera around or operate it by hand” (Bevan, 2023). There has been a continuing major boost of technology-related devices enhancing the productivity of the movie and still life industry. “Sony is at ISE 2023 announcing that it is expanding its lineup of PTZ cameras with the addition of two 4K models – the SRG-A40 and SRG-A12. These latest PTZ cameras come with built-in AI analytics to make the cameras as simple and automated to use as possible, with the PTZ cameras able to automatically frame and track subjects as they move around” (Bevan, 2023).

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Safety is paramount in the Formula 1 Championship. As such, in the F1 World Racing Competition, there has been a new technology camera to help pilots while driving. “The helmet camera technology has been trialed during the last two seasons but now every driver will be mandated to wear the minuscule camera that weighs just 1.4 grams (0.05 ounces)” (Growcoat, 2023). In printing, technology is changing the industry. “One trend that emerged throughout 2022 and resurfaced at Formnext, was the growing number of functional materials being brought to market to unlock new applications for existing technologies. Equispheres introduced a non-explosible 3D printing aluminum at the show, which is less susceptible to explosions or fires” (Smith, 2022).

In the Health Sector, the latest update indicates that a lot more innovations in technology are enhancing the work of health workers in the industry. For instance, “Telehealth has seen significant advancements since the onset of the pandemic in 2020. In 2022, healthcare providers regularly hold video conference meetings with patients over the internet to discuss their concerns and provide medical advice. The telehealth market is expected to reach \$185.6 billion by 2026 (Mishra, 2022). “According to industry experts, healthcare technology's future trends are expected to bring new capabilities and strategic breakthroughs. In 2023, medical images, including x-rays and CT, MRI, and PET scans, will increasingly be read and evaluated first by AI machines before being examined by radiologists in hospitals globally” (Bielski, 2023).

As regards Commerce Industry, industry players are adopting new technologies to address the profound cracks and challenges customers face in the business world on daily basis. “New technologies used in eCommerce emerge regularly. Consequently, online businesses must adapt to the latest trends and the needs of today’s customers” (Vaniukov, 2023). In the words of Vaniukov (2023), “Online shopping is particularly gaining momentum, resulting in whopping eCommerce sales growth. The growing popularity of online retail is directly related to the emergence of new eCommerce technologies. Online shopping has become more convenient than ever. Thus, it is not surprising that the eCommerce sector is forecast to grow by almost \$13 trillion in the 2022–2027 period” (Martin, 2023). The outcome on the industry is tremendous an indication of positive growth as being projected.

With respect to the Education sector, the effects of technology are enormous. Many innovative educational technological bids are being developed to simplify and enhance teaching and learning processes from elementary schools to the university level. “Edtech or Educational Technology is digital technology that’s designed to enhance or aid teaching and learning, utilizing computer hardware, software, and educational theory to enrich learning experiences” (Martin, 2023). “The industry is growing fast and doesn’t show signs of slowing down as more individuals and organizations use Edtech for engaging, convenient and results-driven education.” (Martin, 2023).

In the Agriculture industry, “Farm automation brings together agricultural machinery, computer systems, electronics, chemical sensors, and data management to improve equipment operation and decision-making, and ultimately, reduce human input and error. Reduced labour

time, higher yields, and the efficient use of resources are driving the large-scale adoption of the technology” (Agriculture XPRT, 2022). Subsequently, many farmers in developing countries are now applying the latest technology for optimum farm yields in various aspects of agriculture. “Farmers now use automated harvesters, drones, autonomous tractors, seeding, and weeding to transform how they cultivate their crops. The technology takes care of menial and recurring tasks, allowing them to focus on more critical functions” (Agriculture XPRT, 2022). In the years to come, it is anticipated that technology will become computerized. The observations and developments from these industries/sectors worldwide indicate technology is rapidly making serious impacts on every sector of the world economy.

Technological Unemployment

“The term ‘Technological Unemployment’ is unemployment caused by technological advancement.” (Brynjolfsson & McAfee, 2014). In the opinion of Edwards (2021), “Technological unemployment occurs when developments in technology and working practices cause some workers to lose their jobs.” “Nowadays, all spheres of human activities are covered by digitalization. The development and adaptation of digital technologies may cause structural unemployment in many industries because of massive automation. Thus, in a short time, the supply of labor will not correspond to the demand” (Perevozchikova, 2022). Talk about progression in technology making way for advancement in sectors such as health, transportation, agriculture and the like. Technology innovation has caused many to learn new skills and stay abreast with the trend to enable them to be their bosses. On another side, technology has caused a loss in the human labour force. With robots and AI devices on the scene, many workers are being laid off and rendered jobless. “Technology is one of the reasons behind the growing disparities within the work force in many countries, with middle-wage earners losing ground” (Farrell & Loungani, 2015). “Technological Unemployment is a phenomenon where new inventions change the nature of work, eliminating some specific jobs while also creating new higher paying jobs and launching entirely new industries.” (Farrell & Loungani, 2015).

“Technological unemployment is the unemployment that results from the introduction of new technology into the economy. It can be caused by the replacement of workers by machines or the automation of tasks that were once done by workers” (Techopedia, n.d). In order to drive the economy as the case in the middle and developed countries, Ghana will have to develop clear technological measures for massive productivity in most of the industries. “To deliver productivity growth and boost innovation and entrepreneurship, Ghana will need to drive technological transformation through the adoption of digital and complementary technologies in domestic firms” (World Bank, 2019). “Focus on accelerating the adoption of Industry 3.0 technologies such as internet access, mobile phones, computers, and smartphones, particularly in smaller firms and manufacturing. This will help lay the foundation for the adoption of more advanced ‘Industry 4.0’ technologies of big data analytics, artificial intelligence and software for automation and online payment systems” (World bank, 2019). The causes of technological unemployment are quite fascinating. One of them is attributed to the replacement of humans at work by mechanization in industries and manufacturing sectors. “Technological

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unemployment is caused by the displacement effect, in which robots or other automation complete tasks formerly done by workers” (Grossman & Helpman, 1991). Pianta (2003) observed that “the overall employment impact of innovation at the firm level tends to be positive; firms which innovate in products, but also in processes, grow faster and are more likely to expand their employment than non-innovative ones, regardless of industry, size or other characteristics.”

But as a coin has two faces, so does technology. “The rise in technology has not only contributed positively to the world but it also has had its adverse effects. Technological advancements have brought about many modules, systems and software that have reduced the work involved in production but gotten rid of humans who use to man such operations thus leading to an increase in unemployment” (Investopedia, n.d.).

“A characteristic example is the early 2000s recession in Japan where unemployment reached 5.4 percent in 2002, the highest in 50 years” (MIT Technology Review, 2018). “Foremost companies laid off temporary workers typically comprising about ten percent of the staff. Nissan, Japan’s second-biggest car manufacturer, recorded heavy losses and decided to restructure causing 5,000 staff to become redundant” (World Economic Forum, n.d.). Most intense of these was that of the Zama plant which had a workforce of 2,500. “These workers were laid off since the factory had now been equipped with the latest technology and robots that boosted car manufacturing” (Samanta, 2010). The consequences of technological unemployment are mixed and not far-fetched with respect to the industries in Ghana’s economy. “The effects of technological unemployment are both positive and negative. On the one hand, technology can make workers more productive and create new jobs and tasks for them. On the other hand, technology can also lead to the displacement of workers as machines or robots complete tasks formerly done by human beings” (World Economic Forum, n.d.).

Despite these developments, uncertainty remains about how varied technological progressions will drive employment in a few years to come. “There is no one answer to this question as it is still unclear how different technological advancements will affect employment in the future. Some experts believe that technological unemployment will increase as more jobs are replaced by robots or other forms of automation, while others believe that new opportunities will be created that will offset any negative effects. It is important to note that there is no evidence that technological unemployment is a permanent trend, and that it is likely to vary depending on the specific technology and economic conditions.” (World Economic Forum, n.d.).

The consequences of technology on the Photography Industry in Ghana

The outcomes of technology in the photography industry can be attributed to positive and negative parts. “The study showed that advancement in technology has had both a positive and negative impact on the photography industry in Ghana. It has caused a surge in employment for young ones while pushing others out of the scene as keeping up with regular updates to technology is quite a hurdle for many, resulting in low patronage and then redundancy” (Business and Financial Times, n.d.). On the bright side of things, advancement in technology

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for photography seems to have caused the industry to have an influx of new entrepreneurs. “A new World Bank report shows that digital technologies have the potential to foster the much-needed upgrading of Ghana’s firms and the creation of new job opportunities” (Work bank, n.d.).

According to the Business and Financial Times (n.d.), many unemployed youths have turned to Photography, an industry estimated to be worth over 100 billion dollars (GHc 61,298,930,000). They report that photography studios are popping up in many places around Accra and are mostly setup and owned by young men and women. With the advancement in technology, photography does not look as mundane and tedious as it used to be when it started. The high-tech gizmos have drawn a crowd of very interested young people. Luxurious events especially weddings have boosted the rates that they charge for full coverage of these events. One studio-Team1000 words revealed that a couple would pay between GHc1500 - GHc10,000 for coverage depending on the package they select. However, one major challenge for these entrepreneurs is that as technology flourishes the prices for these powerful cameras and their accompanying accessories plummet with tags reading as much as \$7,500 (GHc 45,974.20).

The government also does not have fitting financial policies to help these unemployed photographers acquire the needed equipment. Success in the industry would depend on how much equipment a photographer has and how well they are used since many have developed quite a taste for excellent photos and videos. “Camera phone technology can really boil down to one simple concept – pure and simple convenience. Not only will the best camera phones feature powerful imaging sensors (for example, the Samsung Galaxy S22 Ultra has an incredible 108MP sensor – higher than most of the best professional cameras), but they’ll also have incredible computational photography features that take a matter of milliseconds to process the images you capture and improve aspects such as sharpness, white balance and more” (Oakley, 2022). These innovations are making huge impacts on the photography industry in Ghana. A couple of examples include drones are seen being used by photographers on many occasions in some parts of the country. They enable photographers to shoot areas hitherto they could not in time past. Digital Photographers are no more seen carrying heavy cameras and their accessories to cover different programmes. The camera sizes have been reduced to portable ones by the manufacturers easy to be carried anywhere. Images and videos are shots, previewed and selected together with clients. The best ones are printed and framed for remembrance by wedding couples, ordination of a church minister, parties, naming ceremonies, birthday parties and others. More so, the era, while the tripod was used for shooting high dynamic range images, is gradually changing. New devices with up-to-speed technology have been innovated to augment their uses. “The concept of high dynamic range (HDR) is widely used in photography. This method involves taking a series of photos at different exposure levels and merging them in post-processing photo editing software” (Bunermann, 2023). In most cases, the tripod is not used for the intended purposes of HDR. “Modern cameras are equipped with functions that allow you the freedom to ditch your tripod. With the

settings and automatic exposure bracketing in continuous mode, handled HDR photography and editing become possible” (Bunermann, 2023).

“A new World Bank report shows that digital technologies have the potential to foster the much-needed upgrading of Ghana’s firms and the creation of new job opportunities” (Work bank, n.d.). In the Photography world, the boom in technology is phenomenal. “Cameras have become even more powerful and are being used to reach seemingly unreachable places like the deep sea and even inside the human body to aid imaging during surgeries, diagnosis and treatment” (Oakley, 2022). *“Technology hasn’t only changed the hardware and architecture used in photography, but it has also changed the way an image is captured and processed...A camera is one of the primary needs for photography, and it has seen many refinements. When we look at the past, we will find that good photography used to be a lot harder than it is now. Photographers had to worry about many factors, and if any one of them went wrong the whole picture was ruined. But with the arrival of the high-end digital cameras, photography has seen a steep rise in new photographers”* (Sharma, 2019).

“The best camera phones offer a tantalizing combination of the pinnacle of imaging technology with pin-sharp displays and lightning-fast internet connectivity. In fact, some handsets can deliver better photographs than the 'proper' camera you might otherwise be tempted to pick up” (Oakley, 2022). Technology via Photography has enhanced the perceptions and the aptitudes with which we shoot images. It is helping to increase productivity behind many scenes in the digital photography industry.

METHODOLOGY

The study employed a research design of mixed methods approach with relevant aspects of quantitative and qualitative via descriptive analysis to gather wide-ranging views and experiences from participants. “A mixed methods research design is a procedure for collecting, analyzing, and mixing both quantitative and qualitative research and methods in a single study to understand a research problem” (Fischler, 2017). The face-to-face structured interview and the questionnaire were used as data collection instruments. The researcher targeted participants as the population in the photography industry for the collection of primary data for the study. “Population refers to the entire group of individuals about whom you wish to draw conclusions. The sample refers to the group of people from which you will be collecting data” (Ravikiran, 2022). This study involved a total of 23 participants who were selected using an unsystematic sampling method. The participants consisted of 6 directors of photography studios, 8 graduate workers from photography studios, and 9 photography graduates who were unemployed but seeking employment. All participants were designated from Accra and Kumasi respectfully. The selection criteria for the participants were based on their potential to provide reliable and high-quality information. The research methodology employed both qualitative and quantitative analysis techniques. The qualitative analysis involved interpreting specialized views and analyzing interviews and documents, while quantitative analysis involved using descriptive statistics such as correlations, frequencies, and percentages to support relevant

tables. The survey method was used to collect data, which were then evaluated and discussed to draw logical conclusions. The data collected from participants were thoroughly checked for inconsistencies and edited accordingly. Closed-ended questions were pre-coded, while coding for open-ended questions was done after data collection. The coded data were systematically analyzed using the Excel Spreadsheet, and a lesser number of questionnaires were manually counted. Participants, including directors and selected graduate workers, agreed to be interviewed on the condition of anonymity, and ethical issues were appropriately addressed with all study respondents.

RESULTS AND DISCUSSION OF FINDINGS

This section presents findings for the study's objectives; To investigate the unemployment rate with the dawn of technology in the Photography Industry and to appraise the consequences of technology on the Digital Photography Industry in Ghana.

Presentation of Findings

The study's findings were based on the interviews and questionnaires administered to the directors/workers of the selected Photography Industry and unemployed graduates in the sector. The findings of the study have been presented in two folds as regards the set objectives outlined.

To explore possible reasons for the cumulative joblessness galore in the Digital Photography industry and the consequences this has on Ghana's economy, 14 respondents were interviewed including directors and photography workers in the industry. In addition, 9 unemployed photography graduates' perceptions and experiences were sought. Two wide-ranging themes were supported with relevant quotations from the transcribed arduous interviews, which surfaced from the analysis of the interview data. They included graduates with photography competencies losing their jobs due to technology and directors' indisposition to employ more graduates with photography aptitudes due to unfriendly business environments. These two major thematic areas are all related to participants' perceptions and experiences of technology in the digital photography industry.

4.3.1: Data to investigate the unemployment galore with the dawning of technology in the Digital Photography Industry

Table 1: Quotes relating to why graduate workers with photography skills are losing their jobs as a result of technology in the industry

Graduate	Illustrative Quotes
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PGW 1 "The director of the studio threatens to make us unemployed if we do not find extra time to update ourselves with the dawn of technology regularly. We must up our game. He can't afford to lose out existing and new clients to his competitors within the metropolis and beyond due to fast technology advancements in the industry."

PGW 2 "The director had a pattern of acquiring a new state-of-the-art tech hub every two years to expand the company. However, due to the COVID-19 pandemic, three out of six studios had to be closed down. Technology has significantly impacted the photography industry in positive ways. Currently, I work from home and engage in social media platforms to fast-track my work process and send it to my director's main office, etc."

PGW 3 "The photography firm sent me to a university to upgrade my skills via modern technology to enhance our team's chances of winning a bidding contract any time it is advertised. In fact, I'm yet to find my position in the studio. My director tells me he is yet to dismiss those who are deficient in the latest trends of technology in the industry. He simply cannot pay more for less results"

PGW 4 "Due to the fast pace of technology on regular basis my director expected me to know everything within a short time. He fired me because naturally I am a slow learner and tells me I can't compete in the competitive photography industry. My uncle intervened. Currently, I am on probation for the next 12 months."

PGW 5 "At a meeting, the director dismissed 3 of us because we failed to win a juicy contract from a multimillion-dollar foreign company while he was outside the country. The company expected us to include/mention the newest technology during the presentation to cover the job but did not know its existence."

PGW 6 "The director of the photography studio suspended us because we (workers) are not doing enough to use technology to woo new clients to the firm. Truly, I challenged him on his assertion. That particular month ended, and I was evicted from the firm. Currently, I work as a receptionist at another photographer's studio."

PGW 7 "I worked for a Photography firm for years and acquired experience. My director has the desire to expand due to advanced technology. He decided to send half of the staff to the new location. He ceased the expansion agenda because the business environment is very unfriendly."

PGW 8 "A newly employed graduate lady in our studio set the pace with excellent skills in the newest technology. Her proficiencies had always been used as a benchmark for all the team members. Since then we are always on top of issues."

Source: Author's fieldwork (2022)

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The submission by (PGW 1) offers an insightful perspective. According to the respondent, the director of the photography studio encouraged the staff to improve their skills and stay up-to-date with the latest technology in the industry. The director's advice was motivated by the need to remain competitive in a crowded marketplace and retain clients. The director realized that by keeping his staff updated and creative, they would be more likely to win over new customers and maintain their existing ones. The respondent's account also emphasizes the importance of self-empowerment and continuous development in the photography industry. The director's advice to stay updated with the latest technology and trends shows that success in this field requires constant effort, dedication, and the ability to adapt and improve is crucial in the photography industry. The theory that best links the statement is the theory of competitive advantage. This theory states that companies must continuously strive to improve their skills and stay up-to-date with the latest technology and trends to remain competitive in their respective industries. The respondent's submission highlights the importance of self-empowerment and continuous development in the photography industry and emphasizes that success in this field requires constant effort and dedication.

The findings from (PW2) show remarkable insight. His plan to grow the business was thwarted by the Covid-19 pandemic. It is unfortunate as the expansion could have provided more job opportunities for workers in the studio. Despite the situation, he has adapted to the current environment and is not eager to hire more employees. This is evident as some of his workers are now working from home. To stay competitive, the director is utilizing technology with the limited staff he has. Another important issue that the government must address promptly to boost confidence among photography industry directors and other business leaders is the stability of the economy. If this issue is not addressed, more photography studios may shut down, exacerbating the high unemployment rate in the country. The government should take a closer look at the impact of technology on the industry. The best theory that could be used to explain this situation is the Theory of Constraints. This theory advances that the success of a system is limited by its weakest link, and in this case, the weakest link is the impact of Covid-19 on the economy. The theory suggests that the government should focus on removing the constraints that are limiting the growth of the photography industry and other businesses, such as economic instability.

The data obtained from (PGW 3) is both enlightening and concerning. The decision to send the respondent to the university for a specific reason was commendable, but the fact that the respondent is expected to replace four staff members is worrying. If the director's decision is implemented, it could lead to an increase in unemployment within the sector, especially if the staff members are unable to secure immediate alternative employment. The industry is already struggling with high unemployment rates, compounded by economic challenges. The respondent's statement suggests that the director may be exploiting technological advances to reduce the number of staff and minimize expenditure. As such, photography graduates must engage in continuous learning in digital photography technology to remain competitive in the business. It highlights the need for a structural change in the photography industry to adapt to the changing technological landscape and maintain employment opportunities.

The statement suggests that (PGW 4) was not given adequate consideration for being a slow learner. This situation highlights the fact that humans have different learning abilities and speeds. Without the intervention of his uncle, the respondent would have been among the unemployed graduates. As a result of job insecurity, the respondent experienced increased stress and mental health problems. However, if he fails to catch up within the probationary year, his employment status is in jeopardy. Structural change theory hypothesizes that individuals should anticipate challenges and work progressively to overcome them. Had the respondent taken proactive steps, such as seeking additional training or support, he may not have faced dismissal from his job. The incident underscores the importance of job security and the challenges that individuals face in the labour market.

As regards (PGW 5), the response is quite reflecting. The director of a digital photography company dismissed three, including himself because they failed to secure a contract with a foreign company. The company expected the team to showcase the latest technology during the presentation, which the team was unaware of. This incident highlights the importance of continuous learning and adaptability in the digital photography industry. Structural change theory suggests that individuals and organisations must be willing to embrace new technologies and adapt to changing market demands to remain competitive.

In the competitive digital photography industry, the effective use of technology is essential for attracting and retaining clients. PGW 6 was suspended by the photography studio director for not utilizing technology enough to woo new clients. Although the respondent initially challenged the director's assertion, he later recognized the error and apologized. Despite the apology, the respondent was dismissed from the studio. This incident demonstrates the significance of technology and the need for workers to keep pace with its advancements. The structural change theory connected to the study is technological change and adaptation. The respondent's current job as a receptionist at another photography studio may be a result of the skills gap that led to the suspension and subsequent dismissal. The structural change theory linked to the respondent feedback is the skills and knowledge gap. According to Ferreira and Fernandes (2020), "technological advancements have transformed the photography industry, requiring workers to keep pace with new developments to remain competitive. Failure to adapt to technological change can lead to negative consequences for workers and the firm."

Evidence from (PGW 7) indicates that the current economic crisis is having serious turmoil in his photography business. The respondent's experience in the digital photography industry revealed that despite the desire to expand the business using advanced technology, the director decided against it due to the unfavourable business environment. Instead, he proposed to transfer half of the staff to the new location rather than hiring additional employees. This may have been due to the challenges that businesses face in the digital photography industry, such as rapid changes in technology and increasing competition. Structural change theory highlights the need for businesses to remain dynamic and flexible to succeed in the face of environmental changes. According to Zhang and Venkatraman (2014), organizations must be adaptable and

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flexible to respond to changes in the market and industry. This concept aligns with structural change theory, which theorizes that businesses must adapt to changes in the environment to survive and thrive.

The submission from (PGW 8) indicates competition as a result of the application of new technology is good. The statement suggests that a female graduate recently joined a digital photography studio and impressed her colleagues with her exceptional skills in using the latest technology. The ability of the female photographer to rub shoulders with her male colleagues is remarkable. She defied all odds to control the studio due to her experiential ingenuity in the modern technology of digital photography. Her abilities have since been used as a benchmark for the rest of the team, which has resulted in improved performance and staying on top of industry trends. The respondent's situation highlights the positive impact that new hires with advanced skills can have on a team's performance. Structural change theory suggests that organizations need to constantly adapt to changes in the industry, including technological advancements. Hiring individuals with the latest skills and knowledge is one way to achieve this and remain competitive. The statement highlights the positive impact that new hires with advanced skills can have on a team's performance in the digital photography industry. By keeping up with technological advancements and investing in training and development, organizations can remain competitive and adapt to changes in the industry. "Discrimination at the workplace, sexism and industry stereotypes have contributed to a general lack of opportunities for women in photography. Photography remains stubbornly male-dominated. In terms of commissioning, exhibition and publication of work, there is a conspicuous lack of equality in the industry" (Bright, 2019).

Table 2: Quotes relating to why Directors are reluctant to employ more graduates with photography-related competencies

Directors	Illustrative Quotes
DIR 1	"I have two studios at Osu RE and Achimota. Haplessly, fire gutted the latter a year ago. I could not absorb the workers in this studio. I have not been able to reinstate it due to financial constraints. Currently, credit facility from the bank comes with a very outrageous interest rate which I can't afford it."
DIR 2	"I am unable to expand my studio with modern digital technology stuffs because they are very expensive on the local and international markets. How can I employ more hands into the business?"
DIR 3	"High cost of overheads especially on weekends where work is in abundance yet sometimes breaking even becomes very difficult. Technological advancements in the industry are enhancing our work. Now, the works of people can be executed by just a worker. Why should I keep more than necessary workers? I will dismiss a little more after the Xmas festivities."
DIR 4	"The dawn of technology is really enhancing new methods in the social media space (photo sharers and photo bloggers), skills of shooting, rendition and

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	delivery to prospective clients. Thus, no need to employ more workers except on a hiring basis where the demand is very high with a short pace to deliver the job.” We satisfy our clients unreservedly.
DIR 5	“I have plans of employing more graduate workers into my intended establishment of more studios of all the regional capitals in the southern part of this country. But I’m afraid, these unemployed graduates might eventually loot me and wreck my business.”
DIR 6	“Yes, I agree technology is the way to go. It’s really helping the industry. I cannot employ additional photography workers. In the next few weeks, I will lay off some workers.

Source: Author’s fieldwork (2022)

The statement by DIR 1 suggests that the digital photography industry can be challenging for small business owners. The speaker, who owns two studios in Osu RE and Achimota, experienced a setback when one of the studios was destroyed by fire. Despite attempts to keep the affected workers employed, the studio was unable to absorb them. Financial constraints have prevented the speaker from rebuilding the gutted studio, and high-interest rates on credit facilities perhaps have made it difficult to obtain financing. The situation highlights the need for small businesses to have contingency plans in place for unexpected setbacks and to have access to affordable financing options to support recovery and growth. Structural change theory is linked to feedback. Small businesses need to anticipate and plan for potential crises or setbacks, and having access to affordable financing options can be a critical factor in overcoming challenges and adapting to changing circumstances.

The assertion made by DIR 2 highlights the challenges of running a successful digital photography business in today's market. The high cost of modern digital technology equipment locally and internationally and the challenges of hiring additional staff due to high exchange rates and taxes are making it difficult for him to expand his operations. This situation illustrates the importance of strategic planning and foresight in the face of market challenges. Structural change theory suggests that entrepreneurs should anticipate and prepare for market changes and disruptions by investing in new technologies, training programmes, and other resources that can help them stay competitive and grow their businesses. Structural change theory suggests that economic growth and development depend on shifts in the structure of the economy, including changes in technology, employment patterns, and resource allocation. It highlights the importance of policies and investments that can facilitate such shifts, such as investments in education, training, and infrastructure. This situation underscores the need for government policies and programmes to facilitate access to affordable equipment, minimize taxes and promote industry growth. “Ghana's digital photography industry faces significant barriers to growth and development due to high equipment costs, high taxes and currency fluctuations” (Amponsah-Dacosta, 2019).

The data from DIR 3 suggests some clients run away when they realised that on daily basis he keeps increasing prices. He attributed his increment of the photo shoot packages to government

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taxes and levies on regular basis on his business. Optimistically, he asserts, technology-related issues are augmenting the industry with software and digital inputs. The development means the industry is benefitting from the dawn of technology yet with severe setbacks by government economic hardship in the country. The high cost of overheads to run his studio affects his profit margins considering the fact he works with workers who expect pay at the end of a job or the month. These challenges constrain directors not to expand and engaging more workers. Evidence suggests that the government cannot employ all graduates from various public universities monthly in the existing economic crisis. Consequently, affects private partnerships to help government grow the economy thus creating a huge revenue gap for the state. His intention to dismiss some workers is as result of the economic hardship prevailing in the sector now. If he carries out his threat it means unemployment galore in the photography industry hence, a security threat in the country at large.

The response from the female DIR 4 is quite disturbing yet the reality is on the ground. In a fast business working environment like the photography industry, no director with huge sums of investment will tolerate slowness and less productive from graduate workers. Smartness, creativity and ingenuity are the order of the day due to the strict competition among the industry players. The statement from DIR 4 suggests that she expects his workers in the digital photography industry in Ghana to be able to quickly adapt to new technologies. He suspended two employees who he deemed to be slow learners and instructed them to speed up their learning or face dismissal. It highlights the pressure that workers face in the industry to keep up with technological advancements. The use of threats and punishments to motivate employees to learn may not be effective in the long run and may create a stressful work environment. The statement underscores the importance of continuous learning and development in the field of digital photography. Structural change theory associated is with learning and development theory.

The account made by DIR 5 in the digital photography industry in Ghana suggests that they are optimistic about the future of their business and plan to expand it by opening more studios and employing more graduate workers. However, they express concern that unemployed graduates may become a threat to their businesses by engaging in criminal activities. This highlights the challenges that businesses face in the current economic climate, where there is high unemployment and limited opportunities for graduates. As far as structural change theory is concerned this situation highlights the importance of adaptation and innovation in response to changing economic conditions and labour market trends.

The director (DIR 6) agrees that technology has played a crucial role in advancing the digital photography industry in Ghana. This has led to increased efficiency and productivity, which has made it unnecessary to hire additional photography workers. Unfortunately, this means that the speaker will need to lay off some workers in the next few weeks, as their services are no longer required. The use of technology has allowed businesses to operate more efficiently, which has ultimately led to the decision to reduce the workforce. While this decision may be difficult, it is necessary for the business to remain competitive and financially viable in the

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long term. The theory of Technological advancements has had a significant impact on the digital photography industry in Ghana. The use of technology has enabled businesses to operate more efficiently and has increased their productivity. Due to this increased efficiency, there is no need for additional photography workers. Therefore, the respondent plans to lay off some workers in the next few weeks.

Besides, the data from the remaining 9 unemployed digital photography graduates in Ghana is significant in this discussion. According to the evidence gathered from these respondents, all 9 (100%) believed that the emerging technology in the industry is preventing photography firms from hiring them as workers. The assertions made by the participants are noteworthy because they suggest that technology is helping an industry that is grappling with high operational costs and taxes, which are impeding the willingness of photography studio directors to expand and employ more workers. These revelations from unemployed digital photography graduates indicate that they are aware of the problems facing the industry. Key stakeholders need to address these issues to avoid any potential chaos in the sector. The continued unemployment in the industry, combined with other factors, could potentially create a national security threat. Therefore, all stakeholders need to help address the problematic situation in the country. The Ghanaian government should urgently develop and implement strategies to resolve the rising unemployment in the digital photography industry. This will require the collaboration and cooperation of all stakeholders to create a more conducive environment for employment in the industry. These findings highlight that even unemployed photography graduates are aware of the challenges facing the industry, and stakeholders need to address these issues to avoid potential chaos in the sector. If this trend continues, it could lead to a national security threat due to unemployment combined with other factors. Therefore, meaningful stakeholders need to develop and implement solutions to address the rising unemployment in the photography industry urgently. The government, in particular, has a responsibility to address this issue to prevent any potential negative consequences.

Data to appraise the consequences of technology on the Digital Photography Industry in Ghana

The evidence gathered from respondents in Tables 3 and 4 is summarized based on the questionnaire sent. A total of 11(82%) males and 3(18%) females participated in the study. It indicates that the industry is controlled by males. It is buttressed by Zippa (2016), in the US “38.2% of all staff photographers are women, while 61.8% are men.”

Regarding the educational background of the respondents in the study, 10(71%) had their training up to the university level whereas 4(29%) had training from other sources related to photography institutes. Data shows respondents have varied positions and responsibilities assigned to them differently in their respective studios. The duties include 7(50%) for preparation of grounds and shooting; 4(29%) for editing and printing; and 3(21%) for framing, labeling, packaging and delivery where necessary. Besides, directors 6(100%) are responsible for ensuring that clients’ specifications are met accordingly. Table 5 to Table 16 are the

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thoughts of 14 participants (directors and graduate workers). The views of the 9 unemployed photography graduates are catalogued at the tail end of the presentation under this objective.

Table 5: How conversant are you with regard to the use of new technology in the digital photography industry?

Responses	Frequency	Percentage (%)
Not conversant	1	7
Averagely Conversant	8	57
Very Conversant	5	36
Total	14	100

Source: Author's fieldwork (2022)

From Table 5, it can be observed that 2(14%) graduate workers surveyed reported having little or no knowledge of new technology in the photography industry. Out of the surveyed workers, 8(57%) reported having average knowledge and familiarity with modern technology and its associated accessories in the photography industry. Four (29%) of the surveyed workers disclosed having very good knowledge and familiarity with recent technology and its related matters in the photography industry. Based on the feedback from the surveyed participants, it can be inferred that the majority of them are familiar with emerging technologies and associated concerns in the photography industry. These findings are particularly noteworthy in an industry facing challenges such as the expansion of photography studios and high rates of unemployment among photographers.

Table 6: Is the dawn of technology transforming the digital photography industry in Ghana?

Response	Frequency	Percentage (%)
Yes	14	100
Total	14	100

Source: Author's fieldwork (2022)

With respect to item 6, all respondents 14 (100%) confirmed latest technology is enhancing the activities of the Photography Industry professionally. Bulky cameras and equipment used years ago are becoming extinct due to emerging technology in the industry. "Camera cranes, Steadicams and camera tracks all have specific physical constraints" (Smith, 2021). Today, the

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narrative is different. The submission is evident in the latest use of drones in the industry to shoot scenes from skies, forest zones, vantage, remote areas and others. “Drones provide new aerial perspectives, enhancing visual experience and capturing new vantage points of the world” (Smith, 2021). “Drones are far from being just fancy flying cameras. Their sophisticated technology allows them to obtain and record information where humans cannot, such as in dangerous environments and difficult-to-access areas” (Smith, 2022). The directors on their part admitted that the new technology in the industry is worthwhile. Regrettably, the expansion of the studios by the directors is problematic due to the unfriendly business environment in the country. The views of the respondents are an admissible fact technology is playing a major role in the sector in the 21st century. It suggests that both directors and workers should take advantage of the new dawn of technology to move the industry to better levels to meet the anticipations of clients and citizens.

Table 7: How is your studio coping with the new trends of technology in the digital photography industry?

Responses	Frequency	Percentage (%)
New cameras and equipment have been purchased to deal with new trends in technology.	6	43
Regularly, photographers with advanced expertise in the industry are hired to organize seminar presentations.	3	21
Workers are given in-service training in advance on a regular basis to catch up with the new trends of technology in the industry.	5	36
Total	14	100

Source: Author's fieldwork (2022)

The feedback from the survey participants suggests that directors and staff of the digital photography industry in Ghana are making efforts to address technology-related issues in order to operate their studios effectively. Specifically, 6 (43%) reported that they are keeping up with new technology trends by purchasing new cameras and equipment. Additionally, 3(21%) stated that they regularly hire experienced photographers to give presentations and update their staff on the latest industry advancements. Meanwhile, 5(36%) reported that they provide in-service training for their workers regularly to keep up with new technology trends. These strategies are important for the industry to remain competitive and successful, as the photography landscape is constantly evolving. By adopting measures to cope with emerging challenges, the industry can remain relevant and modern. “Fifth and finally, technology can increase the productivity of individual workers, making them more valuable to their employers” (Johnson, 2019).

Table 8: What are the chances of those who cannot apply technology in the Photography Industry?

Response	Frequency	Percentage (%)
They will struggle to get jobs to do even if they are the CEOs of their entrepreneurship	4	29
They are likely to work in areas they do not have aptitudes	2	14
They will become unemployed in the sector	8	57
Total	14	100

Source: Author's fieldwork (2022)

According to the data presented in Table 8, 4(29%) of the respondents reported that they anticipate difficulties in securing employment even if they establish their entrepreneurial ventures. Furthermore, 2(14%) of the respondents expressed concerns that workers may be required to work in areas where they lack the necessary skills and competencies. Eight (57%) of the respondents noted that failure to adapt to new technology in the industry could result in job losses. These findings suggest that workers in the digital photography sector may face challenges in finding employment, regardless of their proficiencies and experiences, if they do not keep up with the rapidly evolving technology in the industry. As regards structural change of theory: The findings from Table 8 indicate that the adoption of new technology in the digital photography industry has significant implications for the employment prospects of workers in Ghana. This can be explained by the theory of technological unemployment, which suggests that advancements in technology can displace workers and render their skills obsolete. As such, it is crucial for workers in the digital photography sector to continuously develop their skills and adapt to new technological trends to remain employable.

Table 9: Is technology causing unemployment in the digital photography industry?

Response	Frequency	Percentage (%)
Yes	11	79
No	3	21
Total	14	100

Source: Author's fieldwork (2022)

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Table 9 contains thought-provoking feedback from respondents regarding the impact of technology on unemployment in the digital photography industry in Ghana. Clearly, 11(79%) believed that technology is causing unemployment in the industry, while 3(21%) believed otherwise. This feedback highlights a challenge that many developed countries face, which is the potential for rapid technological advancement to displace workers from their current jobs without the creation of new ones. The rising cost of labour and the affordability of machines are some of the reasons why companies are investing in labor-saving technologies. The feedback suggests that both directors and unemployed graduates in the photography industry need to take proactive steps to position themselves for the ever-changing trends in the industry. This will enable them to remain competitive and relevant in the face of technological advancements which is a vital recommendation of the skill-biased technological change theory. The structural change theory associated with the statements is the "Skill-Biased Technological Change" theory. This theory suggests that technological change can lead to the displacement of low-skilled workers while increasing the demand for highly skilled workers, leading to skill polarization in the labour market.

Table 10: What are the major causes of unemployment galore in the photography industry due to technology?

Response	Frequency	Percentage (%)
Directors are not expanding studios because of the unfriendly business environment grappled with high taxes and others.	6	43
Cameras and their accessories are very expensive locally and internationally.	4	29
Access to credit facilities from banks to set up entrepreneurs is extremely difficult.	3	21
Poor economic policies are deterring passionate employers from absorbing unemployed photographers.	1	7
Total	14	100

Source: Author's fieldwork (2022)

The responses catalogued in Table 10 reveal several challenges facing the digital photography industry in Ghana. A common issue among respondents is the lack of funds for industry expansion due to the current economic crisis. Many directors are reluctant to expand their studios due to an unfriendly business environment and exorbitant taxes, as reported by 6(43%) workers. Four (29%) respondents noted that cameras and accessories are very expensive locally and internationally, making it difficult for directors and self-employed individuals to extend their mandate in the industry and absorb jobless individuals. Access to credit facilities from banks is also extremely challenging as asserted by 3(21%) respondents, hindering them from practicing their skills and training in the industry. Moreover, 1(7%) respondent attributed poor

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economic policies to deterring passionate employers from absorbing unemployed photographers. These challenges, if not addressed seriously, could impede the growth of the photography industry and contribute to the persisting unemployment of photography graduates, which is a threat to national security. The private sector is seen as the engine of growth, and the government should resource the industry to enable it to absorb more unemployed photography graduates. The researcher believes without addressing the challenges identified, the future looks bleak for these unemployed photography youth. Therefore, it is important to take measures to support the growth of the industry, which will not only create job opportunities but also contribute to the overall economic development of the country. The Structural Change Theory supports this argument, as it emphasizes the importance of shifting resources and labour from low-productivity sectors to high-productivity sectors, which can lead to sustained economic growth and development.

Table 11: What should Photography directors do to minimize unemployment galore as a result of technology in the digital photography industry?

Responses	Frequency	Percentage (%)
They should expand their studios to employ more unemployed graduates in the industry despite the challenges they are facing.	4	29
Government should provide them with soft loans to support their services.	0	0
Government should reduce high taxes on cameras and equipment in the industry.	10	71
Total	14	100

Source: Author's fieldwork (2022)

According to statistics from the survey of digital photography industry stakeholders in Ghana, 4(29%) of respondents believe that industry directors should continuously seek out new technology-related issues in the industry, as technology is constantly changing and dictating the pace of the industry. Additionally, 10(71%) of respondents believe that the government should reduce high taxes on cameras and equipment in the industry, indicating that industry players are willing to invest in these devices for the possible growth of their studios. However, none (0%) of the respondents felt that the government should provide industry players with soft loans to support their services, possibly due to the exorbitant interest rates (32-35%) charged by commercial banks in the country. These findings suggest that industry players are not satisfied with the current high taxes and economic crisis in the industry. Consequently, the government must develop better ways of incentivizing industry players, such as providing soft loans or reducing taxes, to help them expand and employ more unemployed photography graduates. Failure to do so could be a threat to national security, as the persisting unemployment among photography graduates indicates a bleak future for them. Therefore, it

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is imperative for the private sector to become the engine of growth and for the government to provide resources to the industry to absorb more unemployed photography graduates.

Table 12: To what extent do photographers benefit from new technology as compared to analogue processes in the digital photography industry?

Response	Frequency	Percentage (%)
Images captured can be previewed instantly on the LCD.	5	36
The operating costs of digital photography are less costive than analogue ones.	4	29
Digital Cameras are more convenient to work with than analogue cameras.	2	21
Digital cameras can store more images than film cameras.	3	7
Total	14	100

Source: Author's fieldwork (2022)

Table 12 provides a comprehensive breakdown of the benefits that photographers are experiencing in the 21st century. According to the data, 5(36%) of the respondents attested digital technology enables instant previewing of captured images on LCD screens, while 4(29%) confirmed that operating costs for digital technology are lower compared to analogue alternatives. Two (14%) of respondents noted that digital cameras are more convenient to work with compared to analogue ones, and 3(21%) stated that digital cameras can store a larger number of images than film. These findings suggest that the advantages of digital technology outweigh those of analogue technology in the photography industry.

Despite these advantages, the assertion that digital technology has created more job opportunities for unemployed photographers in Ghana is contested by industry players. Both employed and unemployed photographers argue that digital technology has contributed to the scarcity of job opportunities in the industry and that the economic crisis in the country further compounds the situation. The benefits of digital technology have enabled photographers to produce high-quality images for various purposes, including personal use, exhibitions, social media, and commercial clients. With respect to the Structural change of theory, the statements in Table 12 provide empirical evidence that digital technology is favoured over analogue technology in the photography industry. However, this does not necessarily translate to more job opportunities for unemployed photographers, as other factors such as the economic crisis in Ghana also play a significant role. Nonetheless, the benefits of digital technology have enabled photographers to produce high-quality images for various purposes.

Table 13: State some of the challenges encountered with the dawn of technology in the digital photography industry in Ghana?

Response	Frequency	Percentage (%)
Digital cameras have become very difficult to buy due to the high exchange rate	7	50
Directors have minimised hiring spree of assistant photographers to work with	5	36
Studios hitherto relied upon and survived on analogue photography have lost clients and are almost out of business due to new technologies in the industry.	2	14
Total	14	100

Source: Author's fieldwork (2022)

The data presented in Table 13 sheds light on the challenges faced by digital photographers in Ghana. Out of the respondents, 7(50%) mentioned that high exchange rates have made it difficult for them to purchase digital cameras. This highlights the need for the government to examine the underlying factors affecting the economy and take steps to strengthen the cedi against major foreign currencies. Furthermore, the government should also consider reducing the high duties imposed on imported cameras, which obstruct employed photographers from purchasing and setting up their studios. Five (36%) of the respondents confirmed that directors have either minimized or ceased hiring assistant photographers to work with them. This indicates that the unfriendly business environment has forced directors to cut back on their expenses and avoid additional hires, despite having job opportunities available. These trends demonstrate the high level of economic hardship in the country, with directors being cautious and holding onto their resources. Moreover, 2(14%) of the respondents revealed that studios that relied on analogue photography are losing clients and almost going out of business due to the new technology in the industry. This is an example of the impact of technology on the photography industry, and it highlights the inevitability of change in this field. These findings suggest that the industry players are facing significant challenges, and the government should consider implementing policies to support them and reduce unemployment in the sector.

The data reveals the difficulties faced by digital photographers in Ghana, including the high cost of digital cameras, the reluctance of directors to hire additional photographers, and the impact of technology on the industry. To address these challenges, the government should consider implementing policies aimed at supporting the industry players and creating an enabling environment for growth and development.

Table 14: What should photographers do to stay in the fast technological advancement in the digital photography industry?

Response	Frequency	Percentage (%)
They should continually search for and adopt new technology in the industry.	8	57
They should on a regular basis train staff on the update of new technology in the industry.	6	43
Total	14	100

Source: Author's fieldwork (2022)

According to Table 14 in the digital photography industry in Ghana, 8(57%) agreed that it is crucial to continuously seek and embrace modern technology in the industry. The finding indicates that failing to stay informed about technological advancements could result in falling behind in a highly competitive industry. It highlights the fact that technology is essential in the current landscape of the industry. Six (43%) emphasized the importance of regularly training staff on the latest technology in the industry. The response serves as a reminder to directors of photography studios to invest in the necessary resources to keep their staff up-to-date with technology. By doing so, staff members will feel fulfilled and motivated, leading to improved productivity and success for the studios. Neglecting to train staff on new technology can harm an already besieged industry facing numerous challenges. Overall, the results indicate that technology has a positive impact on the digital photography industry in Ghana. Both staff and directors must adopt and utilize new technologies in their daily operations to remain competitive and succeed in the industry which aligns with the Technology Adoption theory. This theory suggests that the adoption and utilization of new technologies can drive economic growth and development by increasing productivity, efficiency and innovation.

Table 15: Suggest ways by which due to the dawn of technology unemployed photographers can be self-employed in the photography industry.

Response	Frequency	Percentage (%)
Some should form a partnership, pull their little resources together and set up their photography studios.	8	57
Others should take risks in securing a credit facility to set up their studios.	1	7
Others should start as a freelancer in the industry	5	36
Total	14	100

Source: Author's fieldwork (2022)

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In the field of digital photography in Ghana, technical education aims to equip students with the skills to become self-employed. Due to economic challenges faced by the government and private sectors, many graduates are struggling to find employment. To address this issue, photography students must be innovative and proactive in seeking opportunities in the industry. Waiting until after graduation puts them at a disadvantage. Eight (57%) respondents contended that unemployed photographers should form a team and pool their resources to set up photography studios. However, issues of trust and leadership must be thoroughly addressed before embarking on any partnership. Others 1(7%) suggested taking the risk of securing credit facilities to set up individual studios. However, the high-interest rates and reluctance of banks to lend to unemployed graduates and business people are significant obstacles. Five (36%) proposed others should start as a freelancer in the industry. Starting small and working towards greater achievements is key. Practicing as a freelancer can gradually sell oneself to the general public via social media and other channels. Through this approach, freelancers can generate money from interest groups to begin their set up of entrepreneurship. Government should create a supportive environment for individuals to develop themselves and start their own businesses. The technical education mandate in digital photography in Ghana seeks to promote self-employment. Unemployed graduates must be proactive and innovative to create their opportunities.

A study was conducted among 9 unemployed photography graduates in Ghana to understand their perceptions of the industry. Evidence suggests that rapid technological advancements in the field is thwarting their employment prospects. The participants identified several technological developments that are directly or indirectly preventing them from getting hired. Regarding self-employment, all 9 participants expressed a desire to start their businesses but cited various financial constraints. They noted that the current economic climate in Ghana makes it difficult to obtain loans from banks, and even if they qualify, they often lack the necessary collateral. The high cost of equipment, especially cameras, is a major barrier. They lamented the fact that the government and other key stakeholders in the industry are not doing enough to support young people who want to pursue photography as a career. On the issue of technology, the majority of participants 7(78%) reported being knowledgeable and up-to-date with the latest advancements in the field. However, 2(22%) participants faced setbacks after their equipment was stolen. They acknowledged that technology has enhanced the work of photographers in the industry, but did not believe that it was pushing them out of job. They pointed out that the increasing use of camera phone technology was having a significant impact on the industry and creating new opportunities. The study highlighted the challenges faced by young people trying to enter the photography industry in Ghana, including limited access to capital and high equipment costs. Despite these obstacles, many participants remained passionate about their craft and eager to explore new technological innovations in the digital photography industry.

CONCLUSION

The findings of the study has significant research implications for policymakers, key industry stakeholders and photography workers to continuously develop their digital skills to remain relevant in the industry. With the emergence of new technologies, graduate workers must adapt and develop new skills to remain employable. Therefore, there is a need for workers to engage in continuous learning and upskilling to remain competitive in the job market while the industry can benefit from skilled workforce that can innovate and grow the industry. Technological unemployment is a pressing issue in the digital photography industry in Ghana, and it is a challenge that must be addressed urgently. Concerning the first objective, the study found that the advent of technology has led to significant job losses, particularly among recent photography graduates. While technology has many benefits in the industry, such as improved proficiency and exactitude, it has also led to redundancies and downsizing, contributing to the country's unemployment galore. As regards the second objective, this study has successfully appraised the consequences of technology on the digital photography industry in Ghana. The study found that technology has had both positive and negative consequences on the industry. On the other hand, technology has led to increased productivity, efficiency and precision in the editing, shooting, printing, packaging and delivery of clients' orders. It has also led to an alarming rate of unemployment, especially among photography graduate workers. The study also revealed that directors are willing to promote growth in the industry while recognizing the benefits of technology in the industry, they are also mindful of its negative impacts. Additionally, the government can create policies that would ensure a better distribution of the benefits of technological advancements. The government could incentivize the expansion of photography studios by offering tax breaks or other financial incentives. It would encourage studio directors to take on more workers and expand their businesses, potentially creating new job opportunities. Future research may look into other sectors of the graphic design industry that are grappling with technological unemployment and develop more comprehensive policy recommendations to address the issue.

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