KWAME NKRUMAH UNIVERSITY OF SCIENCE AND TECHNOLOGY,

KUMASI, GHANA

Digital Photography: Influence of Smartphone usage in relation to Visual

Communication.

by

Prosper Kofi Dzukey (BA. Communication Design)

A Thesis submitted to the Department of Communication Design in the

Faculty of Art,

College of Art and Built Environment in partial

fulfilment of the requirement for the degree

MASTER OF PHILOSOPHY:

(COMMUNICATION DESIGN)

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Supervisor: Dr. Edward Appiah

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CERTIFICATION/DECLARATION

I, Prosper Kofi Dzukey, declare that this submission is my own work towards the Master of Philosophy and that, to the best of my knowledge, it contains no material previously published by another person nor material which has been accepted for the award of any other degree of the University, except where due acknowledgement has been made in the text.
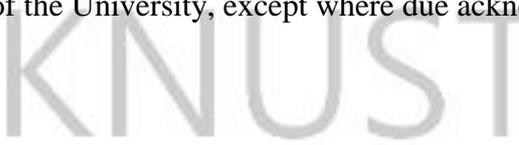
Prosper Kofi Dzukey (PG9238213)

(Student Name & ID)

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Signature

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Date

Certified by:

Dr. Edward Appiah
(Supervisor's Name)

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Signature

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Date

Certified by:

Dr. Edward Appiah
(Head of Department's Name)

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Signature

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ABSTRACT

This study describes the results of a phenomenological research aimed at enquiring on the influence of smartphone photography activities on the mainstream digital photography in relation to visual communication. New knowledge and new frontiers have emerged from the results. Previous studies revealed that smartphone photography being a newly emerged visual communication practice is reuniting families and friends through the act of mobile photography. Fifteen participants were purposefully selected and interviewed for their experiences in smartphone photography within three major cities in Ghana namely: Accra, Kumasi and Takoradi. The responses were integrated into a body of data out of which three themes were developed: Technological Convergence, User- applications and Improvement in image resolution to deal with the three research objectives respectively. The results show that professionals and non-professionals alike will continue to experience the practice of smartphone photography because the practice is seen as a new medium of social interconnectivity. However, on the issue of whether the DSLRs could be replaced by the emergence of the smartphone, results suggest the contrary. The study also revealed increased human rights infringements like "voyeurism" and "secret filming" of victims as part of the activities due to dramatic improvement in the image quality.

The study therefore elicits promulgation of governmental policy or some regulations on the use of smartphone photography especially in public spaces to reduce the incidence of human rights abuses.

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CHAPTER ONE

INTRODUCTION

1.1 BACKGROUND TO THE STUDY

Over the last decade, Digital Photography practices saw infiltration of camera phones in to the mainstream photography endeavors. This phenomenon could be attributed to technological advancement in the area of mobile telephony. Since 1996, the growing novel technologies in the mobile imaging (cell/camera phones), have gone through some transformation. In 2007, camera phone became smartphone (Maeda, 2012) which has more or less become an accepted imaging tool for digital photography. Smartphones are primarily cell phones integrated with digital camera and internet facilities (Kim & Kwon, 2012). In this study, cellphone, camera phone, mobile phone and smartphone will be used interchangeably and in context.

Even though there are several determining factors of whether a cell phone is smartphone or not, this definition is in the context of this research. What made cell phones smartphones are their ability to run on different operating systems (OS), Android (OS) for (Google) Apple iPhone runs on (iOS), RIM Blackberry, Symbian for Nokia and Microsoft Windows Mobile (Kim & Kwon, 2012). The question of why mobile computer has become so important in the emergence of smartphone photography today could simply be explained by the functionalities of the operating systems being employed by the manufacturers and the limitless bounds of third-party applications they run on. Such applications (often referred to as *apps*) is readily available for download from the internet. The case in which smartphones are being used for digital photography of some sort is only one of the innovative use of the digital device. Other devices are also integrated with digital camera and are capable of producing digital photographs. These devices are laptops, iPads, mini drones,

spectacles, buttons, pens and many other modern digital gadgets. In the context of this study, smartphone photography becomes possible once a cell phone has a hardware component (camera integration) and (installed application) user-application on the phone (Echevarria & Gutierrez, 2011). Other considerations that made it possible is the fact that, smartphone as an information communication technology (ICT) tool and also as a result of technological convergence (Rayner, Wall, & Kruger, 2004). In view of that users take advantage of these development for an innovative gain.

These developments have become so pervasive that almost all mobile phones now are becoming smartphones, and many users are not necessarily interested in photography per se but rather becoming avid photographers. Again, smartphones are used for circulating and networking with images (personal photography) on the internet for personal inter-connectivity which obviously have become a culture of photography practice.

1.2 BACKGROUND TO THE RESEARCH PROBLEM

The integration of digital camera into cell phone has made mobile photography a key issue of visual communication in recent times. With cell phone becoming smartphone, the information communication Technology (ICT) concept in digital photography becomes phenomenon. Nowadays cellphone or smartphone do not only transmit voice over a distance but also capable of "enabling a multitude of communicative activities" which include mobile photography (Villi, 2010). Around 2007 two monumental phenomena of smartphone productions in the world happened. Firstly, Apple launched the first generation of iPhone and secondly, Google also announced Android platform initiatives for Smartphones (Maeda, 2012). These two monumental developments brought about the revolution in mobile imaging simply because of digital camera integration into mobile phones which propelled mobile photography to a great height.

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Linking the camera integration to the phenomenon of emerged camera phone use for mobile photography practice brought to mind the 1890's Kodak's inexpensive and easy-to-use Brownie' with the accompanied slogan *"You push the button, we do the rest"* that transformed photography into an everyday leisure activity (Murray, 2008). Many decades after, the camera phone had emerged just like the Eastman Kodak's Brownie (Sekula, 2014), the use is now ubiquitous but this development has been pushed forward 'speedily' by the availability of advanced digital technology, nonetheless it is transforming our relationship with photography in today's globalized world. As shown in plate 1.1, The advancement in photographic technology is what Murray refers to as the '*Kodak moment*' being replaced by the *'mobile moment'*.

Plate 1.1: 'Kodak moment' being replaced by the 'mobile moment' (Murray, 2008)

By Murray's assertion, the "*mobile moment*" represents the current state of mobile technology and smartphone usability in the context of digital photography. In view of this, smartphone production saw an increase in production in the last decade. Whilst smartphone production reached an estimated number of 1 billion in 2012, and is expected to reach 2 billion in 2015 (Rushton, 2012), miniature digital camera integration into phones also increased by the same percentage. Apart from the increase

in camera integration over the years, the growing popularity of camera phones redefines not only mobile communications but also mobile-visual communication. The mobile Moment is what results to mobile-visual communication: a new genre of photography. Roberts (2011) refers to this type of genre as 'iPhoneography' that is taking photographs with an iPhone. This genre is predominant in traditional media as well as social media landscape in Ghanaian. Janssen (2013) describes a similar process as 'Phonetography' which means taking photos with the smartphone or any other kind of phone with camera integration. This type of photography has become more common due to the integration of high-quality digital cameras on most mobile phones. The proliferation is also as a result of photography apps spurring the shift from the traditional digital photography processes (use of DSLRs) toward the use of smartphone (Janssen, 2013). The emerging process is phenomenal, pervasive and trendy as it is becoming accepted as a rewarding venture in Ghana. This phenomenon could be speculated upon by way of technological advancement and the impact on Digital Photography in respect of visual communication is yet to be established in this study. Several studies have been conducted around the subject matter. For instance Nunoo, (2013) did a study on the Smartphone Information Security Risks; Kang, Cho, & Lee, (2009) had earlier delved into the Analysis of Factors Affecting the Adoption of Smartphones in general whereas Lundberg, (2013) explored how smartphones affect personal interactions. These studies including Gai, (2009) Case Studies on Beijing Camera Phone use, did not critically look at the phenomenon of smartphone photography in relation to visual communication.

It is in the light of the shortfalls in the knowledge gap in terms of the usage of smartphone for visual communication that necessitate this exploratory study aimed at

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finding out the influences of digital camera integration into smartphones and the invariable use for smartphone photography.

1.3 STATEMENT OF THE RESEARCH PROBLEM

Integration of camera into smartphones and its ubiquitous use is affecting the activities of Digital Photography and invariably diffusing Professional Digital photography practice (Cruz & Meyer, 2012). The emerged phenomenon is pervasive and trendy as it is being accepted as a venture by the social systems. The irony is while the situation is becoming uncontrollable, more of the devices influx the Ghanaian market probably to lend credence to what is known as technology convergence and advancement (Kerr, Thinyane, & Foster, 2009). Nonetheless, not much academic enquiry is done in terms of the impact of smartphones on the traditional digital photography practice within the context of visual communication. Plate 1.2 illustrates the phenomenon that is been investigated.

Plate 1.2: Spectators taking pictures of Team GB's celebration parade after the London 2012 Olympics. Photograph: AFP/Getty Images

1.4 AIM AND OBJECTIVES OF THE RESEARCH

Apart from gathering pieces of evidence that are in existence (Nunoo, 2013; Taflinger, 1996), the main aim of the research is to explore the impact of smartphone activities in the 'face' of traditional digital photography. This will include the type of devices (smart Phones used for digital photography), technologies employed and the influence of these devices in relation to visual communication. This will mean observing the following objectives:

- To explore user experiences of smartphone for visual communication activities;
- To explore the technologies that permit easy use of smartphone for digital photography and
- To establish whether the innovative visual communication activities of smartphone use will mean the **'death'** of DSLRs.

1.5 RATIONALE

The rationale for this research are in twofold: practical and academic. The practical rationale stems from personal experiences as a professional digital photographer practicing for over a decade and as a tutor of digital photography in one of the higher educational institutions in Ghana. The academic rationale stems from the gap identified in literature about the emerged phenomenon in society where the use of smartphone for digital photography has become a raging activity in recent times (Janssen, 2013; Roberts, 2011). Plate 1.3 illustrates the raging activities of people fascinated by employing smartphone for digital photography at different locations.

Plate 1.3: Images of users experiencing smartphone photography (Researchers' Library)

Aside having academic and practical dimensions, this study aligns with the interpretivist stance to derive the epistemological position, "where valid knowledge is considered as individual sense making through which participants continuously interpret, create, give meaning to, define, justify and rationalise (their) actions" regarding their experience (Bhattacherjee, 2012).

To place this research in perspective, it is considered to be beneficial for filling academic and knowledge gap since the exploration is expected to reveal the true understanding of the technology acceptance and adoption of camera phone usage as well as diffusion of innovations of mobile phone photography within the Ghanaian context.

1.6 RESEARCH QUESTIONS

The research is guided by one main research question with three sub-questions.

❖ How has the introduction of camera into smartphones affected the activities of traditional Digital Photography in relation to visual communication?

- What are the user experiences of smartphone for visual communication activities?

- How have the technologies (both native and third-party apps) permitted the easy use of smartphone?

- What is/are the implication of DSLRs with regards to the innovative visual communication activities on the use of smartphones?

The relationships between research aim/ objectives and research questions are presented in Table 1.1

Table 1.1: Matrix of the research aim/objectives and research questions.

	Research Questions	Objectives
Main	**How has the introduction of camera into smartphones affected the activities of Digital Photography in relation to visual communication?**	**To explore the impact of smartphone activities on traditional digital photography**
Sub	1. What are the user experiences of smartphone for visual communication activities?	1. Exploring user experiences of smartphone for visual communication activities;
	2. How have the technologies (both native and third-party apps) permitted the easy use of smartphones?	2. Exploring the technologies that permit easy use of smartphones for digital photography
	3. What is/are the implication of DSLRs with regards to the innovative visual communication activities on the use of smartphones?	3.To establish whether the innovative visual communication activities of smartphone use will mean the **'death'** of DSLRs

1.7 RESEARCH DESIGN

Research design serves as a "logical structure" of the inquiry (Nieuwenhuis, 2007), and a guide to exploring the phenomenon of smartphone photography in relation to visual communication. The philosophical assumptions, which is the knowledge claim for the "nature of existence" is interpretivism. For the epistemological stance, the research paradigm is aligned to constructivism, therefore qualitative approach is

adopted typically for understanding the essence of the phenomenon of smartphone photography. For this study, I held the view that this paradigm (world view) agrees with subjectivism since participants are expected to express their feelings about the phenomenon. This means that the "nature of reality" out there is subjective (multiple reality) and therefore subject to the interpretation of individual experiences and perspective. It is worth noting that the theoretical perspective close to constructivism is interpretivism (Creswell, 2007). Schwandt (1998) explains that research paradigm that aligns with interpretivism approach are those that have to do with understanding human action therefore the experiences (actions) of users was understood through the interpretations they encountered. This knowledge claim forms the basis of understanding the 'world' of smartphone photography. According to Kingsley (2009), to understand the world, it must be interpreted. The lived experiences of people are best understood whenever they are asked to narrate their story in context (Kingsley, 2009).

The study adopts qualitative research method not to discover but rather understand lived experiences (Creswell, 2003). According to Creswell, "conducting a qualitative study means that researchers try to get as close as possible to the participants being studied". In practice, qualitative researchers conduct their studies in the 'field,' where the participants live and work. These are important contexts for understanding what the participants are saying. By this adoption, I sought to capture relevant information from smartphone photographers on the "field" rather than looking through literature to find answers to the research objectives and questions. The field here means wherever the purposefuly selected participants are, they must be visited for their 'lived experiences' to be gathered in their natural settings. According to Denzin and Lincoln (1998), a qualitative research of this nature requires the researchers to interpret

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phenomena "in their natural settings" not "send out instruments for individuals to complete"(Creswell, 2003), but rather by capturing personal experiences that describe routine and problematic moments and meanings in individuals' lives (Denzin & Lincoln 1998). Babbie and Mouton (2001) also explained why qualitative enquiry should not focus on the accounts of human behaviour but on rather having an in-depth understanding and the ability to describe the phenomenon.

The strategy for the study is phenomenological research. According to Van Manen (as cited in Creswell, 2007), "Phenomenology is not only a description of phenomena, but it is also seen as a strategy in which the researcher makes an interpretation (i.e., the researcher 'mediates' between different meanings" (van Manen, 1990) of the lived experiences.
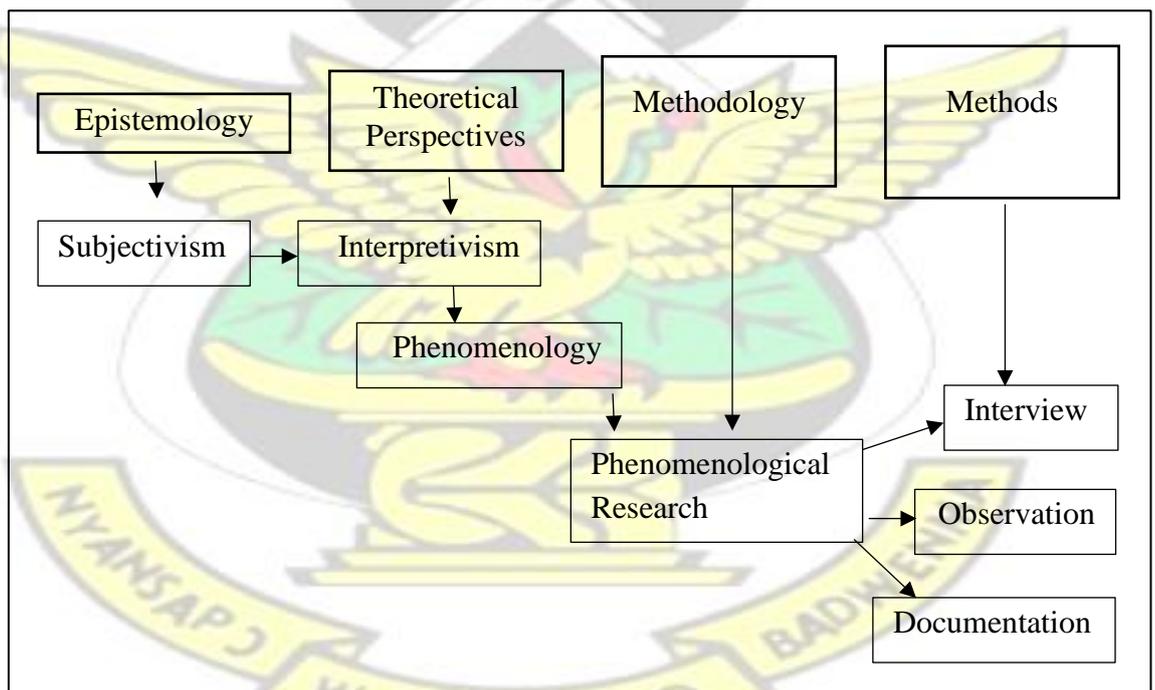
Figure 1.1: Relationship linking Epistemology, Theoretical Perspectives, Methodology and Research Methods. (Adopted from Crotty, 1998)

The relationship between all the processes in the design are carefully drafted to show the road map of how the knowledge claim is established in the first place, the

theoretical perspective that can appropriately lead to finding that reality, the procedures that are relevant to this type of enquiry and the method(s) of getting the data (Figure 1.1).

The matrix (Table 1.2) demonstrates how each of the research sub-questions was taken through data collection instrument. Interview remains the principal instrument however observation and document were also employed.

Table 1.2: Matrix of the research problem against instruments

	Research sub-question	Interview	Observation	Document
1.	What are the user experiences of smartphones for visual communication activities?	x	x	
2.	How have the technologies (both native and third-party apps) permitted the easy use of smartphones?	x		x
3.	What kind of innovative visual communication activities necessitate the ubiquitous use of smartphones and determine whether the smartphones are in competition with DSLRs?	x	x	x

1.8 SIGNIFICANCE OF THE RESEARCH

Qualitative research, in most cases, requires deep understanding into the meaning of unfolding phenomenon and in this case the integration of camera into smartphone and subsequent use for digital photography. Having reviewed a number of academic materials (books and journal articles on the subject areas), online media scholarly articles and researcher's observation from digital photography; It became clear not much was done to fill the academic gap created by the emergence of smartphone photography in relation to visual communication. The justification also stems across the fact that technology adoption, its acceptance and the usability of these technology dependent gadgets by people in the audio-visual industry was pervasive. Besides, the

general public in Ghana requires an enquiry like this to establish the reality of the phenomenon for the security of the social system to be protected against should there be any adverse finding that will be ill to social stability. Apart from the fact that this research has revealed the Ghanaian context of smartphone usability in relation to visual communication, the validated result adds up to the current limited research materials in the area of smartphone photography in Ghana. Currently, some of those limited academic research only points to how Ghanaians living abroad share smartphone photographs with families and friends via the internet (Burrell & Anderson, 2009). In spite of all these however, the influence of the integration of camera into smartphone for digital photography in Ghana was unavailable which is why it was important to carry out this enquiry.

1.9 DELINEATION OF THE RESEARCH

The study will not enquire into the core functions of smartphones but rather the use of the camera feature which serves as an attractive quality of the phone (Kano, 2001) and third-party apps running on the phone that spurs the use of smartphone for digital photography. There will not be a comparative analysis of smartphones and Digital Single-Lens Reflex Camera (DSLRs).

The study did not seek to establish a demographic relationship in the use of smartphones for photography, instead, study focused on the lived experiences of some selected professional Photographers, non-professionals (amateurs) within three major cities in Ghana (Accra, Kumasi and Takoradi). The rationale for the choice for these cities is discussed in section 3.6. The data from these three cities was put together as one geographical location which means the analysis was not based on the individual cities but rather, as one location for easy conclusions to be drawn. By this strategy, all

the raw data from the various cities was disintegrated as one body of data for thematic analysis not comparative analysis.

1.10 STRUCTURE OF THE THESIS

Chapter 1 This study starts with the description of the background of the study, its objective, rationale and purpose. Theory and literature are used to justify the need for this research to make an academic enquiry. The research explores the knowledge proposition set out in the rationale and the justification and it is elaborated upon with the main research question and sub-questions that provide the basis for interrogations, and ends with the design for this research.

Chapter 2 begins with the road map that contains the review of related literature and documents based on the research design (logical structure) with the theoretical framework of difussion of innovation theory (DoI), supported by Technology Acceptance Model (TAM), which sets the foundation for this research. Preliminary discussions focus on the difussion of innovation theory as it relates to the study, which has to do with the integration of camera into smartphone and its ubiquitous use for digital photography. The chapter continues with the accounts of new innovations in sensor development, the presence of digital images in the social media and risk characterising smartphone photography

Chapter 3 captures the research design and methodology. It discuses research philosophy, design and methods, and outlines the plan adopted to explore the issues happening in smartphone photography within the domain of visual communication. The type of research strategy (phenomenological reseach) was discussed as one of the qualitative approaches. The chapter procedes with issues regarding validity and reliability. Methods and tools, together with the population sample of data collection,

are explained. Finally, the method of analysis and ethical considerations are captured for the successful implementation of the study.

Chapter 4 This chapter cataloged the structure of the reports on the raw data, its presentation and the analysis and subsequent interpretation of the findings. Three themes are developed after coding and categorization of the transcription of the raw data. The themes are (a) Technological convergence (b) User Experience and (C) An improvement in image resolution.

Chapter 5 which is the concluding chapter, gives a summary of the study. It opens with highlights on the rationale for the study, some review of related literature and theoretical framework used. It also captures issues of digital photography, smartphone photography, new innovations in smartphone manufacturing sector (issues of vertical integration) activities of smartphone photography and its implications. And then finally some recommendations for this study are given.

1.11 LIST OF ABBREVIATIONS

DSLR: Digital Single-Lens Reflex

CMOS: Complementary Metal-Oxide–Semiconductor

CCD: Charged-Coupled Device

APPS: Applications

WMC: World Mobile Conference

TAM: Technology Acceptance Model

PEOU: Perceived Ease of Use

PU: Perceived Usefulness

DoI: Diffusion of Innovation

CHAPTER TWO REVIEW OF RELATED LITERATURE
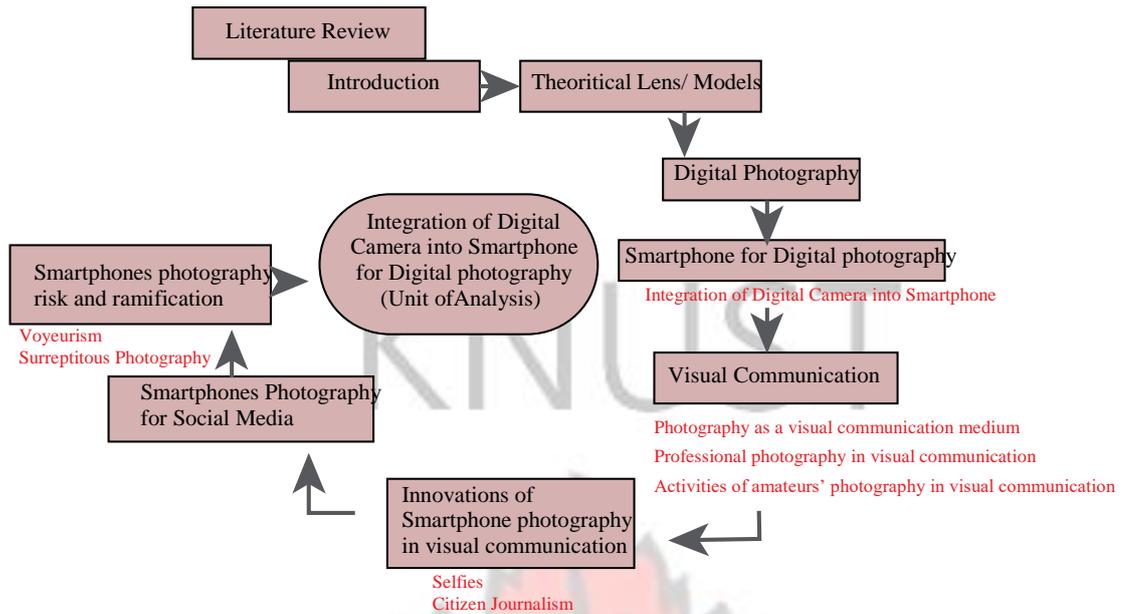
Figure 2.1: Diagram showing structure of the review

2.1 INTRODUCTION

This chapter outlines relevant literature that explores the phenomenon of smartphone photography activities which determine the rationale for the research. The aim of the research forms the basis of the choice for topics and sub-topics for the literature review because it directs the focus of the study. Figure2.1 illustrates the review structure targeted at the main aim of the research which is to explore the impact of smartphone activities in the 'face' of traditional digital photography in relation to visual communication. The aim is broken down into a smaller achievable unit in objectives as follows:

- To explore user experiences of smartphone for visual communication activities;

- To explore the technologies that permit easy use of smartphones for digital photography and

- To establish whether the innovative visual communication activities of smartphone use will mean the **'death'** of DSLRs.

The study required exploring smartphone photography as a phenomenon It also explored the technologies that makes it easy for the practice to be rampant as well as the innovative visual communication activities that necessitate the ubiquitous use of smartphone in the social settings.

2.2 THEORETICAL FRAMEWORK

Diffusion of Innovation (DoI) theory by Rogers (2003) perfectly fit the design of this research and it is used in conjunction with Technology Acceptance Model (TAM), (Davies, 1989) to basically ground the study theoretically and intellectually. The framework, (DoI) has certain keywords that must be understood within the context of this research. **'Adoption'** refers to the stage in which a technology is selected for use by an individual or an organization. **'Innovation'** is similarly used with the nuance of a new or innovative technology being adopted. **'Diffusion'** refers to the stage in which the technology spreads to general use of it. **'Integration'** connotes a sense of acceptance, and perhaps the understanding of the technology, within the user environment.

Diffusion is a special type of communication concerned with the spread of messages that are perceived as new ideas. An innovation is an idea, practice, or object that is perceived as new by an individual or other unit of adoption. The characteristics of an innovation, as perceived by the members of a social system, determine its rate of adoption (Rogers, 1995). As shown in (Figure 2.2), the diffusion S- curve illustrates the category of members of a social system that adopt the innovation over time.

According to Rogers, between the early and late majority adopters constitute 64% of users which makes the adoption rate phenomenon.

Diffusion S- curve
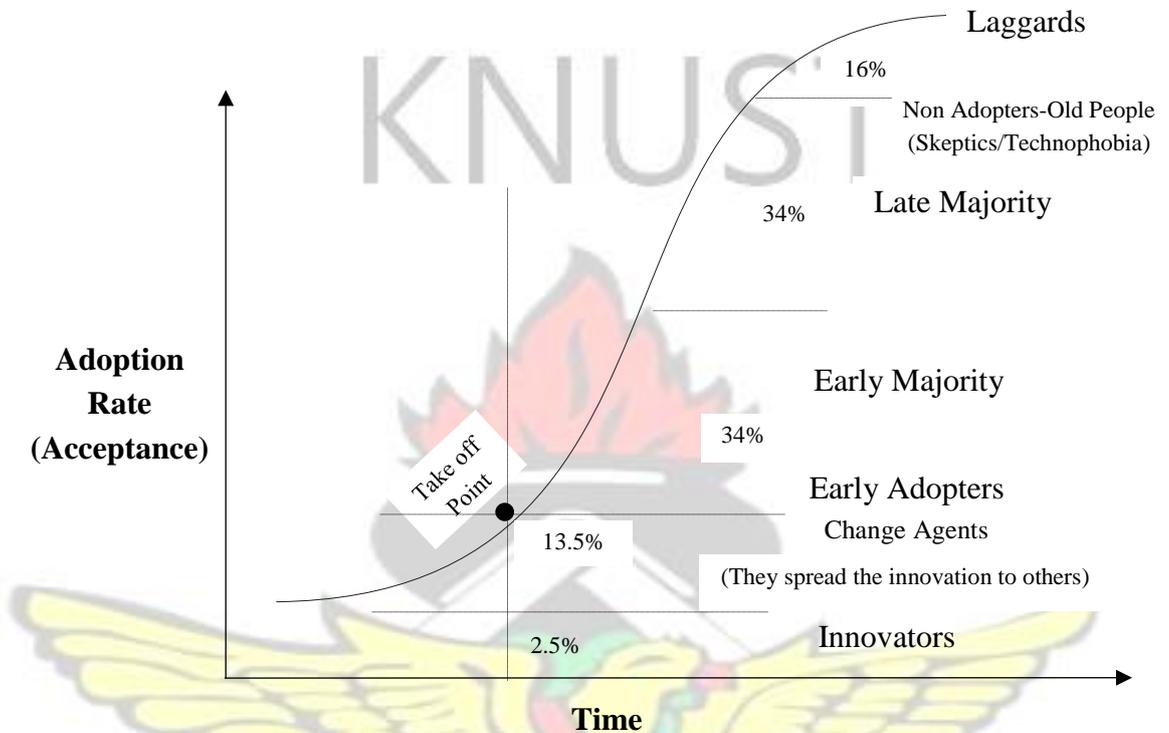
Figure 2.2: Diffusion S-Curve showing the acceptance rate of the social system (Adapted from Rogers M. 1995).

Technology Acceptance Model (TAM) shown in Figure 2.3 is a technological model carefully chosen to support (DoI) theory which is an information system theory that models how users come to accept a technology and how they use that technology (Davis, 1989). This theory suggests that when users are presented with new technology, a number of factors influence their decision about how and when they will use it, notably: behavioral intention (BI). Behavioral intention according to Davis (1989) is directly influenced by the perceived usefulness (PU) and perceived ease of use (PEOU). Whereas the PU is "*the degree to which a person believes that using a particular system would enhance his or her performance*", perceived ease of use

(PEOU) is *"the degree to which a person believes that using a particular system would be free from effort"*.
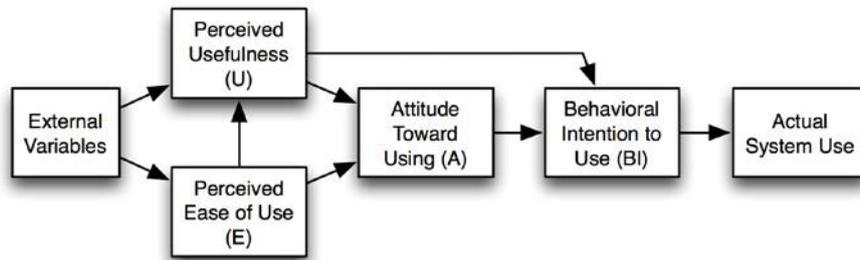
Figure 2.3: Technology Acceptance Model (Davis, 1989)

In addition, these theories and their application helped in formulating the research questions. Again, the theories were instrumental in identifying themes from the data that was gathered from the field for analysis. They actually helped reveal factors of enjoyment associated with the use of camera phones as participants were examined against the use of smartphones in relation to the technology adoption, acceptance and eventual use for digital photography (Chtourou & Souiden, 2010; Song & Han, 2009).
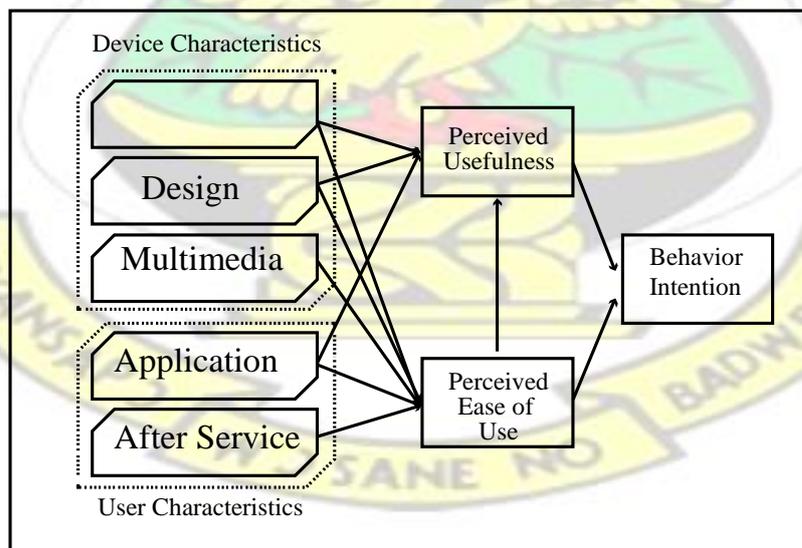
Figure 2.4: TAM for Smartphone use   Wireless

      Internet

The model (Figure 2.4) demonstrates how the characteristics of smartphone device meets user characteristics. Advanced smartphones come with internet connectivity that

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allows for cloud computing and other social media interactivity. The ergonomics of the device is designed such that, it is handy and the converged device allows for multimedia functionalities. These things form the device characteristics. The user characteristics comprises the application (native and third- party) and the user friendly nature of the application icons as well as the affordances of the device when it comes to digital photography. What this model seeks to demonstrate is how whenever users accept technology, usually, it is characterized by perceived ease of use which eventually triggers perceived usefulness that leads to behavior intention (Davis, 1989).

2.3 THEORETICAL AND HISTORICAL PERSPECTIVE OF PHOTOGRAPHY

The ontology of photography will not be reviewed in this section, however it is important to understand in context, how photography known '*yesterday*' as a preserve of technical and chemical process is '*today*' seen as modernized digital process in image production. The genesis of the photographic camera has its roots in antiquity (Dorresteijn, 2012; Vickers, 2006). As early as the 5th centuries BC, Chinese and Greek philosophers and mathematicians described the camera obscura (Dark chamber) in their experimental writings. During the Renaissance the camera obscura was first used to reproduce a scene from the outside world which was the basis for reality drawing on substrates. The concept proved instrumental for the development of perspective painting. Since then, the revolution in photography and photographic processes begun. In the 19th century, Joseph Nicéphore Niepce's attempt on producing photographic image was further developed by Daguerre in 1837. Daguerre's art work, 'daguerreotype' was the turning point of commercial photography according to many scholars and practitioners in print industry at the time (Drenttel & Heller, 2006).

So many years after the outdooring of 'daguerreotype' the advancement into perfecting long-lasting captured images on sensitive substrate saw great improvement. The 20th

century photographic latent images from films were juxtaposed with the introduction of digital images produced by digital sensors in the 1900s (Benner & Tripsas, 2012). Digital camera technology utilizes semiconductor chips such as charge-coupled devices (CCDs) to capture and convert light images to binary data, replacing the role of silver halide film in analog cameras. This innovative development by technology giants such as Kodak in 1992, announced the first professional digital camera system: DCS100 which had 1.3 megabyte CCD image sensor (Eismann, Duggan, & Grey, 2004). However, not too long, the expensive and bulky digital cameras have evolved from providing low resolution images to affordable compact units capable of recording high resolution pictures.

The theory and historical perspective of Photography is important in placing the study in proper context. Cruz and Meyer (2012) discuss the practicability of Photography theory in view of the study. Cruz and Meyer contend that 'theory has worked traditionally within two epistemological axles; on one hand it has long been understood as a powerful technology for representation of reality'. Even though it was not fully accepted by all scholars in Art at the time, the concept still remains and forms a basic form for 'regular theme in work to understand photography's role in the world'. On the other hand, Cruz and Meyer recognize Barthes, *Camera Lucida* in which he was interested in the 'essence' of photography, not in its sociology (Cruz & Meyer, 2012). Beyond the theory of photography, is also the need to observe the historical journey of photography till the current state where there is a growing interest in the use of smartphone for digital photography which was tipped to have been as a result of technological convergence and ubiquity (Murphy, 2010; Rouse, 2005). But, how did this technology get to this point where smartphones are being used for digital

photography? Cruz and Meyer (2012) again discuss periods in history; "first moment to fifth moment" in connection to how we got here.

The **First moment** (nineteenth century) saw the invention of photography, the expertise needed to create photographic images through the use of chemical emulsions that were often prepared in the field and applied to glass plates, tin plates or paper. Notable names associated with this regime include Niepce, Daguerre, and Fox Talbot for their scientific trial and error methodology to getting images fixed on a substrate. The **second moment** (1900 – 1930) also saw the introduction of the Kodak camera at the end of the nineteenth century with the advertising slogan "you press the button; we do the rest". It was during this period that the mass market for photography was being shaped: the "amateur market was explored because of the emergence of cheap and easy-to-use cameras (Kodak Brownie) from Eastman Company. Notable of this moment is that it saw the fact that nonprofessionals also could use the camera to take snap shots just as today many unskilled photographers can use point and shoot cameras or more particularly, smartphones to do personal photography. In the **third moment** (1930–1990), there was improvement in the development of the camera and later within the period, the traces of digital technology were felt. This means besides the analogue photography practice, digital photography also surfaced gradually and both technologies are being used concurrently.

Since 1990, the **fourth moment** began and that was the arrival of digital technology in photography (Cruz & Meyer, 2012). Like many other technologies that are susceptible to change, the digital photography as a technology also brought some change into the dynamism of imaging. The change according to Cruz and Meyer, "means that the knowledge economy and power networks where photography used to

operate were reconfigured, and these changes could be understood in three spheres; control, distribution, and knowledge – to which we now turn our attention". Cruz and Meyer again noted that, only few photographers "serious leisure", gain control within the second and third moments.With the emergence of digital technology, images are easily distributed amongst friends and loved ones across the world via inertnet connectivity. The third leg of the knowledge economy and power networks in photography discued by Cruz and Meyer points to the "new technical know-how" and the innovations in the capture, process and presentation of digital photographs. Significantly, Cruz and Meyer further assert that:

> *An important element in this **fourth moment** is that, because of the change from a light- chemical process to a light-electronic one, a completely new technical know-how has become embedded in the creation of photographs: the use of post-processing computer software. As a result of this shift, new actors gained interest in photography, namely those experts in the use of computers who became drawn to photography as a technically interesting area. The lab skills centered on chemicals and enlarging techniques were replaced by the computer skills wielded by Photoshop experts..,* (Cruz & Meyer, 2012, p. 213)

The concluding part of photography in perspective '**Moment**' is what Cruz and Meyer argued to be the use of technological devices for photography. They wrote: "the iPhone as a socio-technical network: a fifth moment". Narrowly debated whether or not the iPhone or the smartphone emergence as an innovative yet technological device used for photography falls under the fourth or fifth moment remains an issue that will be lingering in the minds of many researchers.

Notwithstanding the use of iPhones to capture images, Cohen (2005) and Petersen (2008) also argue that the iPhone is not only a tool for photographing subjects but is also used for distributing the captured images via the internet. Cohen and Petersen noted further that, the iPhone image sharing characteristic is responsible for the

growing interest in people using the device in their daily lives (Cruz & Meyer, 2012, p. 215).

Currently, with the proliferation of smartphones, not only the iPhone is capable of distributing images, but many third-party applications ready to be downloaded from the play store or Apple store also facilitate easy capturing and sharing of these digital photographs. Other raging debate on people using camera phones or smartphones for capturing and distributing images is partly due to the design and affordances of the device generally known as 'usability' or 'user friendly'. Nonetheless, the following factors are considered in respect to the practice: Firstly, mobile connections are increasingly fast, especially as a result of the widespread use of 3G technology and secondly, the easy use of the device comparing to the DSLRs which come with some user complexity.

2.4 DIGITAL PHOTOGRAPHY

In the context of visual communication, digital photography is an advancement in technology of image capturing and sharing (Winston, 2013) and it is what (Cruz & Meyer, 2012) also refer to as fifth moment in the historical perspective of photography. This study explores smartphone photography as a raging phenomenon in the face of modern technological advancement. In Digital photography, digital camera is used instead of analogue camera to capture image not onto light sensitive silver film but rather on a light sensitive charge coupled device (CCD).

Digital photography is one of several forms of digital imaging. Digital images are also created by non-photographic equipment such as computer tomography scanners and radio telescopes.

The technology of photography is becoming easier due to the digitization or democratization of image capturing processes. In support of this visual culture, Pauwels (2008) however argues that increased democratization of visual technology does not necessarily lead to greater visual literacy. Pauwels agrees with the notion that with digital photography, one can now photograph anything.

The statement *photograph anything* brings to mind the famous statement made by an American photographer Robert Frank in 1961 when he said, "[y]ou can photograph anything now," (Fuente, Santiago, Román, Dumitrache, & Casasanto, 2014; Winston, 2013). This could be right due to the democratization of photography that Pauwels talked about. The tendency of photographing anything now as opined by Frank, also agrees with digital photography practice and its democratization using smartphone. Today, not only can a picture be taken of anything using smartphone but it can also be previewed instantaneously on the digital screen of the camera and shared with friends or acquaintances much quicker and easier than before.

So many decades after George Eastman began experimenting on the first Kodak Brownie camera around the 1800s with the slogan, "You press the button, we do the rest" the outcome of the process was groundbreaking in the history of photography. The rationale was to achieve the 'convenient of pencil in the film camera production'. However, the idea was not successful until the invention of the digital camera (Busch, 2006). This means that, the replacement of the analog process of image capture by the computerized process of image capture explained the basis and coming in to existence of digital Photography. The public debate at the time on the up-and-coming of digital photography was that it was going to be part of the "digital revolution." (Ritchin, 1999). Arguing on the same subject matter which is "digital revolution" Meyer (2008) asserts that, between the period 1991–2004, the technology for digital

cameras went through rigorous ups and downs to be perfected by manufacturers and trade-oriented media. Meyer further intimates that computer technology that characterized the digitalization of the tradition analog photography results to Digital photography.

As a visual communication tool, digital photography is pervasive activity undertaken by technically skilled persons. However, as to whether one must be skilled or unskilled to perform visual communication is a debate that will be raging and does not form the basis for this study. Rather, the study discusses the role of the integration of digital camera into smartphone which is said to be an attractive quality by virtue of its purpose and persuasive value   (Kano, 2001) to perform visual communication activity which people react to. In visual communication, one thing that is constant is image that must be seen for the communication to be effective and in the case of this study, photographic image from smartphone.

It has been stated that "images transfix" (Fuente et al., 2014). Sontag explained that, it is the perception of the visual identity of the image that causes the viewer who is being communicated to by the photograph to be transfixed thus; it is also what causes a person to pause for a moment to look at the image. Now, does it matter if the device used to produce the image is a DSLRs or smartphone? This question is somehow inherent in the objectives that have driving this research to explore the influence of smartphone photography activities on traditional digital photography.

To understand vividly the technology trends in context, Lasén and Gómez-cruz (2009) discuss the emergence of smartphone and its technological convergence in digital photography. They argue that, "the convergence between digital photography, mobile telephony, Internet and the growing practice of displaying and sharing pictures with other people increase the connectivity of public spaces and the convergence between

online public spheres and urban public places" (Lasén & Gómez-cruz, 2009). They hold the view that the availably of smartphone technology made it possible for people in all kinds of spaces to indulge in smartphone photography.

The culture of visual communication and for that matter digital photography is a way of disseminating visual information. Taking cue from José van Dijck, a Professor of the University of Amsterdam, specializing in Media Studies argues that "photography becomes influential as an increasingly popular tool of communication" He concedes that the preferred method of communication is photography because according to José van Dijck "[p]ictures [have] become more like spoken language as photographs are turning into the new currency for social interaction" (José, 2008).

Since the transition from analog to digital photography, there have been tremendous improvement in digital images (Busch, 2006). For instance, an important change in this transition phase is how quick the visual images can be produced as compared to the analog counterpart (film base picture). The tendency to share digital photograph by way of communicating it visually with others still remain the culture of easy sharing. Digital photography requires no developing and processing of films. Instead Photos are shot with the digital camera and stored on a removable drive. The concept of digital photography and by extension, visual communication that must be understood by stakeholders in the working spaces of media industry and visual communication industry as well as the general public is the concept of technology adoption and acceptance of smartphone for digital photography.

In finding answers to the research questions put up in the **section 1.7**, the researcher's view is not to say that because Pauwels (2008) assertion that smartphone photography which he described as a form of visual culture is also a form digital photography so therefore smartphone images are equivalent to DSLR images when it comes to image quality. However, it is also an undeniable fact that manufacturers of recently out doored iPhone 6 and other android phones like Samsung galaxy 6 plus or Galaxy Note 5 have improved image sensor which means the integrated camera is capable of capturing high quality photographs even under low lighting conditions. According to Tim (2014) the area of a 35mm full frame sensor found in professional DSLR's which is responsible for quality image is approximately 50 times larger than a typical 1/3" smartphone sensor, and it makes a great difference when contrasting the DSLR's sensor to the smartphone image sensor (Tim, 2014) . APS-C sensors, found in entrylevel and mid-range DSLRs, are 21 times larger. Figure 2.5-6b shows the relationships in the sensor sizes in popular devices.

Figure 2.5: shows sensor sizes of DSLRs. Adopted from (A) (Tim, 2014) and (B)
                    (Taylor, 2014)

The larger sensors in DSLRs allow the

6a
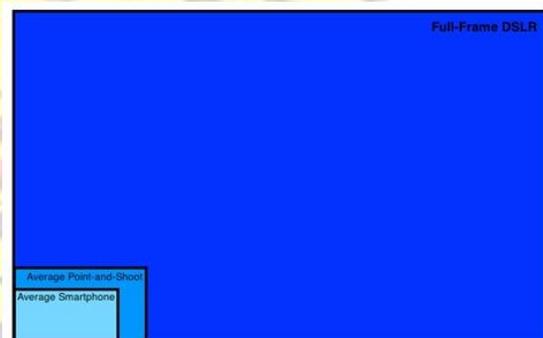
6b

pixel sizes in the sensor array to be much larger, equating to much higher sensitivity, much better low light performance, and lower noise at high ISOs. A 16-megapixel

full frame sensor, found in a camera like the Nikon D4S, has 7.3µm pixels: 6.5 times larger than the 1.12µm pixels found in the Samsung Galaxy S5's 16-megapixel smartphone sensor (Tim, 2014). It is not surprising the Nokia Lumia 1020 smartphone was launched with a 41-megapixel cameras because the manufacturers of mobile devices would like to improve on the image quality of the device which has been a bother to many users. This improvement means that the smartphone camera is now capable of producing acceptably good quality images. And it is this that pushes the study to look at exploring the technologies that permit easy use of smartphone for digital photography.

2.5 SMARTPHONE

A smartphone is a mobile phone with more advanced computing capability and connectivity than basic feature phones. Smartphones typically include the features of a phone with those of another popular consumer device, such as a personal digital assistant PDAs, a media player, a digital camera, and/or a GPS navigation unit. In addition, other features include touchscreen capability in place of QWERTY key pad, web browsing, Wi-Fi, third-party apps among others.

There are number of definitions of smartphone as suggested by (Nunoo, 2013). Gartner (2009) as cited by Nunoo, asserts that *"A smartphone is a large-screen, voicecentric handheld device designed to offer complete phone functions while simultaneously functioning as a personal digital assistant" (p.22).* Another definition pushed forth by Palm also defines a smartphone as a *"portable device that combines a wireless phone, e- mail & Internet access and an organizer into a single, integrated piece of hardware"* (Elgan, 2007 cited in Nunoo, 2013). Plate 2.1 below shows a typical example of a smartphone from Samsung electronics.

Plate 2.1: A sample of a smartphone

Prior to 2007 when the world saw the growing novel technologies in the mobile imaging that results into advanced smartphone development, there were significant innovations adopted by social system (Maeda, 2012). Smart phones are built on a mobile operating system that allow the user to perform functions like browse the internet, send and receive emails, download music and other applications, read and edit documents, use maps and satellite navigation and so on. They have faster browsing and download speeds. In simple words they are a pocket version of a computer (Dvorak, 2012; Evers, 2005).

Before the mobile phone became the smartphone around 2007 (Maeda, 2012), it was seen as a fashionable technological social gadget adopted and accepted by people for social and economic use. According to Scott (2008), the mobile phone is not just a social technology, but he however points out that the device is a highly personal one as well. The close relationship between the mobile phone and the body contributes to the device's personal and symbolic significance Scott noted. Some users perceive their handsets as extensions of their physical selves (Scott, 2008). This notion is perhaps

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best illustrated by the Finns, who commonly refer to the mobile phone as 'kännykkä', which translates into English as "an extension of the hand" (Mäenpää 2000; Oksman & Rautiainen 2003a; Oksman and Rautiainen 2003b) as cited in (Scott, 2008). Perhaps this is the reason for the handy nature of the mobile phone.

2.5.1 INTEGRATION OF CAMERA INTO SMARTPHONE

Since the development of the first digital camera in 1975 by Steven Sasson (Gennuth, 2012), when he invented and built the first electronic camera using a charge-coupled device (CCD) image sensor (Prakel, 2009), the digital camera has been fixed into many devices including smartphones. Other devices with digital camera integration include: laptops, web cams, mini drones, goggles (spy glasses), pens, buttons and wrist watches and perhaps many tinier converged devices that are yet to be integrated. The concept of integrating digital camera into smaller devices began by Kahn Philippe. It was believed that Kahn Philippe first linked his digital camera and mobile phone to transfer a captured image on June 11, 1997. This was successful during one of his experiments at Eastman Kodak company (Bockaert, 2007). Kahn's innovative experiment which later culminated into the digital camera was one of the features integrated into his cell phone and the product of subsequent use for some sort of digital photography at the time. Kahn's innovativeness perhaps was inspired by the original instant camera, popularized by Polaroid in 1972 which serves as an instantaneous photographic visual communication device. Again, Kahn's innovativeness and subsequent use for some sort of digital photography at the time augured the birth of instant visual communications with mobile device (Rockwell, 2014). Since then the development of digital cameras into smartphones have gone through several technological advancements till date. Plate 2.2 below illustrates the integration of advanced digital camera into an iPhone.

Plate 2.2: The integrated digital camera and Flash on an iPhone

This development is augured to be the birth of instant visual communications (Rockwell, 2014). As a result of this development and the fact that there are strenuous efforts by various institutions including Rambus to improve the camera quality draws our mind to the ever increasing high fidelity of smartphone camera. Rambus is an American technology licensing company founded in 1990 (Rambus, 2015).

2.5.2 IMAGE RESOLUTION VERSES IMAGE QUALITY OF SMARTPHONE

For the purposes of this research, the discussion on image resolution will be focused on the smartphone rather than the DSLRs. This is because the DSLRs are noted for producing high quality images compared to smartphones. The dramatic improvement in the image qualities of smartphone photographs in recent times became a border to some professional photographers to the extent that a question like; *is smartphone coming to ruin digital photography practice for that matter ruin our career?* was asked rhetorically (Dolcourt, 2013). This study only considered this legitimate question only

to make a case for the integration of camera into smartphone (Plate 2.3) for digital photography.

Integrated Digital Camera

Plate 2.3: shows the integrated digital camera and Flash on an iPhone

Rambus (2015) reveals a new breakthrough in image resolution for smartphone cameras. The breakthrough came after decades of image resolution dilemmas by consumers that are enthused with smartphone photography but the image quality was low fidelity. The earlier smartphones produce low quality images and many people especially professional do not appreciate the result perhaps because it cannot meet professional standards. Rambus came out with an emerging solution under a new image capture technology to improve the resolution of the smartphone cameras. This is known as Binary Pixel Imager which is to replace the CMOS imagers (Rambus, 2015) for processing the images produced by smartphone and point-and-shoot consumer cameras.

Zhang (2015) asserts that two billion people used smartphone worldwide in 2014. This was contained in a slideshow created by Samsung marketing outfit and shared to the general public as part of the research findings. The study that was conducted in 2011 by Pew Research Center, a Washington based nonpartisan American think tank found that 92% of smartphone users use their phones to take pictures. 80% of users go

on to send their photos elsewhere after they are snapped (figure 2.6). The survey also shows that Smartphone photography is more popular than Internet browsing, emailing, app downloading, and gaming (Zhang, 2015). The reason that was attributable to the result suggests camera quality and specs of the device accounts for the outcome.

Also in the shared information by Samsung, was another study done by Comtech, a telecommunication corporation in 2014 that revealed, people's preferences for buying
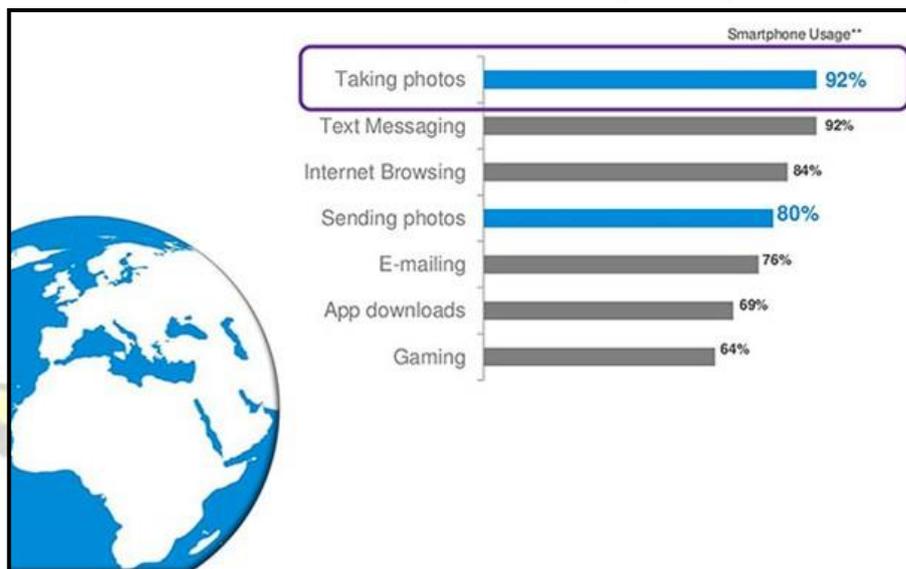
Figure 2.6: shows the chart of the result by Pew Research Center (Zhang (2015)
Smartphones put the quality of the integrated camera in third position as the most important consideration, trailing only 4G/LTE capability and reliability/durability. Consumers as a whole are very serious about using their smartphones as an everyday pocket camera.

2.5.3 BINARY PIXEL IMAGERS

Smartphone cameras with HDR, or high dynamic range possibilities will be able to capture or reproduce darker tones, mid-tones, and highlights of a high-contrast scene. Rambus is working on technology that takes HDR one step called Ultra HDR, the next

iteration of this process attempts to draw out details you often lose in shadows and highlights (Rambus 2015).

Table 2. 1: Shows the characteristics of the Binary Pixel Imager (Rambus, 2015)

Inventions	Description
Binary Operation	Binary operation enables the imagers to sense photos using discreet thresholds, similar to the human eye, for better sensitivity across the gamut of dark to bright and improved dynamic range.
Spatial Oversampling	Spatial oversampling sub-divides Individual pixels to capture more data and extend dynamic range of the imager.
Variable Temporal Oversampling	Variable temporal oversampling takes multiple samples during a single exposure period to avoid pixel saturation, improving the sensor's signal-to-noise ratio and low-light performance for better indoor and nighttime photography.

Athow (2015) wrote an article on the Rambus innovation entitled: *Cleverly Rethinks Picture Taking* and called the entirety of the project "*a DSLR in your pocket*" which means even though the device is a pocket phone, it has some capabilities of DSLRs. This technology which offers "better low-light sensitivity and enhanced stop-motion performance" in addition to the "DSLR-quality dynamic range in smartphone and single shot HDR photos and videos with no post processing involved"(Athow, 2014) was introduced at Mobile World Conference (MWC) 2013. The success of this new technology meant that in an exposure, the smartphone now has the capability to "oversample pixels in order to collect raw data" from the scene. Plate 2.4 shows dramatic improvement in the image quality in respect to the dynamic ranges of the photograph. The deficiency in the conventional Mobile imager is corrected in the illustration in the two photographs in plate 2.4. Smartphones with Binary Pixel Imager would now produce images with full dynamic range in both still and motion photographs, improved clarity and stop-motion capabilities and good result in low lighting situations
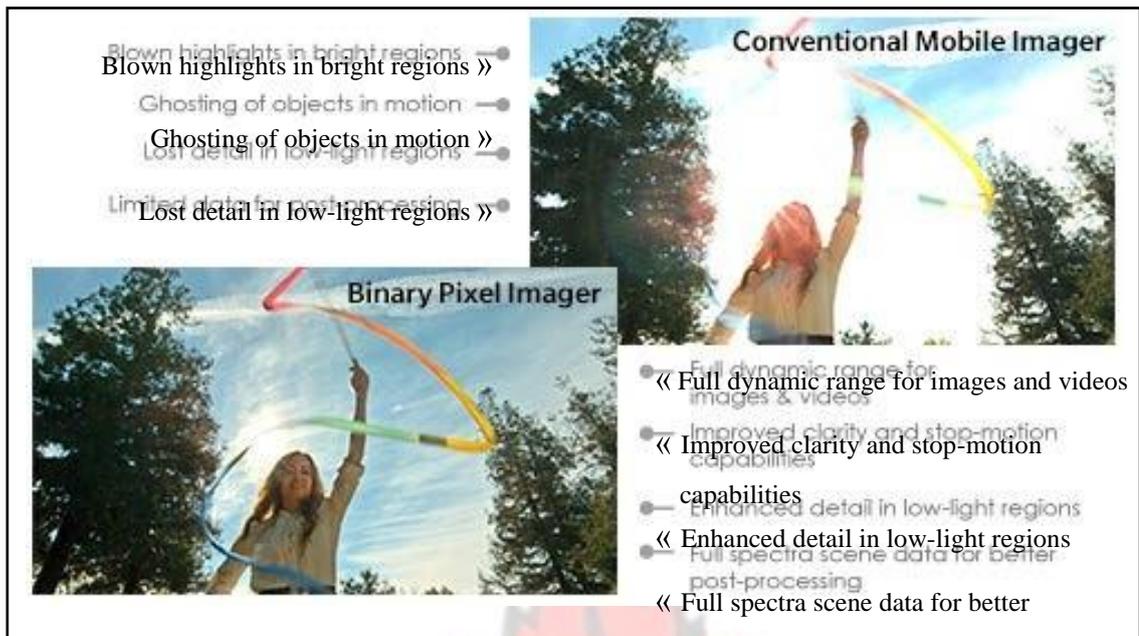
Plate 2.4: shows Binary Pixel Imager verses Conventional Mobile Imager (Rambus, 2015).

By this singular development in the image quality, smartphone photography enthusiasts can now produce photographs that are pretty good. The chief technology officer at Rambus, Dr. Martin Scott remarked:

> Today's compact mainstream sensors are only able to capture a fraction of what the human eye can see. Our breakthrough binary pixel technology enables a tremendous performance improvement for compact imagers capable of ultra-high-quality photos and videos from mobile devices. (Athow, 2015).

Désiré Athow who is a technology analysts and the publisher of the article also comments that:

> As improvements are made in resolution and responsiveness, more and more consumers are using the camera functionality on their smart phone as the primary method for taking photos and capturing memories. However, high contrast scenes typical in daily life, such as bright landscapes, sunset portraits, and scenes with both sunlight and shadow, are difficult to capture with today's compact mobile sensors – the range of bright and dark details in these scenes simply exceeds the limited dynamic range of mainstream CMOS imagers.

This binary pixel technology is optimized at the pixel level to sense light similar to the human eye while maintaining comparable form factor, cost and power of today's mobile and consumer imagers. The results are professional-quality images and videos from mobile devices that capture the full gamut of details in dark and bright intensities.

Benefits of binary pixel technology as mentioned by Rambus (2015) include:

- *"Improved image quality optimized at the pixel level"*

- *"Single-shot HDR photo and video capture operates at high-speed framerates"*

- *"Improved signal-to-noise performance in low-light conditions"*

- *"Extended dynamic range through variable temporal and spatial oversampling"*

- *"Silicon-proven technology for mobile form factors"*

- *"Compatible with current CMOS image sensor process technology"*

One thing that must be understood in this invention of digital photography is the characteristic of Digital image. This characteristic is the pixel nature of the image making it digital (Skinner, 2007). Skinner described digital images as being:

[…] made up of small elements called pixels. Millions of pixels, usually referred to as megapixels, combined to make a digital photograph. Often you will see the word 'noise' used in reference to digital capture. This is simply the digital equivalent of grain in film (Skinner, 2007, p. 23).

The quality of smartphone digital image is determined by the processing of the captured scene to a stored file formats plus the pixel resolution of the camera. Usually, the smartphone image file format is JPEG (Joint Photographic Experts Group).

Researches are underway to develop a RAW image file format for smartphones as part of the image resolution improvement process. This is not to say that smartphones are

in competition with the DSLRs but to make the image quality an acceptable one for the 'lovers' of smartphone photography as a converged technology.

2.6 TECHNOLOGICAL CONVERGENCE

In the past, the availability of visual communication devices used to capture images did not include smartphone. Today, the situation is not the same due to what is described under a broad term, 'technology convergence'. Murphy (2010) made a stunning argument over these subjects in his master's thesis titled "Mobile Convergence and Mobile Adoption: Mobile Phones as Culturally Prominent Features of Contemporary Society and Their Impact on Users in 2010". Even though Murphy's argument was based on mobile technology in general, it is still valid to make the same argument for smartphone technology because mobile devices include the smartphone. Convergence can be defined as "the coming together of different communication technologies such as the telephone, the computer and the television" (Rayner, Wall and Kruger, 2004: 351) as cited in (Murphy, 2010).

Rouse, (2005) defines *convergence* as a "coming together of two or more distinct entities or phenomena". According to Rouse, convergence is "increasingly prevalent in the IT world". There is a convergence whenever two or more different technologies are embedded in a "single device". Taking pictures with a cell phone and surfing the Web on a computer are two of the most common examples of this trend (Rouse, 2005). According to Rouse, people are influenced by converged technologies and are persuaded to adopt and accept the technology for whatever purpose. The integration of camera into the smartphone for instance is a typical example of technology convergence which made Rouse's assertion more credible because the social system appears to be drifting towards the use of smartphone for digital photography than the stand alone camera.

There are four dimensions of convergence that can be related to smartphone photography. Apart from the technological dimensions, there is the economic, the cultural and the globalized dimensions. All these dimensions of convergence are inextricably linked with Information Communication Technology (ICT); The ICT becomes the platform onto which convergence takes place.

In spite of all these gains brought up by technological convergence, there are some setbacks. For instance, the earlier integrated camera into phone by way of convergence suffered some negative responses from users in terms of low quality in resolution of the camera compared to the quality of their stand-alone counterparts like the DSLRs. However, contemporary converged technologies have developed exponentially, resulting in higher quality cameras on mobile phones than on many stand-alone cameras. (Murphy, 2010). Plate 2.5 illustrates the coming together of digital camera, microphone, recorder, telephone, laptop, health gadget, calculator and many other items into one smartphone. Smartphone in 21st century has virtually all stand-alone hand held devices converging in it making it all in one device capable of performing various task including snapping of photographs.

Plate 2.5: shows the converged technologies in a mobile device.

Another form of convergence that is inextricably linked to technological convergence when it comes to smartphone photography is economic convergence of the device. Rouse again explains that, "Economic convergence creates a greater understanding as to why ICTs are becoming more densely-converged than ever before. The key difference between the two prevalent modes of convergence (technological and economic) is the difference in functionality and the way in which users of ICTs react to this difference" (Rouse, 2005). The smartphone today offers a "plethora of functions" beyond its core functions. It makes economic sense to integrate multiple functionalities of other devices onto the smartphone such that it can perform multiple tasks. One of the economic convergence of smartphone was the fusion of digital camera onto the cellphone. Kano (2001) refers to this type of convergence whereby users get additional satisfaction beyond the core functions of a device and name it "an attractive quality". By Kano's assertion, the integration of camera onto cellphone is

not an act of making the device more complex, instead multiplicity of the functions of a device makes it economically converged and convenient. It is said that "Technological convergence has pushed mobile phones to the very edge of their own classification" (Rouse, 2005).

Further explanation of economic convergence in the words of Rouse is likened to Gilles Deleuze and Felix Guattari and their concept of "deterritorialisation". Cited in (Rouse, 2005), Deterritorialisation can be described as:

> *a move away from a rigidly imposed hierarchical, arborescent context, which seeks to package things (concepts, objects, etc.) into discrete categorized units with singular coded meanings or identities, towards a zone of multiplicity and fluctuant identity, where meanings and operations flow freely between said things. (Deleuze & Guattari, 1972).*

It is possible to see this "deterritorialistion" in a smartphone whereby multiple user applications are integrated such that multiplicity of task can be executed with one device. Apart from the camera integration, listening to radio, scientific calculations, writing of memos and even setting alarm clock are basic functionalities offered by the smartphone.

Vertical integration of manufacturing companies dealing with Information Communication Technology (ICT) devices such as smartphones are compelled by the deterritorialistion mentioned by Deleuze and Guattari in Rouse, (2005) to adopt new ways of consolidating their gains in technology advancement. Vertical integration is an arrangement in which the supply chain of a company is owned by that company. This means that assets that were previously held by two firms are combined into a single firm. The result is either joined ownership or sale of one firm's assets to the other to help reduce risk associated with suppliers transactions (Vergara, 2012). For

instance, Apple Inc. and Samsung Electronics, two technology giants were considered vertically integrated, they manifest this structure very differently (Vergara, 2012).

Samsung Electronics, a South Korea based technology giant leverages all aspects of their manufacturing process (Figure 2.7) from raw materials to electronics components to fully-assembled products (Eisenberger, Li, Mitrenko, Vajrapu and Xu, 2003). Currently rated the world's largest suppliers of electronic components (Yoo-chul, 2010). The current outlook of the Samsung firm in view of its prospective consumers worldwide know Samsung as one of the top makers of televisions, yet it has vertically integrated into it the production of the mobile device to produce Samsung Galaxy S series of smartphones and the Samsung Galaxy Tab.
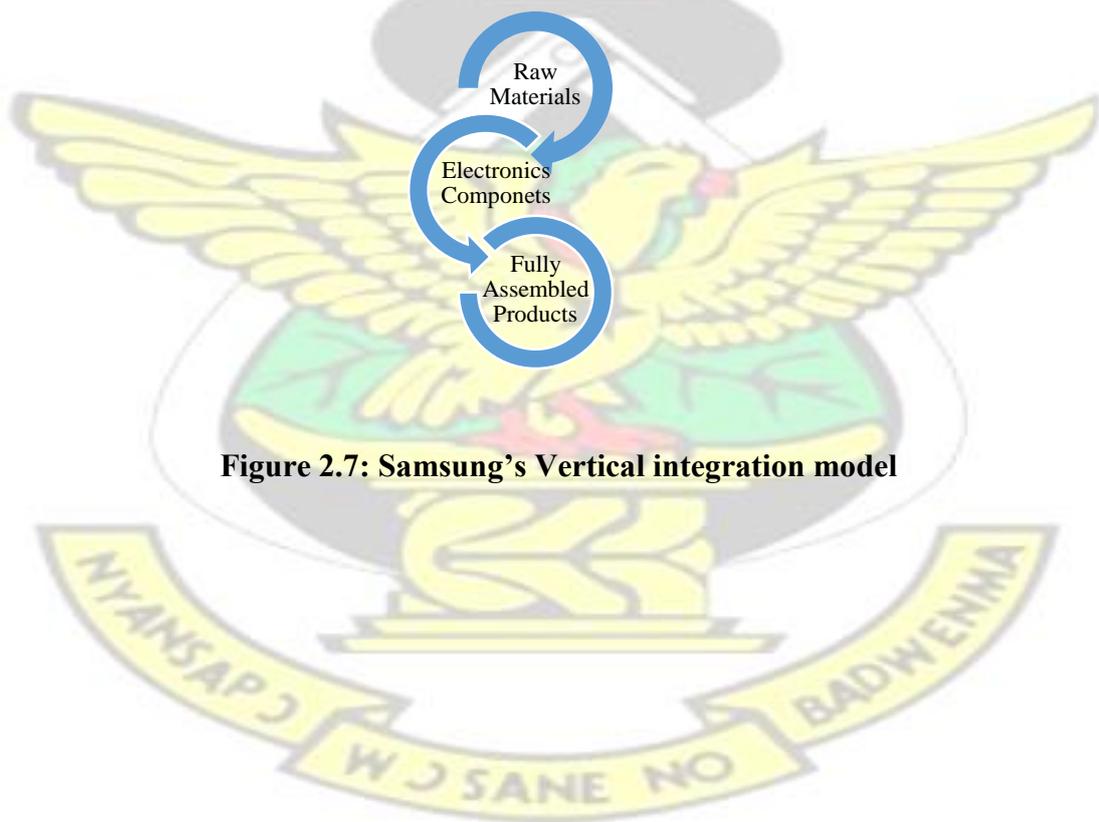
Figure 2.7: Samsung's Vertical integration model

Table 2. 2: shows companies that rely on Samsung's' vertical integration

Source: Wikipedia.org:http://en.wikipedia.org/wiki/Samsung_Electronics#products),
quoting Yoo-chul (2010)

Rank	Company	Parts Supplied	% of Total Sale
1	Sony	DRAM, NAND Flash, LCD Panels	3.7
2	Apple Inc.	AP (Mobile processor) DRAM, NAND Flash	2.6
3	Dell	DRAM, Flat Panels, Lithium batteries etc.	2.5
4	Hewlett-Packard	DRAM, Flat Panels, Lithium batteries etc.	2.2
5	Verizon Communication	Handsets etc.	1.3
6	AT&T	Handsets etc.	1.3

The vertical integration of the Samsung firm with the advancement in electronics production coupled with ever promising technological convergence leads to the integration of camera into smartphone and its subsequent use for smartphone photography. It must be noted that the Samsung firm is not the only vertically integrated firm dealing with smartphones. Like many others firms (Table 2.2), Apple Inc. also went on a similar trajectory. This was manifested in Bajarin (2011) assertion that Apple is vertically integrated "because it is essentially four companies in one, thereby controlling "all the major critical parts of the value chain used to make and sell products." The relevance of vertical integration to my study is to understand other market dynamics that necessitated manufacturers' integration of camera into smartphone not only to meet the demands of technological convergence but also the growing consumer needs.

Two more types of convergence linked to the adoption and acceptance of smartphone use for digital photography are Cultural convergence and Global Convergence. According to Artz and Kamalipour (2003), Cultural convergence can be defined as "the decrease and obliteration in cultural and sub cultural uniqueness, accomplished, by and large, through the creation of a sanitised and trivialised regional and global commercial culture" (Artz & Kamalipour, 2003). The influence of technological culture is mentioned by Amjad Umar (2003) when he made reference to the fact that "we are living in an Internet-based digital age".

2.7 INTERNET INFRASTRUCTURE IN SMARTPHONE

The internet is perhaps the most widespread example of technological convergence. All of these different types of media have become digitized and made more readily available than ever before. Advanced smartphones come with smart capabilities including Wi-Fi internet to facilitate mobile browsing, cloud computing and more importantly and for purposes of this study, sharing of photographs with others by way of visual communication via the web. Without internet connectivity on smartphone, image data cannot be shared through the web.

All over the world, countries have signed up to International Telecommunication Union (ITU) and GSMA and have enjoyed different levels of internet penetrations over the years (GSMA, 2015). The world is seeing a rapid technology migration to both higher speed mobile broadband networks and the increased adoption of smartphones and other connected devices. Mobile broadband connections will account for almost 70% of the global base by 2020, up from just under 40% at the end of 2014. Smartphone adoption is already reaching critical mass in developed markets, with the devices now accounting for 60% of connections. According to the GSMA, (2015) the developing world is driven by the increased affordability of devices—that will produce

most of the future growth, adding a further 2.9 billion smartphone connections by 2020 (GSMA, 2015).

Lundberg (2013) cited the central bureau of statistics, SCB (Statistiska Centralbyrän, 2012), which reveal that in Sweden during 2012, 94% of the Swedish population had access to the internet, 85% used the internet on a daily basis and almost 60% regularly accessed the internet via a smartphone.

By June 2014, there were 632 million internet users in china and a penetration rate of 46.9%. The number of users using mobile devices to access the Internet overtook those using PCs 83.4% and 80.9%, respectively (Bischoff, 2014). In 2012, Kenya's Wireless broadband stood at 72nd in the world; 2.2% of the population, 124th in the world (Dynamic Report, 2012) of international Telecommunication Union (ITU), Kenya.

In Ghana the internet penetration stood at 4.2% of population users as of June 2009 according to international Telecommunication Union (ITU). Ghana was the first African country to be connected to the internet in 1994 according to the report. With an average household download speed of 5.8 Mbit/s Ghana had the third fastest speed on the African continent and the 110th fastest out of 188 countries worldwide as at February, 2014. According to Ghana's Internet Usage and Telecommunications (IUT) Report 2014 of *Internet World Stats*, the availability of internet is quickly spreading around the country nowadays.

In 2010, about 5% of the population had internet, which increased to 10% in 2011. These figures are growing rapidly, with the introduction of new technology, and government support. There were nearly 1 million internet users in Ghana in 2009. Ghana is expanding its wireless network connectivity with government supporting the expansion of the Fiber-Optic infrastructure around the country. It is now an important

market segment, as the internet spreads throughout the country and with smartphone photography culture becoming one of the latest phenomenon in Ghana driving speedily on the internet platform guaranteed by service providers like Vodafone, MTN, Tigo, Glo, and Airtel Ghana. Ghana offers a fairly limited access to 3G networks in the main cities such as Accra, Cape Coast, Takoradi and Kumasi, but for basic internet connections, there are more than 140 ISPs (Internet Service Providers) in Ghana.

An article published on January 16, 2013 suggests that the increasing use of smartphones made Ghana the No.1 in mobile broadband penetration (Myjoyonline.com 2013). Fouad Chalabi, Executive Director at M-Pay Limited and Telecoms Analyst at Ghana Telecommunications made the assertions and attributed it to Ghana's outstanding international rating in mobile broad-band penetration in the country. An International Telecoms Union report also ranked Ghana as the first in Africa in terms of more people connected to mobile broadband. The report revealed that usage has increased substantially with about 14 percent of the population now using broadband. With more reliable internet facilities available and readily accessible on smartphones, more image data can be transferred when it comes to photo sharing via social media (Multisilta & Milrad, 2009).

2.8 SMARTPHONE PHOTOGRAPHY

The latest technology adoption in the life of photography in recent times could be the use of smartphone to communicate visually. Basically, smartphone photography is the use of smartphone for digital photography. For the purposes of the study, smartphone photography is the same as mobile photography (Gye, 2007; McNamara, 2012). The integration of camera into smartphones and its engagement into digital photography

activities show its potential not only to revolutionize personal photography and to propagate the democratization of image Pauwels (2008) as a visual culture but also to confirm what Robert Frank said, 'you can photograph anything now,' (Sontag, 1973 in Winston, 2013). This statement, *you can photograph anything now* was made in 1961, many years before Kodak announced the first professional digital camera system in 1992 (Eismann et al., 2004). Smartphones in recent times can capture pretty good pictures due to their high resolution camera Cochrane & Bateman (2010) and share them almost instantly and automatically through internet integrated infrastructure subscribed by users.

The phenomenon of smartphone or mobile photography unlike the DSLRs counterpart has a unique characteristic that makes the practice more appealing to the enthusiast.

❖ it is inherently mobile

❖ it is photography made exclusively by a smartphone or mobile device

❖ it is Integrated with camera apps for mobile photography experience

❖ it edits apps, usually used together, combined to produce and showcase 'keepers'

❖ its genres can cover: documentary, portraiture, street, citizen journalism, fashion and reportage

❖ its images tend to be instantly shared to a variety of social networks after editing, or images are shared in specialist photo sharing platforms like Instagram - mobile photography makes photographic projects and essays easier to produce

❖ images can be captioned, framed and story-captioned - it encourages a democratic and amateur enthusiasm.

For visual artists and photographers, the camera phone not only presents ways to extend one's photographic practice, but it also provides an opportunity to a free creative expressionism of practitioners and aesthetic conventions often associated with it. Reasons are given to this practice. Interpersonal communication, which is one of the reasons why people increasingly use camera phones is widely attributed to the integration of digital camera to phones (Jenkins 2006). For instance, people take snap shots of themselves with their smartphone "selfie" (Ave et al., 2014) and instantly send it to their friends and pals via social media.

Fundamentally, the integration of camera has served as an attractive quality feature of the smartphone (Kano, 2001). According to Kano, attractive qualities is a delight attribute therefore the integration of camera into cellphones raise user's satisfaction which also is in agreement with technology acceptance model's "behavioral intention" (Davis, 1998). The delight in the use of camera phone for interpersonal communication could be as a result of convergence of culture (Jenkins, 2006). As suggested by Jenkins, mobile phone has been a central part of a convergence culture that is transforming our understanding of visual communication in the new millennium. Manovich (2001) also reveals that:

> *Digital assets may be understood as important forms of cultural and personal expression. Mobile phones with cameras have emerged as powerful enablers for the capture, editing, storage, and sharing of digital images, thus promoting new ways to produce and experience photo media.*

Camera phone photography may be understood as a multi-faceted and dynamic imaging practice shaped by the constant ebb and flow of emergent communication technologies and the shape-shifting nature of mobile media.

Scott (2008), citing Dunleavy (2005) on camera phones and network technologies and indicated that the popularity of camera phone is making everyone a visual

communicator, adding everyone has the potential of contributing to shaping our perceptions of major and minor events happening around the world. (Dunleavy as cited in Scott, 2008). In agreement with this assertion, Sam Nzima, a popular award winning photographer based in South Africa also contends that: "*With an iPhone, everybody is a photographer*" (IStore, 2014). Sam Nzima was instrumental in the famous June, 1976 Soweto uprising by photographing that iconic image of *Hector Pieterson*; one of the first persons that was shot by the South African police. Nzima currently features in TV commercials promoting iPhone for photography. What it means is that, it is possible for users of iPhone or smartphone in general to become avid photographers.

The phenomenon of Smartphone photography added a new dimension to visual culture forming a new breed under what the researcher believed is social photography. In any social setting, it is not difficult to know the presence of Smartphone photographers. They are easily identified by a pose in which the phone is held in the hand with outstretched arm, pointing the back of the phone at the object to be photographed, while staring at the screen. The posture of these people when holding the camera phone also raises some security concerns. The ergonomics of the camera phone make it difficult to tell if a person is sending a mobile email, text message or taking a photograph. Quite often, one may not notice the taking of the picture at all, as the act of photography is concealed in the act of writing a text message, therefore creating a space in which the visual and the textual converge creating room for surreptitious photography.

2.8.1 INNOVATIONS OF SMARTPHONE PHOTOGRAPHY

It is often said that the best camera is the one you have with you and in this age of revolutionary mobile imaging, camera is likely to be a smartphone (Alvarez, 2015). During his daily classroom sessions, Alvarez (a National Geographic photographer)

explores both the technical and the creative side of smartphone photography. He discusses top photography apps, visual diaries, storytelling capabilities, and how to most effectively use and share mobile imagery. Stephen Alvarez, who is a National Geographic Expert argues strongly on his conviction of his world view on technological innovations and creative use of smartphone in recent times has to do with serious improvement in the innovative development in smartphone sensors, lenses, image stabilization, and screen size, as well as myriad new creative apps that are fostering a good bond between advanced smartphones and their users.

The status quo of smartphone photography is by itself a result of technology innovation. According to Microsoft Encarta dictionary 2009, 'innovation is defined as new idea or method: a new invention or way of doing something'. Taking cognizance of this definition, one could easily agree with Alvarez's views on smartphone use and also to agree with the saying 'the new ways of taking pictures with smartphone is an innovation'(Alvarez, 2015). He explained further, these smartphone innovations were observed the years that he had practiced digital photography and encouraged researchers to venture into this ever growing phenomenon, hence the quest to explore the phenomenon of these practices.

2.8.1.1 'IPHONEOGRAPHY'

The widespread introduction of Smartphone technology, and in particular the Apple iPhone, which went on sale in the U.S. June 2007, has been instrumental in ushering in a new wave of smartphone aesthetics and practices (Roberts, 2011). The popularity of the iPhone, along with the photographic aesthetic it generates, has led to the development of the photographic genre called 'iPhoneography'. In her book 'The Art of iPhoneography: A guide to Mobile Creativity', Roberts defines iPhoneography as:

'the art of shooting and processing (editing and enhancing) digital images using an iPhone'.

This technology of smartphone, especially the high-end ones and its use for creative endeavors fit perfectly into the context of visual communication which form the basis of my study. Smartphone photography, a form of digital photography which the study is exploring is convenient to those who are mobile. It is not surprising however, when McNamara (2012) refers to smartphone photography as mobile photography in the actual sense of the term. McNamara asserts that Mobile photography is the art of photography using a smartphone or mobile device. He defined the process of photographing of anything using the philosophy of 'the best camera is the one that is always with you'.

When the history of mobile photography is written three particular dates that must not be forgotten are the post digital date: June 11th 1997 when the first image was taken by a camera phone by Philippe Kahn (Bockaert, 2007), the launch of the iPhone in 2007 and the launch of Instagram in 2010 (McNamara, 2012).

In another statement attributable to McNamara, he says 'Mobile Photography has changed everything'. He further stated that mobile photography otherwise known as:

> *iphoneography, is a mobile street photography or smartphone photography this relatively new form of photography has firmly established itself as the visual vanguard of the 21st century. As a totem, citizen weapon and an artist's tool, the mobile photography is pissing off traditional photographers everywhere and creating new 'stars' along the way (McNamara, 2012).*

Mobile photography is so influential now that camera manufacturers are bringing phones to cameras rather than cameras to phones (McNamara, 2012). Like many bloggers who double as academic scholars McNamara is mindful of the fact that digital Photography has never been easy to define. Science or art? One thing that

permeates through his thoughts and presentation of ideas in the context of smartphone photography is the fact that the phenomenon is driven by diffusion of innovation in the era of digital age. In spite of all this, (McNamara, 2012) he argues that the culture of technology in respect to smartphone photography makes the social system now enter the world of the visual social web - A community of professional and nonprofessional photographers (Cecilia & Niklas, 2014) where shared photos are both language and currency (McNamara, 2012); with our experiences being increasingly shared through lenses, filters and photos are phenomenon of our social experiences.

The desire to send social photographs has informed an accelerating visual culture since the advent of photography and telegraphy in the 1880s. From the early daguerreotypes through to current smartphone practice, our relationship with the photographic medium has been fuelled by the urge to hold a frozen moment, to catch something of ourselves within the flux of time. In the new social landscape of photography, the habitual act of instant shooting and posting open up dynamic forms of temporal perception. At the end of 2013, it is estimated that 1.4 billion smartphones will be in people's pockets across the globe (Leonard, 2013), each one capable of storing and sending thousands of digital images through cyberspace.

Reflections on individuals' visual narratives and embodied connections with photographic practice illuminate how we photographically mediate memories and a sense of the present moment (McLennan, 2013). How are these memories captured, what forms do they take and how do they mediate individual narratives? One concept that comes to mind is the Allure of the selfie.

Selfie is the Oxford Word of the Year for 2013 (Kandice, 2013; Senft & Baym, 2015). Selfie is a neologism defined as "a photograph that one has taken of oneself, typically

one taken with a smartphone or webcam and uploaded to a social media website." The emergence of this phenomenon a few years ago was therefore dependent on advances in digital photography and mobile phone technology, as well as the rise of Twitter, Facebook, and Instagram, among other social media sites, which supply an outlet and audience for the photos. Selfies emerge from a convergence of technologies and results to a phenomenon, and they are taken in both private and public spaces (Warfield, 2014). The phenomenon of Selfie activities in the face of digital photography or visual communication sparks off some concerns in the public spaces.

The International Journal of Communication, 2015 reveals some scholarly publications that include the one published by Senft and Baym (2015) when they asked; *what does the selfie say?* The study investigates a global phenomenon of selfie as it dominates social media platforms. One scenario that raised concerns according to the article reads: "Selfies at Funerals: Digital Commemoration, Presencing and Platform Vernacular," they examined mass volume digital photographs on Instagram walls hash tagged '#funeral on Instagram, noting that, given the social conventions of the platform, the majority of these images constituted legible and legitimate cultural practice of presence; a practice that is directly embedded in wider rituals of mourning and memorialization' (Senft & Baym, 2015).

In a deeper perspective, several reasons were given to the act of "selfieing". One of the reasons given frequently for enjoying taking selfies is that it allows the subject full control over the photographic process, from the time photo is taken, to deciding the angle and expression, to editing the image to choosing which photos to share with others. Susan Sontag (1973) made a good revelation when she noted that, "photography is power". In that piece of literature Sontag writes, 'To photograph is to

appropriate the thing photographed. It means putting oneself into a certain relation to the world that feels like knowledge and, therefore, like power' Sontag further intimates that 'There is an aggression implicit in every use of the camera' (Rettberg, 2014). Selfies and self-representations. (The relationship between 'self" and the smartphone). Within the networked fabric of personal smartphone snaps there exists a form of individual representation that has incited much public debate and discussion. This form of portrait shot shows the subject with outstretched arm, turning the smartphone lens upon themselves as they become both photographer and photographed. A large canon of academic research has begun to emerge on this particular photographic gesture.

The concept "Picture Yourself" becomes more prominent in society in and around 2007 when smartphone and its third-party apps infiltrate the user populations. Kano's attractive quality (Kano, 2001) characteristic tendencies that the smartphone has in recent times when there was a paradigm shift from its core functions of "making and receiving call" to being able to capture high resolution photographs was as a result of digital camera integration to the phone. You will notice that it is the camera integration into smartphone and its ubiquitous use (Cruz & Meyer, 2012) that form the basis for the research to explore its impact on Professional Digital photography practice in relation to visual communication.

2.8.2 SMARTPHONE PHOTOGRAPHY APPS

With the advent of Photography apps on smartphones, picture taking Instagram is an application or "app" that allows the user the opportunity to upload and share photos over an online social network for public consumption. It is a social platform that offers an occasion to connect with others over the internet, and a possibility to foster social interactions through visual imagery. Instagram was first launched on October 6th of

2010 exclusively for the iPhone. By December of 2010, this app had reached one million users (Instagram Press Center, 2013) as cited in (Ostrowski, 2013). Since the app launched, Instagram has made many changes including a new layout and visual design, the addition of new filters as well as a new tagging systems. 2012 marked an important year for the application. On 3rd April, 2012, Instagram was finally launched for Android Smartphones. This move made it possible for millions of new users to start utilizing the application. Another big move for Instagram that year was pairing up with the largest social network on the internet, Facebook. Within three months the Apps had connected over 80 million users around the world (Instagram Press Center, 2013). According to Instagram's press release, there are now over 130 million monthly active users sharing a staggering 45 million photographs every day or 520 images every second. In less than three years, the number of photos that have been shared between users of Instagram has totaled over 16 billion images, with 1 billion people "liking" photos daily. This social network has become a huge cultural phenomenon worldwide with over 50% users located outside of the United States (Instagram Press Center, 2013). Instagram has become one of the leading photo sharing communities allowing for millions of users to connect everyday through visual currency, which now includes video, launched in 2013. Ostrowski (2013) suggests that the combination of smartphone and the Instagram application has made it possible for people to capture the world through their cell phones in the form of digital imagery and has allowed people to share these experiences with a community worldwide in real-time.

Apart from Instagram, there are other plethora of Apps that can be found on smartphones. Stapley (2014) wrote an article on the web about some other photography user Application that are accessible on the internet for download for free and for instant use. Stapley suggests that, these Apps are influencing the use of

smartphone for digital photography. The following according to Jon Stapley, are types that are frequently used by smartphone photography enthusiast:

- **Flickr** (iOS or Android)

Flickr is a clever and flawlessly engineered piece of software, with a wonderfully clean user interface that allows you to upload up to 1TB of images to your Flickr photo stream. You can also use the app to follow other photographers – given that the strong community is one of Flickr's greatest assets, this is a welcome feature. There's even some limited editing function, with filters and basic image adjustments, and easy instant sharing to all social networks.

- **Snap seed** (iOS or Android)

Snap seed provides an astonishingly clever mobile editing tool for serious mobile photographers. It allows for quick and easy cropping, sharpen, tilt-shift focus effects and more. One interesting feature on the snap seed is the Selective Adjust feature that allows you to localise your adjustments of contrast, brightness and saturation to specific parts of the image.

- **Photo Editor by Aviary** (iOS or Android)

Aviary is one of the best apps around for operational simplicity. There are also a few basic fixing tools, which are really handy for quick smartphone snaps. Blemishes can be removed, red-eye can be reduced and teeth can even be whitened. You can also play with colour temperature, saturation, contrast and brightness, and apply sharpening or focus blurring.

- **Litely** (iOS only)

A superficial image-adjustment app that promises to make your photos pop and sing in a pretty good way. It has both design and user interface (UI) which are admirably sleek and user-friendly. It comes with lots of image styles presets pleasingly subtle. It allows for tweaking the intensity for precise effects on your photos. You can also fiddle with brightness, saturation and sharpness.

• **DOF Calculator (**Android only)

Another camera companion app, the DOF Calculator is designed to help photographers achieve the perfect depth of field via images that are at the optimum point of focus. Using menus and sliders, you input data into the camera about both your camera and your subject, and from there the app calculates the near focus, depth of field and far focus. It requires a little technical knowledge in order to be able to work with full efficacy, but if you've got the know-how it is especially useful for landscape images, allowing you to control exactly what is in focus between the foreground and background.

2.8.3 SMARTPHONE PHOTOGRAPHY IN GHANA

In 1992, a telecommunication company belonging to Millicom Ghana limited, Mobitel now Tigo emerged in Ghana. At the time about 19,000 Ghanaians were hooked on their network. Six years after, the number rose to 43,000 and by the middle of 1999 the number has increased till now to 68,000 because other network providers have joined the telecommunication business. The trend continued until 2012, when the number of mobile phone users in Ghana was estimated at 24.4 million (Addo, 2013; Eto, 2012; Ofosu-Asare, 2011).

Ghana and other African countries like Tanzania, Uganda and Kenya were seen to have been leading cellular service in Africa. Since then, cell phone ownership has

grown exponentially. Even though cellphone ownership in South Africa and Nigeria can be equated to the United States, Smartphones which are an advanced form of cellphones are not popular in most of the African counties, however, fewer people adopted and accepted the device with '34% of South Africans' (Poushter & Oates, 2015).

The situation that existed a decade and half ago cannot be said to be prevailing today in respect to smartphone ownership. Today, it is possible to find almost every 9 out of 10 people possessing cell phone of sort or smartphone. The situation is what scholars refer to as technological advancement in mobile telephony (Campbell & Park, 2008; Mobile, 2005).

On the 16th of January, 2014, it was reported online that Accra Mall Management in Ghana, was to ban Photo taking inside the Mall. The management of the Accra Shopping Mall was expected to announce the ban on the use of cameras especially smartphone at the shopping center. The directive, had become necessary as shop owners at the mall complained of low sales despite the high number of visitors (Admin, 2014). According to the report, many people visit the mall ostensibly to take pictures with their smartphones.

Results from a special survey conducted by the management group indicated that, although about 3 million people visited the mall during the Christmas and New Year weekends, the average consumer's spending dropped about 12.9 percent. This implies that people mainly go to the Mall purposely to take pictures not to buy goods. For instance, the survey reveals about 70.8 percent of visitors to the mall visited with the sole aim of taking photos for their Instagram and Facebook accounts.

The Public Relations Officer of the mall who disclosed the results of the finding in a press release said: "We see people coming here dressed up in leather jackets and woollen hats just to take pictures for the Instagram and Facebook accounts. And the most annoying bit is that they fail to hash tag us in these photos!" (Admin, 2014).

The officer added that "the slump in sales has nothing to do with the extortionate prices of goods and services or poor customer service, it's all to do with the fact that people come here just to take photos and not to shop." He argues that tthe Mall is not a tourist center like the Kwame Nkrumah mausoleum or the 'Boti' Falls where tourists are expected to be taking photograph of themselves and posting them on the Instagram. He however reiterated that, measures will be put in place to stop this because it is affecting business. In sync with what the officer says, the report again stated that a member of the security staff also confirmed the results. In the words of the security man; "*Masa don't be deceived by the full car park. Most of these people only come here to take pictures on their smartphones and tablets. It is true, they are really spoiling business. But now, we are glad we will have the power to seize camera phones and we will make sure we do it to the best of our abilities*" (Admin, 2014).

Logically, the rise in smartphone ownership could mean the rise in smartphone photography. The reason can be situated in the theory propounded by Davies (1989), Technology Acceptance Model (TAM) which deals with the adoption of new technology and subsequently accepting its perceived ease of use and perceived usefulness.

Often times, you will see Journalists or ordinary persons in Ghana using smartphones for reporting events to television stations or other media houses. At social gatherings the practice is prevalence as many users of smartphone are seen in an arm-stretch

position of holding the smartphone to capture digital photos. The phenomenon of people who are not journalists but take up the responsibility to report events to media establishments or post them onto the social media is referred to as **citizen journalism** (Liu, Palen, Sutton, Hughes, & Vieweg, 2008).

Society is rapidly resonating with the convergence of technology and smartphone photography is not an exception. This gave birth to 'vernacular photography' which is referred to as photographing subjects that are commonly seen around by either amateur or professionals (Paashuis, 2014). Scholars believe that the 'change in digital technologies and the changing function of photography results into a complex technological, social and cultural transformation'(Keightley & Pickering, 2014). The ubiquitous nature of the smartphone makes it possible for 'personal photography' to thrive among the social system in Ghana because, people are adaptive to photography technology change.

2.8.4 SMARTPHONE: CITIZEN JOURNALISTIC TOOL

It is important to understanding the phenomena of smartphone use for citizen journalism in view of technology acceptance and creative innovations. The convergence of technology which combines the integration of digital camera into the cell phone naturally affords users the opportunity of reporting events when they occur. Some time back, this was not possible or was less prominent however, the existing technological and social pressures are changing the role of the photojournalists forever. Often, as news breaks, the reporters of the events are members of the general public who just happen to be on the spot and supply timely images (Prakel, 2010). These citizen journalists capture their images on compact cameras and mobile phones, which permit the images to be instantly uploaded and available on news websites and

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on television. People believe that the low quality publication we see on our screens are as a result of low image resolution of compact cameras and smartphones. Contrary to that opinion, image resolution and quality are produced by the smartphone, Marshall (2015) argues that in recent times, there has been tremendous improvement in the image quality of smartphones. Again, in the World Mobile Conference (WMC) 2013, Rambus demonstrates in the introduction of a new technology known as *Binary Pixel Imager* that is capable of producing a high dynamic range of images from smartphones (Athow, 2015). Adatto, (2008) intimates that, cell phone and digital video cameras can make everyone a potential citizen journalist or television reporter. There it is possible to see smartphone photography common in the society.

2.9 VISUAL COMMUNICATION

Visual communication is communication through a visual aid and is also described as the conveyance of ideas and information in forms that can be read or looked upon. Visual communication in part or whole relies on vision (Frascara, 2004; Sless, 1981). It is primarily presented or expressed with two dimensional images, it includes: signs, Photographs, typography, drawing, graphic design, illustrations, Industrial Design, Advertising, Animation, colour and electronic resources.

According to Victorian Registration and Qualifications Authority, an accreditation body responsible for ensuring that the study of communication design conforms to standard reveals in their guide for 2013-2017 that, for visual communication to be designed to have effective impact, the designer must speak visual language (Victorian Registration and Qualifications Authority, 2012). The authority holds the view that "design and creation of visual communications requires the selection and application of methods, media, materials, design elements, design principles and final presentation

formats. Collectively these are the resources of visual language". Clearly, one of the variables in this visual language is Photograph. Horn (2001) defines:

> *Visual language as the tight integration of words and visual elements and as having characteristics that distinguish it from natural languages as a separate communication tool as well as a distinctive subject of research. It has been called visual language although it might well have been called visual-verbal language.*

2.9.1 PHOTOGRAPHY AS A VISUAL COMMUNICATION TOOL

The introduction prior to the first chapter of Michael Freeman's book, *the photographer's Mind: Creative thinking for better digital photos* reads*:* "Democratic Photography". This means everyone is capable of producing photographic images at free will, anytime and anywhere. What Freeman espoused in his book in relation to visual communication is that photographic image production is no longer the preserve of few technically skilled persons but all who desire to do so (Freeman, 2011). Photography is being democratized. This means that everybody is free to produce digital imagery since most digital cameras are automatically operated. In a quote attributed to Helmut Newton, Freeman writes; "It's all automatic. All I have to do is press the button. It's a camera that every amateur buys. [Pause, points to his head] It's all in there."

The quote by Newton, explained Freeman's supposition of the fact that there is democracy in digital photography. Sontag (1973) notes that photography practice in recent times is so common like every mass art form. She meant that photography is not practiced by most people as an art, instead it is mainly a 'social rite', and the act of practicing photography is a 'defense against anxiety, and a tool of power' which affirms what Freeman refers to as "*Democratic Photography"* (Freeman, 2011, p. 6).

To have memory is to have visual representation of an event or situation (Fuente et al., 2014, p. 5). One of the philosophies of Sontag is that 'Cameras go with family life' therefore smartphone camera is a social tool. This assertion is in reference to the visual documentation of individual achievements using cameras to popularize the use of photography as a tool for visual communication.

The visual nature of Photographs in itself, furnish evidence (Fuente et al., 2014, p. 3). Someone could doubt the occurrences that is narrated, but seems proven when shown a visual image of the moment. One unique thing about the camera according to Sontag is that, its visual incriminates. For instance, it is difficult to deny visual evidence that suggests one's involvement in an act. Most surveillances in public places are visually captured, stored and subsequently communicated to relevant bodies for evidence to be adduced. In the University of Pennsylvania Law Review (Founded 1852), Formerly American Law Register, Kreimer (2011) suggests that visual information as a result of 'public surveillance cameras are said to reduce crime, the prospect of private image capture provides a deterrent to official actions that would evoke liability or condemnation. Images allow victims to claim their voice and to leverage widely held norms to shame violators' (Kreimer, 2011, p. 347). Thus, the visual speaks loudly in evidence than words. Alternatively, the camera record justifies. A photograph passes for incontrovertible proof that a given thing happened. The picture may distort; but there is always a presumption that something exists, or did exist, which is like what's in the picture.

The adage 'a picture is worth a thousand words' refers to the notion that a complex idea can be conveyed with just a single still image. The Picture speaks volumes of itself. It also aptly characterizes one of the main goals of visualization. Photographers desiring to communicate visually should 'see with the eye, and capture with their

heart' even before the actual image is captured (Stuart, 2009). The ability to calculate in your mind how the intended result will look like is referred to as visualization; it serves as preview of what is yet to be captured. Visualization in photography refers to the entire emotional-mental process of creating a photograph, and as such, it is one of the most important concepts in photography. It includes the ability to anticipate a finished image before making the exposure, so that the procedures employed will contribute to achieving the desired result. Stuart argues that the creative process can be practiced and learned; beyond lies the domain of personal vision and insight, the creative 'eye' of the individual, which cannot be taught, only recognized and encouraged (Stuart, 2009) .

Popular sayings such as 'seeing is believing' and 'the camera never lies' indicate trust in the photographic image for presenting objective evidence. This perceived objectivity of photography by the public makes photography a powerful medium for communication by the media. Implied communication in photographs used by the media reinforces ideas and concepts that the photograph presents evidence. Evidence that the event happened in the way that we were informed by the text and very often we see only what we are guided to see by the supporting text (Galer, 2007).

2.9.2 PHOTOGRAPHY AS A VISUAL LANGUAGE

Moran & Tegano (2005) states that, 'Photography is a visual language that shares some important characteristics with verbal language - both communicative and structural. To this end, photography and its visual weight speaks volume in terms of visual communication.

Photography is a dynamic representational system that uses signs to produce and communicate meaning - just as we do when we use words to speak. According to the

Swiss linguist Sausserre, a sign has two elements, that of signifier and the signifiedwith signifier representing the form (in our case photographs) and the signified representing the associated conceptual understanding provoked by viewing a photograph-or its meaning (Hall, 1997, p. 31). For meaning to be constructed, these two elements must exist in relation. Hall notes that it is the relationship between form and meaning that is 'fixed by our cultural and linguistic codes, which [in turn] sustains representation' (p. 31).

Horns (2001) developed a model that suggests components of visual language shown in Figure 2.8. This comprises of words, image and shapes which are emerging as a new international auxiliary language. Horns simply defines visual language or otherwise known as *visual-verbal language* as "tightly integrated communication units that are composed of words, image and shapes"
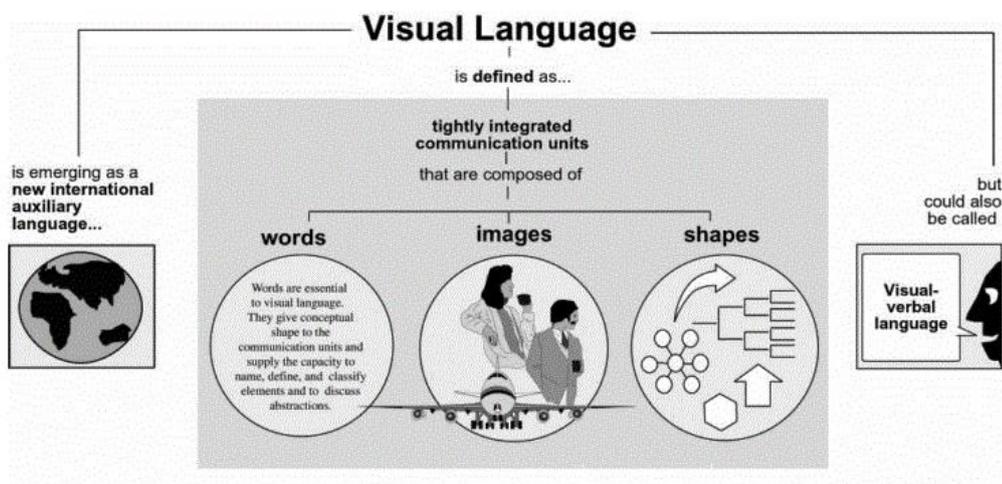
Figure 2.8: Visual Language system (Adapted from Horn, 2001)

It could be understood that Horn's model does not explicitly establish the use of smartphone resulting into visual language, nevertheless the result of smartphone activities that result in visual image form an integral part of visual language.

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The visual communication characteristic of photograph is more like spoken language and are turning into the new currency that is connecting people at difference places and times. Like circulated spoken words, smartphone images as a visual medium with visual mass (Duchemin, 2009), mediate between individuals and groups to establish and reconfirm bonds. José further explained that sometimes pictures make more meaning whenever it is captioned. The meaning that would have been lost if the caption were absent is what he called 'missing voice'. When pictures become a visual language channelled by a communication medium, the value of individual pictures decreases, while the general significance of visual communication augments. A thousand pictures sent over the phone may now be worth a single word: see! Taking, sending, and receiving photographs is a real time experience, and like spoken words, image exchanges are not meant to be archived (Van House, Davis, & Ames, 2005). In their bounty, photographs gain value as 'moments,' while losing value as mementos.

It is not a coincidence to witness a shift, especially among the younger generation with smartphone photography influence, which peer-bond and interact society in pluralised technological community. 'Digitization is not the cause of this trend; instead, the tendency to fuse photography with daily experience and communication is part of a broader cultural transformation that involves individualization and intensification of experience' (José, 2008). The overall meaning that José put to understanding the innovative use of smartphone for digital photography is to communicate visually, create personal identity of the user and documentation of memories. So long as the culture of capturing images with smartphones and sharing of these images continue, human experiences also continues to intensify regardless of who is using the device.

2.10 AMATEURS PHOTOGRAPHY

It is virtually impossible to talk about photography, which is believed to be a technically skilled dominated profession without touching on the activities of those who are unskilled yet have found spaces in the domain of photography. Amateurs as they are called, (self-taught). The Amateur is generally considered a person attached to a particular pursuit, study or who often has little or no formal training in their pursuits, and many are autodidacts. They are non-professional or unpaid trainees, however, a lot of "amateur" photographers also charge fees for their services. In fact, the evolution of digital photography and the phenomenon of smartphone use for photography prominently puts the amateur into serious photography entrepreneurship. You could argue that the hallmark of a true professional photographer is the ability to deliver a great and amazing photograph anytime, anywhere with the core value of photographer's professionalism exhibited. Notwithstanding, there are undeniable facts that some works of amateur photographers are stunning since digital point and shoot requires not much technical proficiency for operation.

The activities of amateurs did not start in the era of digitalization of photography. There is a history to it, until the late 1960s, photographers either developed and printed their own pictures or sent them to Eastman Kodak for printing. Because of the complicated process required to produce color prints, however, some entrepreneurs soon discovered there was a market for photo-finishing services among both professional and amateur photographers. This is how the color processing lab was born. Before long, department stores and drug stores recognized the growing popularity of color photography and began developing and printing color film for consumers (Rice, 2006). This means that printing of the finished photograph was no longer done by individual photographers. This process led to a number of unskilled

photographers dominating the profession since they did not have to print their own pictures, just like the professional photographers. Today, the revolution continues, and most of these establishments are now printing from digital files.

The intervention of amateur photographers' activities in connection with digital photography has its ups and downs, nonetheless the practice is phenomenal. Adatto (2008) in his book entitled 'Picture Perfect: Life in the Age of the Photo Op' wrote in (p.63) and points an instant in 1900s where amateur activity was helpful to the adjudication of justice. Adatto reports on a situation in 1991, where some Los Angeles police officers brutally assaulted Rodney King, a crime suspect, and an amateur photographer recorded it with his video camera. There was public outcry when the footage was broadcasted on television news programs across the country, subsequently, the officers were indicted and investigated (Adatto, 2008). Most of these amateur photographers employ the use of smartphones to undertake these 'unskilled' activities. It can be understood by the fact that they cannot afford budget full- frame sensor cameras or similar (Keimig, 2010). It is said that amateur photographers, are more enthusiastic about embracing the interactive viewing experience as an end unto itself rather than a means (Jacobs, Gallo, & Pulli, 2014). The statement 'what you see is what you get, minus the odd technical flaw' (Prodger, 2007) couldn't have been more appropriate to describe the unprecedented phenomenal activities of amateur works. The July 7, 2005 London bombings led to notable forms of amateur photography (citizen journalism) especially through the use of camera phone photos, they go to show some benefits of amateurism in terms of smartphone photography (Liu et al., 2008).

2.12 SMARTPHONE PHOTOGRAPHY AS A COMMUNITY

In their article, Cecilia and Niklas (2014) described a kind of community where by people congregate. Another interesting approach to photography as a postmodern activity is the development of a 'community'. The notion of community could refer to the 'physical' meeting between photography enthusiasts in the setting of a photography club for example, but could also refer to the more abstract idea of belonging to a community of photographers (Cecilia & Niklas, 2014). In contrast to the physical presence of photographers that Cecilia and Niklas mentioned, which specifically refers to photography clubs, a virtual community is created on the platform of google with a purpose to share ideas and concepts in smartphone photography (Pruitt, 2015). This is a community of amateur smartphone photographers as well as some professionals. Members are welcomed and encouraged to share their captivating PG-rated photographs taken by their smartphone cameras only. Other digital image capturing devices are also allowed but not DSLRs. All images should be considered shareable across and outside of the community. Joining this community means you will not only share photos, but also share tips and tricks as this is a community about smartphone photography (Pruitt, 2015). A lot of photographers especially amateurs and smartphone photography enthusiasts are encouraged to be part of the community. By virtue of these process, the visual communication of smartphone images are encouraged and promoted.

2.13 SMARTPHONES PHOTOGRAPHY AND SOCIAL MEDIA

Social networking has become a major new visual communication phenomenon taking advantage of smartphone and its network connectivity. This is permeating various fields including entertainment, education and business (Multisilta & Milrad, 2009; Okabe D., 2004). The visual images from smartphones instantaneously are transferred

to friends and family members through the engagement of several large social networking tools and platforms. Examples of these platforms are YouTube, Facebook, Flickr, Vibe and WhatsApp which are all internet dependent platforms. These facilities allow for communication of images and videos. According to Okabe and Ito as cited by Multisilta & Milrad, (2009) camera phone photography is promoting visual newsworthiness via internet. They claim that "unlike the traditional camera, the camera phone is intimate and has ubiquitous presence that invites a new kind of personal awareness'

2.13.1 WEB 3.0

One of the technologies facilitating transfer of images via the internet is the web 3.0. Also known as the semantic web, it is not a separate web but an extension of the existing web 2.0, in which information is given well-defined meaning, allowing for better interactivity of computers and people to work in cooperation (Berners-lee, *et al*., 2001) With this platform, a special infrastructure built in to the system allows for connectivity between the phone and the environment.

2.13.2 ONLINE PHOTO SHARING

Posting of photographic images on the internet with or without the intent of sending to a particular person could be termed as online photo sharing. In fact, Sarvas and Frohlich (2011) describe it as an 'electronic transmission of digital photos through the web sites.' Today, this visual communication activity is common with the advent of smartphones that are connected with internet infrastructure for 'multimedia messaging' and this is more or less a phenomenon (Sarvas & Frohlich, 2011).

What is instructive in this process is that, visual images are communicated to an audience. The role of smartphones in this process is key as they continue to promote digital photography in a contemporary sense. A study conducted by Keightley and

Pickering in 2014, looked at the essence of sharing images on the web. According to the authors, the issue is not about just sharing the photographs but rather, how they are shared. They further argued that:

With the family album, sharing takes place in intimate, focused gatherings, and this highly localised form of interaction through images now continues alongside the far more dispersed forms of exchange that occur through photographs being sent as email attachments, as adjuncts to text messages or as postings on online networking sites (Keightley & Pickering, 2014, p. 586). Unlike the traditional method of sharing photographs through the use of albums where one is expected to flip through it and see the content, todays' technology makes it possible to share photographs even in a much larger public space like the web for people to see.

2.14 SMARTPHONE PHOTOGRAPHY RISK AND RAMIFICATIONS

Every technology introduction into the social system has its pros and cons. According to Wikipedia, 'Pros and Cons, is the shortening of the Latin expression 'pro et contra' which simply means (for and against). From the invention of camera obscura to the modern analogue photography through to digital photography, risks (cons) can be associated with it even though there are advantages (pros). Alternatively, smartphone photography, a converged technology innovation in the era of digital photography has these (for and against) factors of risk associated with it. People become victims of circumstances due to ubiquitous use of smartphone. The implication of using smartphones for surreptitious photography is a typical case to look at in order to protect human right infringement of people. In his article published in 2005, Allan Kato Ku illustrated a scenario in which 'a Washington state resident, Jack Le Vu, was the first person in the nation charged for a criminal act while using his camera phone to photograph females from beneath their dresses' (referred to as "upskirt" photos: an unlawfully photographing of under a woman's skirt, revealing her crotch area and

underwear) (Ku, 2005). The charge was based on the "Anti- Voyeurism Laws" that seek to protect the privacy of citizens. The act was perpetrated using cell phone. Even though the victim was not aware of the act, a neutral person who witnessed the act reported that the defendant had "crouched under the victim" then later pretended to be looking on his phone. Subsequently, he was successfully "convicted and sentenced to sixty days in jail and was required to register as a sex offender on one count of voyeurism" (Ku, 2005).

The danger posed by smartphone in the face of surreptitious photography and the instantaneous propensity to transfer the images via internet is a matter of great concern. Smartphones gives any individual, not just the press, police, or paparazzi, the discrete ability to simultaneously capture, store, and disseminate images and video of others.

The issue of privacy protection raises some legal concerns within the jurisdiction of the United States. According to Ku (2005), the issue of addressing camera phone of smartphone use for photography implicates two legal theories:

> *First, whether there can be any right to privacy in a public setting; and, second how technology has adjusted to what society expects as a reasonable expectation of privacy. Reaching an acceptable response to both will assist in forging a robust legal solution. Privacy in a public setting is generally an unrecognized right under the common law and criminal application of the Fourth Amendment.*

Of major concern in Ghana regarding legal enforcement, there has not been any such case that requires legal interpretation in any of the law courts, either at the lower courts, higher courts or the superior courts; at least not that the researcher is aware of.

2.15 SUMMARY AND CONCLUSION

The review focuses on the related and relevant topics and sub-topics intended to enquire into what other authorities have been writing on. This research established the

phenomenon of smartphone photography as a new genre in the media industry in Ghana. Literature was indicative of the fact that the integration of digital camera into smartphones accounts for the emerged phenomenon. By establishing this development in literature, a research gap was identified hence, the research question:

❖ How has the introduction of camera into smartphones affected the activities of traditional Digital Photography in relation to visual communication?

This research question and two other sub-questions guide the focus of the enquiry into finding the influence of smartphone photography against the traditional digital photography.

To accomplish this task, the researcher was guided by the Burrell and Morgan quadrant to determine the direction of the research. The researcher was also guided by the research design; an exploratory approach was chosen to enquire about the knowledge claim of the phenomenon of smartphone photography. Secondly, the research being qualitative in nature was aligned with a philosophical assumption which is interpretivism which will justifiably help explore the globally recognized trend of smartphone photography as a result of technological convergence. It is the view of the researcher that, the best approach to understand the lived experiences of smartphone photography activities by users should be by engaging them in order to listen to their personal narrations rather than administering close ended questionnaires for a statistical data analysis.

It must be noted that two rationales motivated the study; academic and practical rationale. The practical rationale that stems from the researchers' personal experience as a professional photographer for over 15 years, was faced with the notion that the *smartphone is gradually replacing professional DSLRs*. As a professional who doubles requires an enquiry into the validity of this notion.

One key thing that I have done in the quest to make the research an academic type was to search for theoretical frameworks that can provide support for the study. In accordance with the phenomenological strategy of studying the use of technology like smartphone photography, I adopted first, Diffusion of Innovation theory (Rogers, 2003) and Technology Acceptance Model TAM (Davies, 1989). These theories are reviewed in line with how people adopt innovative technology and subsequently accepting the technology for daily use.

Various themes and sub- themes were developed in accordance with the focus of the study for literature review and thee culminated into the designing of a 'road map' for the review.

Finally, knowledge revealed through literature support the view that smartphone production has increased exponentially due to many factors including the integration of digital camera in to it. Both positive and negative characteristics of the smartphone were identified. The next chapter deals with how the study was conducted using appropriate methodology.

CHAPTER THREE METHODOLOGY

3.1 INTRODUCTION

This chapter outlines the logical structure adopted in answering the main research questions: while interrogating the integration of camera into smartphone and its ubiquitous use for digital photography. I examined visual communication activities that these devices are used for in the face of technology adoption and acceptance. Achieving the laid down objectives stated in chapter one was carefully pursued in line with the of following three sub research questions:

a. What are the user experiences of smartphone for visual communication activities?

b. How have the technologies (both native and third-party apps) permitted the easy use of smartphone?

c. What is/are the implication of DSLRs with regards to the innovative visual communication activities on the use of smartphones?

The chapter begins with the research philosophy and also outlines the research design. Academic enquiries are based on some underlying philosophical assumptions about what constitutes 'valid' research and which research method(s) is/are appropriate for the development of knowledge in a given study (Thomas, 2010). The appropriate research methods chosen for the paradigm, research instruments, data sources, and tools used are also outlined. The overall data management which include storage, analysis and protection are also presented. Finally, the document reports on credibility and trustworthiness of the information.

3.2 RESEARCH PARADIGM OR PHILOSOPHY

The research philosophical underpinnings of the study are based on its ontology and epistemology (Saunders, Lewis, & Thornhill, 2009). Ontology is seen as the reality of truth or what is there to know. Epistemologically, subjectivism approach was adopted to explore the "nature of reality". This theoretical perspective explained how the knowledge out there would be acquired. Interpretivism which is closely linked to constructivism informs the type of research questions posed in this qualitative enquiry with the expectation of a subjective truth because the researcher believes that there is no single reality. This subjective approach sharply opposes a positivist paradigm that is usually aligned with a quantitative enquiry. By this "stance" the "what? and how?"

questions were developed to elicit understanding of the nature of truth that necessitate the study to explore the influence of smartphone usage in relation to Visual Communication.

Figure 3.1 illustrates the interrelationship between the building blocks of Research and shows the chronology of the stances through to how the data is gathered.
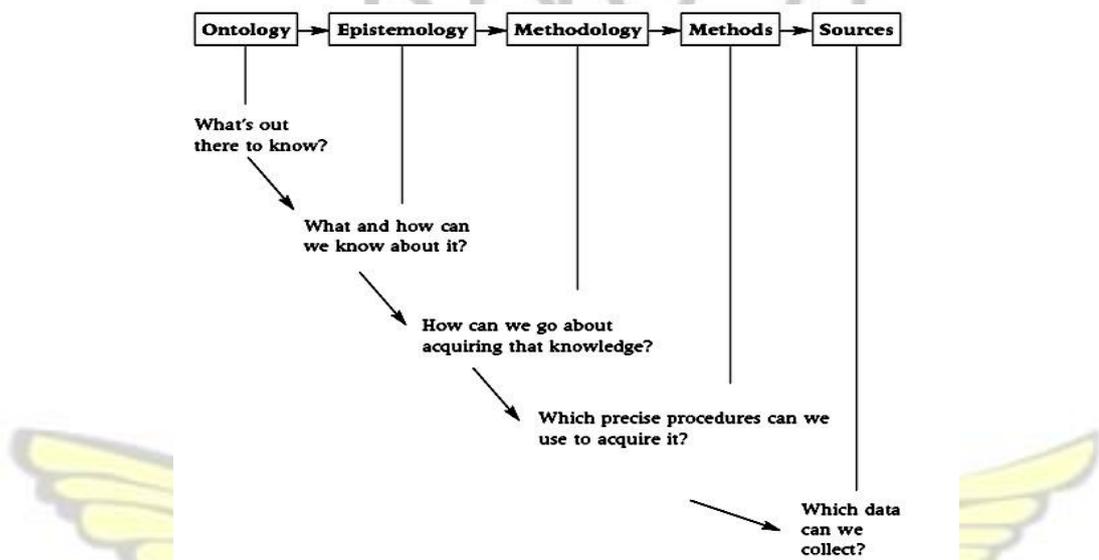
Figure 3.1: The Interrelationship between the Building Blocks of Research (Adapted from Hay 2002:64; Source: Grix 2004:180)

In Figure 3.1, Grix (2004) gives a pictorial and textual annotation of a logic and interrelationship between the building blocks of research which incorporates ontology, epistemology, methodology, methods and sources of data. Being the starting point of research, ontology sets out clearly what a researcher thinks can be researched (Grix, 2002:179) and is "concerned with nature of reality" (Saunders et al., 2009).

The researcher believes that, technological rationalization (Thompson, 1989), demystification of technology and non-complexities of smartphone operations and the fact that society is dynamic in today's globalised world, would mean users would have divergent opinions on the lived experiences of the ubiquitous smartphone

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photography. Unlike, the objectivist stance that holds the view of 'single truth reality', this study holds the view of "no single truth reality" as the basis for this ontological stance hence the inductive approach to the study. In addition, the researcher's position is that there is no single truth reality when exploring lived experiences of people to ascertain factors influencing the adoption and acceptance of smartphone technology for digital photography. In other words, participants shared their views of the reality "in situ" about the experiences of smartphone photography. Finally, the chosen ontological stance therefore places itself in how the phenomenological research is conducted and in the case of this study, the phenomenon of smartphone photography and its influence on conventional Digital Photography.

3.3 RESEARCH DESIGN

Based on the research paradigm, phenomenology as a research strategy was adopted. Phenomenological research requires identifying the essence of human experiences in a developing trend or phenomenon (Moustakas, 1994). Those experiences of the participants in the research are juxtaposed with the researcher's own experiences in order to understand the essence of the reality (Nieswiadomy, 1993). Qualitatively, complex phenomenon reqiures detailed understanding of the issue. This detail could only be established by talking directly with people to elicit primary data. This meant going to their places of work, and allowing them to tell the stories about the subject matter but not what literature outlined (Creswell, 2007). Going through these processes to find answers to petinent research questions required research design. Structuring the research design in a manner to be able to get the right responses follows some logical questions. Taking cue from the suggestions offered by Clotty (1998), the following four questions, amongst others, were considered in consonance with research design framework shown in Figure 3.2.

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- Does the epistemology (or the theory of knowledge) embedded in the research conform to objectivity or subjectivity?

- Does the theoretical perspective (positivism, post positivism, constructionism or interpretivism) agree with the methodology?

- Which methodology, strategy or plan of action (e.g. experimental research, survey research, ethnography or phenomenology) links the methods to the desired outcome?

- Which methods, techniques and procedures (e.g. questionnaires, interviews, focus groups, etc.) are involved in data collection and analyses?
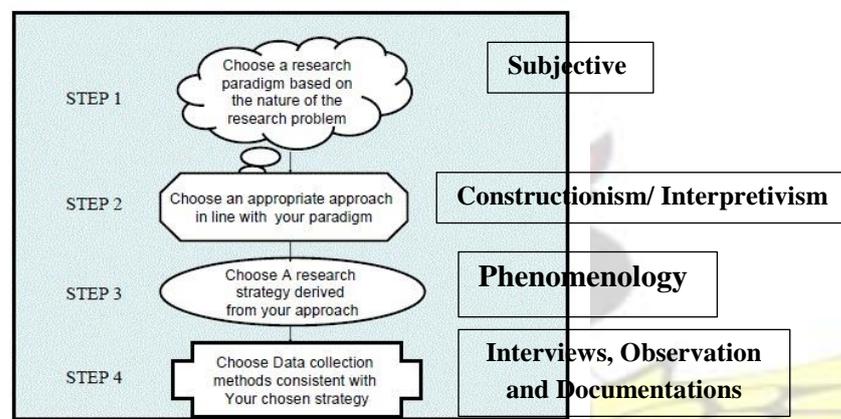
Figure 3.2: Research Design framework

My study delved into a phenomenon – that the innovation of ubiquitous smartphone photography is an issue not only within the borders of advanced nations, but is also catching up with developing countries including Ghana and this is as a result of globalized technological convergence (Murphy, 2010). The study considered the kinds of visual communication activities produced by smartphone within the spheres of digital photography. The study also explored how it is affecting the "traditional" digital photography and what are the lived experiences of members of the society who are fascinated about by the phenomenon of smartphone photography were and finally, the ramification of the phenomenon.

As intimated by Nieuwenhuis (2007), the research design describes the "logical structure" or "plan" outlining "the underlying philosophical assumptions to specifying

the selection of respondents" (Appiah, 2014), "the approach to data gathering, the instrument and the techniques employed as well as data analysis strategy"(Nieuwenhuis, 2007b:70).

Kothari (2004) explains that finding answers to research problems require preparation of the "research design". This preparation includes "decisions regarding "what", "where", "when", "how" which precedes research questions. Kothari describes research design as the arrangement of conditions for collection and analysis of data. Agreeing with Nieuwenhuis (2007) that research design is a "logical structure" Kothari says, research design is the "conceptual structure" within which research is built; it constitutes the blueprint for the collection, measurement and analysis of data (Kothari, 2004).

Yin (2009) also suggests that, to achieve good results in research finding, the design choice should be determined by the type of research question posed. With a well thought out research design, one's intention to find answers to research problems is assured (Babbie & Mouton, 2001, p. 647). Since the study is to derive detailed understanding from participants about their "lived experiences" the qualitative approach was adopted. This resulted in inferences since meaning was induced from the qualitative data gathered. Creswell, (2003) explained vividly that in phenomenological study, where the inquirer often makes knowledge claims based primarily on constructivist perspectives, research deign that is geared towards revealing individual experiences in a natural setting is more appropriate. He further explained, the inquirer collects open-ended primary intent of developing themes from it (Creswell, 2003b).

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3.3.1 DESIGN CHOICE OF PHENOMENOLOGICAL APPROACH

Phenomenology is a research method that emphasizes the study of conscious experiences as a way of understanding the reality around us. It is based on the ideas of German philosopher Edmund Husserl in the early 20th century who believed that human experience is the source of all knowledge (Bhattacherjee, 2012).

Unlike narrative research that investigates the experiences of an individual, a phenomenological study explores and describes the meaning for "several individuals of their lived experiences" in their respective natural setting. Philosopher, Edmund Husserl propounds that the study of a "phenomenon" should focus on describing what people experience in common. Creswell, (2007) made reference to van Manen (1990) that states; "the basic purpose of phenomenology is to reduce individual experiences with a phenomenon to a description of the universal essence (a 'grasp of the very nature of the thing'), to this end, qualitative researchers identify a phenomenon which is an 'object' of human experience (van Manen, 1990, p. 163).

Moustakas (1994) states that "human experience may be phenomena such as insomnia, being left out, anger, grief …" but in the case of this reported study, the "human experiences" of smartphone photography is phenomenon. According to Creswell (2007), it is after the understanding of the lived experiences the description of the phenomenon comes. This description consists of "what" they experienced and "how" they experienced it (Moustakas, 1994 as cited in Creswell, 2007). It is imperative to understand that uncovering the reality of a phenomenology is not only by describing a raging activity, but also the world views of participants. These world views are interpreted based on the researcher's understanding hence the inductive approach to 'mediate' between the meanings of several lived experiences (van Manen, 1990, p. 26)

In phenomenology, certain key words like Describe, Experiences, Meaning, and Essence are used to encode the purpose of a study (Creswell, 2003). The choice of Phenomenological research, therefore places the study in a position to identify the "essence" of human experiences concerning a phenomenon of smartphone photography, as described by participants in a study. Nieswiadomy, (1993) asserts that the strategy adopted in Phenomenological research requires that the, researcher 'brackets' his or her own experiences in order to understand those of the participants in the study. This means experiences of participants are juxtaposed (but not related) to derive good understanding.

According to Babbie and Mouton (2001), understanding these experiences also means examining the multiple variables that are associated with qualitative research so that detailed information can be elicited (Babbie & Mouton, 2001, p.281). Dencombe (2007) as cited in Appiah, (2014) gives some of these variables which are 'observations, interviews, audio-visual material, and documents and reports'.

Interviews of participants coupled with observation of smartphone photography activities undertaken by selected participants perfectly fit the methodology needed for this exploratory research. The study therefore considered the main research question in that regard:

❖ How has the introduction of camera into smartphones affected the activities of Digital Photography in relation to visual communication?

The choice of the phenomenological research for the study plus its philosophical assumption – interpretivism, justifiably helped explored the globally recognized trend of smartphone photography in the era of technological convergence which has made most people in possession of smartphone become avid photographers.

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3.4 RESEARCH METHODOLOGY

Research methodology is usually designed to help an inquirer to think through all the steps needed to be taken, in order to ensure that research procedures are followed to their logical completion and to arrive at credible results. According to Mayer (2009) research methods span through strategic approach to gather data based on research assumptions, research design, and data collection. Unlike research design that spells out the 'logical structure' of the study, research methodology which is sometimes referred to as the "master plan" sets out the strategy or the roadmap to executing the research task. In this vein, it describes the "master plan" for the study. Babbie and Mouton (2001) refers to research methodology as "methods, techniques, and procedures structured out for the implementation of the research design". Babbie and Mouton (2001) reiterate the need to have research design, as well as the 'underlying principles and assumptions' all in place to develop a good research methodology. In other words, research methodology 'assumes' the blueprint" of the research design.

Research methodology focuses on a way to systematically solve the research problem (Kothari, 2004). It may be understood as a science of studying how research is done scientifically. Within it are the various steps that are generally adopted by a researcher to study the research problem along with the logic behind them. It is necessary for the researcher to know not only the research methods/techniques but also the methodology. From an interpretivist paradigm, as in the case of this study, qualitative approach to gathering data becomes appropriate in line with the epistemological assumption and research strategy. The strategy adopted for this study is phenomenological research which is appropriate for inquiring into "human experience" of participants (Moustakas, 1994). The methods, techniques and data

analysis strategies employed for the study are all in accordance with a qualitative inquiry in phenomenological research.

According to Nieuwenhuis (2007 as cited in Appiah, 2014),

Qualitative research is concerned with understanding the processes and the social and cultural contexts which underlie various behavioural patterns and is mostly concerned with exploring the "why" question ... focuses on describing and understanding phenomena within their natural occurring context ... with the intention of developing an understanding of the meaning(s) imparted by the respondents.

Taking cue from the above quote, qualitative research methodology involves careful observation of participants' experiences which often include interactions with the participants in a natural setting. By this methodology which takes its root from constructivist paradigm, raw data from participants' "lived experiences" are analyzed, interpreted and presented (Teddlie & Tashakkori, 2009).

3.4.1 THE DATA COLLECTION CIRCLE

Finding answers to research problems depends on the data collection strategy. So central to this study which is human-centred research is how the data can be collected effectively. In order to minimise difficulties in the data collection and its management procedures, I took cue from Creswell's model of procedures in data management.
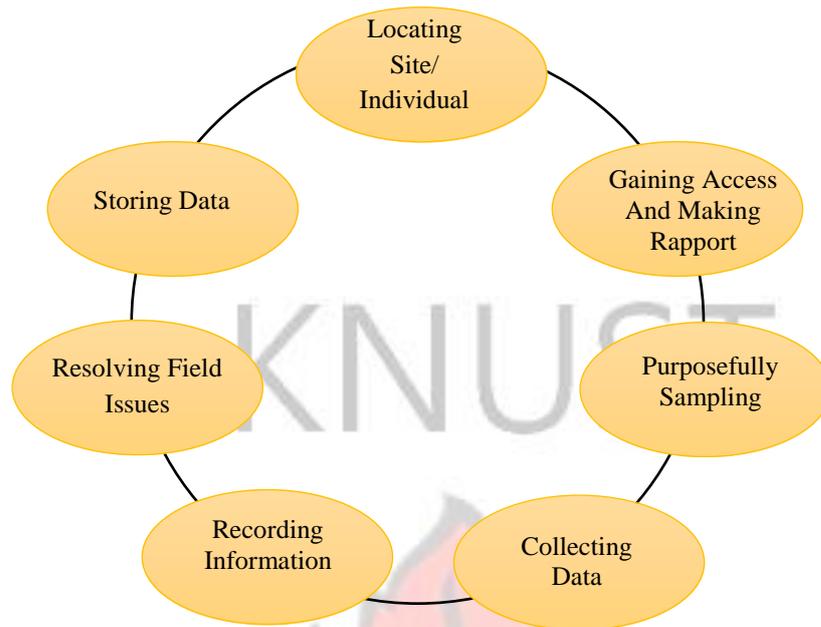
Figure 3.3: Data Collection Activities (Adopted from Creswell, 2007)

According to the Creswell, the model creates a visualization of data collection methodology and it is a "series of interrelated activities aimed at gathering good information to answer emerging research questions." As shown in Figure 3.3, a qualitative researcher engages in a series of activities in the process of collecting data. (Creswell, 2007).

The choice of the model is in consonance with the research strategy adopted for this study. The strategy adopted for the study is phenomenological research enquiring about the integration of digital camera into smartphones and its subsequent use for digital photography. To investigate this phenomenon, I began by determining who the prospective participants are and where they can be found. This was followed by establishing a rapport (Creswell, 2007) with the participants. This according to him is key to ensuring that, there is a cordial relationship in order to elicit relevant information from them with ease.

The sampling technique is the next in line with the model and it was purposeful sampling. Having determined the sampling technique, data collection follows to capture relevant information for analysis. The process continues with resolving field issues encountered and subsequently preserving the data against those who are not supposed to have access to it in accordance with ethical rules. Upon completing the full cycle of the model, the raw data was ready for the development of codes, categorization and subsequent generation of themes based on which the analysis was made.

3.4.2 RESEARCH METHOD

In the embodiment of research methodology lies research methods which have to do with the actual processes of data collection. The term research method is explained by Given (2008, p.521) as:

> *the ways in which qualitative researchers collect data to build their argument. Regardless of paradigmatic preference, all qualitative research methods have common characteristics. They are conducted in an exchange between real people. They focus on meanings as conveyed by participants in the research setting in addition to behaviour. And they take into consideration the social, cultural, and physical contexts within which individuals live, work, and interact.*

The main method employed for the study to understand the lived experiences of participants was interview. Apart from the interview, the experiences of the participants were also observed and documented audio-visual materials were also reviewed.

In a similar study undertaken by Lundberg (2013) he used phenomenological approach to inquire in to "How smartphones affect personal interactions". He combined interviews and observation to collect data. The participants for my study were purposefully selected in order find answers to the main research question;

❖ How has the introduction of camera into smartphones affected the activities of Digital Photography in relation to visual communication?

In order to gain insight into the understandings of what kind of visual communication activities people engage in and how they do it, participants' interactions becomes the key focus (Lundberg, 2013). I therefore collected data via qualitative unstructured interviews and non-participatory observations.

3.5 DATA COLLECTION

Data collection was important for a human-centred technology adoption, acceptance and usability research which sought to reveal the ontological perspective of smartphone usage, and its influence on conventional Digital Photography. Primary data for the research was obtained through unstructured interviews, observation and documentation of audio-visual materials.
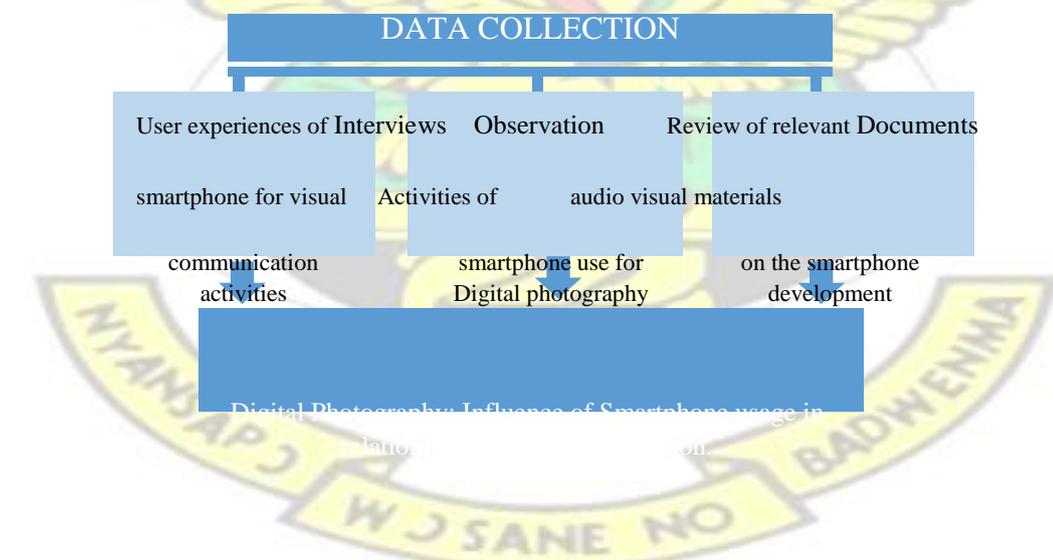
Figure 3.4: The Data collection strategy

3.5.1 INTERVIEW

Interviews are one of the data collection methods through oral quiz using a set of preplanned core questions known as interview protocol. According to (Shneiderman

and Plaisant, 2005), interviews can be very productive since the interviewer can pursue specific issues of concern that may lead to constructive suggestions.

According to Descombe (2007), interviews seem to be an attractive proposition for researchers. It is one of the appropriate data collection methods especially in phenomenological study. One characteristic of interview is its adaptability or flexibility in qualitative enquiry. Bell (2005) confirms that these adaptability or flexibility in qualitative enquiry enable the enquirer to 'follow up ideas, probe responses, and investigate motives and feelings, which the questionnaire can never do' (Appiah, 2014). As Denscombe (2007) contends:

> *When the researcher needs to gain insights into things like people's opinions, feelings, emotions and experiences, then interviews will almost certainly provide a more suitable method – a method that is attuned to the intricacy of the subject matter. To be specific, interviews – in particular in-depth interviews – lend themselves to the collection of data based on:* **opinions, feelings, emotions and experiences.** *The nature of these means that they need to be explored in depth and in detail rather than simply reported in a word or two.* (Denscombe, 2007, p. 175).

The main advantages of interview method of data collection are that:

- direct contact with the users often leads to specific, constructive suggestions; they are good at obtaining detailed information;
- few participants are needed to gather rich and detailed data (Genise, 2002; Shneiderman and Plaisant, 2005).

Depending on the need and design, interviews can be unstructured, structured, and semi-structured. Considering the research strategy adopted (Phenomenological research), unstructured interview was the most appropriate and recommended method for collecting data (Gray, 2014). According to Creswell, unstructured interviews are

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suitable for probing and finding out how 'subject' experience a phenomenon (Creswell et al., 2011). In order not to rely solely on a qualitative data collection instrument (interview) that resulted in inductive findings with some degree of biases, other methods like observation and documentation were used to triangulate the data for its validity and reliability. This is in accordance with the views of Miles and Huberman (1994) and Yin (1994) which state that, multiple instrumentation of data gathering makes data more credible than single instrumentation. It was suggested that triangulation is an authentication mechanism that is associated with an inductive research for credibility (Choudrie & Culkin, 2013). The triangulation was done sequentially not simultaneously with the interview sessions (Gray, 2014). The interview was conducted in English knowing very well that all the respondents could read, write and understand it. This was also to avoid information deficit.

3.5.1.1 INTERVIEW PROTOCOL

An interview protocol with unstructured question format was used in this study. In developing the interview protocol, the research questions were the determining factors as to which questions were to be asked. They were carefully structured in a systematic way to elicit data for analysis. One important factor considered in the designing of the protocol was the theory that was guiding the research (Appendix A). The protocol was grouped into two: Professionals and Non-professionals, to respond to the two categories of participants engaged in the study. Answers to some questions meant the subsequent question did not need to be answered, yet when asked; participants had stories to tell helping to get rich data for further analysis.

3.5.1.2 OBSERVATION

Simple observation was used where the researcher remained as a "non-participant observer" (Babbie & Mouton, 2001b). Observation was useful in identifying and

familiarising with participants for the research. Again, it helped the researcher (observer) identify previously unnoticed or ignored aspects of the research which were not captured by the other data collection strategies. This was adopted to observe the participants in their lived experiences sequential to the interview sessions. The approach comes in two fold: obtrusive and unobtrusive methods of observation.

It was observed that smartphones are frequently in the daily lives of people. Daily Records from observational protocol and recording sheet (Appendix E) were relevant in recalling vivid activities of the actors in the study.

Obtrusive method:

In the Obtrusive method, the observer engaged completely with the user. Some of the participants were engaged by simple probing questioning to understand in detail the essence or the deep meaning of their lived experiences. The process did not influence them in any way. This process took place on the day of the interview but prior to the interview session

Unobtrusive method:

In this method, the user is not engaged in any conversation. This method was massively employed in the study. The participants who were observed under this method were not questioned at all. Their reactions in relation to the use of the device were closely observed for patterns and repetitive action that seemed to suggest perceived enjoyment of the device and these were later analysed to extract useful data. There was no interruption by the observer. This method was applied to collect data from most of the non-professional in their natural settings, (Social gatherings - wedding ceremonies and homes).

In order to get more understanding of the phenomenon of smartphone photography I adopted an approach to observe beyond the participants to see what happens generally in Ghanaian society. It is instructive to note that, the practice of smartphone photography is trendy in several countries. During my educational visit to Cape Peninsula University of Technology, CPUT, Cape Town in South Africa, I observed the practice is common on the streets of the city. Even though Cape Town is not one of the cities under observation, I took the opportunity to understand the rationale in these endeavors. At the World Design Capital (WDC) Cape Town, 2014, people were seen photographing exhibited works. Perhaps as designers, they intended to develop concepts from the captured images. Plate 3.1 shows a visitor at the conference exhibition gallery capturing a moment.

Plate 3.1: Image of user experiencing smartphone photography at the WDC Cape Town 2014 (Researchers' Library)

By simple observation, smartphone photography is common in Cape Town perhaps, because the city is one of many tourist destinations in Africa and people will always want to have pictures of places as validity of being at a given location. The concept of unobtrusive observation was helpful in understanding the phenomenon the more.

Finally, since participants actions and non-action could suggest a concept more than their verbal accounts, observation was a valuable tool for data collection (Kellehear, 1993)

3.5.1.3 DOCUMENTATION

Audio–visual materials were gathered from those who had it in addition to those downloaded from the internet and analysed to have a better understanding of the new development in the area of smartphone photography. Reviews of pundits in the field of smartphone technology were also examined. Press releases from smartphone manufacturing companies were duly reviewed and relevant information derived from them to form the basis of the discussions.

3.6   POPULATION OF THE STUDY

Population is described by Babbie & Mouton, (2001) as "theoretically specified aggregation of research elements", which has to do with a larger group of people out of which sample size is determined. The population for the study consisted of people who use smartphones for digital photography within three cities in Ghana (Accra, Kumasi and Takoradi). The choice of the three cities is purposive. These cities are cosmopolitan in nature and the fact that diffusion of innovation deals with 'cultural evolution' of technology (Rogers, 2003), makes it possible for the technology to be diffused into other parts of the country.

One practical reason for determining the population of the study was that most people in these three cities converge from all parts of the ten regions of country. These people come to acquire new ideas including innovative technologies before returning to their various towns and villages in other parts of the country. In view of this, the assumption was that the use of smartphone for digital photography could stem from these cities especially Accra. This assumption could be traced to the diffusion of innovation

theory (Rogers, 2003). The theory suggests that technologies are accepted over a period of time (refer to figure 4). The researcher believes that, technology acceptance begins from the developed to undeveloped localities of social system within a period of time. Rogers, (2003) asserts that early adopters are people who are influenced by the availability of the technological devices and in most cases they are the people who can afford the cost. The early adopters are also called "change agents" (Rogers, 2003) and are responsible for transferring accepted technology to other parts of the social settings.

The population comprises mainly people who engaged in smartphone photography. The challenge of delineating the population was by grouping. According to Yin (2011), completing studies of this nature will result in some challenges arising in determining which grouping a study focuses on (Yin, 2011). To avoid some of these challenges, the population is categorised into Professional and Non-Professional. The rationale for the categorization was to contrast the themes that had emerged from the data, knowing very well that the results from the two categories could help do proper inferences but not to do any comparative analysis. Again, the categorization, also helped to shape the sampling technique.

3.6.1 SAMPLE SIZE AND SAMPLING TECHNIQUE

Unlike population which is described by Babbie & Mouton, (2001) as "theoretically specified aggregation of research elements", sample size and sampling technique refer to the total number of participants that are selected out of the population and how they are selected.

3.6.1.1 SAMPLE SIZE

Out of the population, the sample size was determined. This consists of six professional photographers purposefully selected across the three cities in Ghana and nine nonprofessional (amateur) photographers also from the same geographical positions. It is well known that, in qualitative enquiry of this nature, sample sizes cannot be the guarantee for the authenticity of the data but rather the quality of information given by the participants. According to(Holloway & Wheeler, 2002, p. 128) sample sizes in themselves do not constitute quality, this is because "guidelines" for quality are not inherent in sample size that are chosen for a study which requires interpretations of experiences. They continue to explain that "sampling goes on until saturation has been achieved". In the case of this exploratory study, I was guided by the philosophical paradigm of phenomenology to select sample size from 5 up to 25 participants (Gray, 2004).

3.6.1.2 SAMPLING TECHNIQUE

The concept of purposeful sampling was used in this qualitative research. This means that the enquirer selects participants and sites for the study because they can purposefully inform an understanding of the research problem which is central to the phenomenon of the study (Creswell, 2007). Purposeful Sampling Strategy was more appropriate for this study because users of smartphones especially those avid smartphone photographers are seen in their natural settings (in situ) and besides, the targeted participants are known. The use of smartphones for digital photography is common phenomenon within the jurisdiction of the study, therefore the users are known. However, those that could give accounts of their "lived experiences" (Teddlie & Tashakkori, 2009) in order to derive intellectual inferences are carefully chosen by first, creating rapport (Creswell, 2007), hence the purposive sampling technique.

Furthermore, the sampling technique was consistent with the type and quality of information needed.

3.6.2 PARTICIPANTS

Giorgi (2009) pointed out four criteria for qualitative research especially in phenomenological research. These criteria include: Systematic, methodical, general, and critical. This reported study was not guided by Giorgi's criteria in its totality, rather the latter two (general and critical) criteria were considered seriously in selection of participants to ensure the expected results are achieved from the study (Englander, 2012). Giorgi explained that these criteria are not for the actual choice per se, instead knowledge derived from the participants should lead to generalization and the researcher should be critical in understanding the lived experiences of the participants. By the philosophical position of this study - a paradigm of interpretivism - the best way of finding out the nature of reality out there, who is vested with the information and how to get that knowledge in respect to the phenomenon of smartphone photography becomes paramount to determining the participants.

Participants are the determined sample size of the population under investigation and their selection is key and almost the initial step in the data gathering process. There are countless number of people within the geographical locations that constitute the population. But one critical question that was addressed subject to the choice of the participants for this phenomenological research was: Does the selected participant have the experience that I am looking for (Englander, 2012)? The participants were carefully considered at the early stage where the research gap was identified in the literature. The participants were purposefully chosen based on the fact that they have "lived experiences" to share in order to understand the essence of the phenomenon. In

all, I knew, the success of the study or otherwise depended on the caliber of my participants since they are my "co- research fellows." Fifteen participants were drawn from three capital cities of Ghana namely, Accra, Kumasi and Takoradi. The participants are categorised into two: Professional and non-Professional Photographers. In each of the regions, two Professionals and three non-Professionals were purposefully selected. The aggregation of these participants resulted to six Professional photographers and nine amateur photographers.

3.6.2.1 Professional Photographers

A major difficulty in determining who a professional photographer is in today's technologically converged and contemporary society, was an obvious challenge. Nonetheless, for the purposes of this study, the 'subject' could be any person who acquired a standard of education and training or a particular knowledge and skills training necessary to render photography services to earn a living. These people, in most cases. belong to an association and are guided by a code of ethics. These categories of professionals meet the criteria to be selected as participants, because aside their professional practice as photographers, they are known to have experienced the use of smartphone for digital photography thereby contributing to the phenomenon under investigation.

3.6.2.2 Non-Professional Photographers

A similar argument can be made in respect to who a Non-Professional Photographer is but again, for the purposes of this study, amateurs are referred to as NonProfessional Photographers. Technological evolution with the development of cheaper, easier-to-use digital cameras and smartphones brought about a reduction of the gap between amateur and professional photographers. In spite of the reduction in the gap, there

always exist some differences between the capabilities of a professional and amateur. This meant that the categories of these participants (Non-professionals) are either avid photographers or any member of the social system who had delight in experiencing smartphone photography.

3.7 DATA ANALYSIS

Data analysis is always the 'screen' through which raw data is channelled in order to extract relevant understanding leading to inferences. It helps transform the raw data from the field into a set of information that can be relied on for conclusion. Data analysis is described by Corbin and Strauss (1990) and Miles and Huberman (1994) as important to be considered at the beginning of the study so as to direct the next interview and observations toward sources that are more useful for addressing the research questions (Nunoo, 2013).

This section, upon following the 'logical structure' for gathering the data using phenomenological research approach, opens the way to begin the analysis. By the philosophical position set out for the study, the qualitative data analysis of interviews, observations and documents form the basis for the obtained results. The methods as outlined in the research design (logical structure) focuses on the semi-structured interviews with the two categories of participants: Professionals and nonprofessional (amateurs) photographers in addition to critically analyzing contents of some selected documentations on the integration of camera into smartphone and subsequent use for digital photography. The main aim of the research was to explore the impact of smartphone activities in the 'face' of traditional digital photography. The task required critical analysis of participants' immersed inputs that shaped the understanding of the 'lived experiences' of smartphone photography that was explored.

To start with, the raw interview data were disintegrated into codes and categories. The qualitative description of the interviews generated 242 codes. These codes were keywords or phrases derived based on the responses from the 15 participants both professional and nonprofessional photographers under investigation on what accounts for the ubiquitous use of smartphone for digital photography. In developing the codes out of the responses of the interviewees, the research was guided by the objective that stems from philosophical assumptions of phenomenology of the study and individual experiences (Creswell, 2007) so as to be able to arrive at appropriate categories and themes. Out of the codes, 72 categories were chosen and three themes arrived at on which the analysis was made.

An exploratory study of this nature requires phenomenological data analysis steps (Moustakas, 1994; Polkinghorne, 1989) to preparing for thematic analysis so that the reality claims put up by the researcher could be established at the long run (Creswell, 2007). In view of that, and to be in a better position to make meanings from the raw data, the transcription of interview responses was critically looked into for significant statements which involve highlighting of sentences that provide clue to arriving at an understanding of how the participants experienced the phenomenon. Moustakas (1994) calls this step 'horizonalization'. Horizonalization also known as Horizontalization is a phenomenological data analysis steps which simply means identifying clues, significant statements, quotes, demeanors from data that provide an understanding into participants lived experiences of a phenomenon. Clusters of meanings are developed from these statements forming the basis for the thematic analysis. The process involved laying out of all data emerging from the field for examination and treating the data as having equal weight.

In all these, there was regular reference to the field notes that were taken during the interview sessions, which also formed the ground onto which the themes were arrived at. This process provided a mechanism by which the perspective of the researcher could be recalled from field memo to either affirm a concept of research direction or facilitate an understanding of some relevant ideas within the course of the research. Qualitative research is an 'evolutionary journey' (Strauss & Corbin, 1998), this meant that the research direction could change based on emerging concepts and different ideas could popped up in the data which was really what transpired. With the help of the memoing, the researcher developed minor themes and major themes for the discussions in consonance with best qualitative research practices (Birks, Chapman, & Francis, 2008; Strauss & Corbin, 1998).

3.7.1 VALIDITY

Qualitative research requires validation of results from data for authentication. The researcher ensures that findings from the research confirmed data collected by following the suggestions of Maxwell, (2011). For instance, participant validation reduced misinterpretation of what they report on during interview sessions to the barest minimum. Validation strategies ensured 'trustworthiness' and clear the tendency of doubts associated with qualitative exploratory studies (Patton & Cochran, 2007).

Triangulation is one strategy used for increasing validity of findings, and in this study, conscious efforts were considered to validate the findings which had to do with deliberately seeking evidence through other methods to ensure reliability. This strategy was in accordance with Patton and Cochran's example as outlined in their article which states that "if you have done interviews and focus groups, compare the findings from each. If they coincide, that strengthens our faith in having identified important issues. Remember, though, that people talk about things very differently in

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different contexts: any differences you find are an important source of data in themselves" (Patton & Cochran, 2007). As a result of that, participants were observed closely during the interview session to identify their demeanour as they responded to the semi-structured quizzes. This approach helped to confirm the validity of their stories.

Yin (2011), advocates for measures to be put in place to strengthen the validity of the findings and these measures should be incorporated into the research design. This helps the enquirer to be sure of data credibility.

The issue of biases from both the inquirer and the participants were not overlooked.

In addition, the issues of "trustworthiness," "authenticity," and "credibility" (Creswell & Miller, 2000; Lincoln & Guba, 2000) which were highly debated by (Patton & Cochran, 2007) were followed. For instance, in most of the interview sessions, the participants were asked based on their consent to demonstrate how they engage in smartphone photography. They obliged without hesitation and illustrated their lived experiences which also show that they were not coerced. Participants were observed attentively and observed with keen interest with the theory guiding the study in mind.

During the study, the theory of Diffusion of Innovation, (DoI) by Rogers, (2003) and Technology acceptance model Davies (1989) were carefully considered and used as a "yard stick" to ensure that the information put out by the participants conform with them since this exploratory study is being "driven" on the premise of these two philosophical underpinnings.

3.7.2 RELIABILITY

Reliability in qualitative research refers to "the stability of responses to multiple coders of data sets" (Creswell, 2007). The researcher ensured that questions posed to

smartphone users both professionals and non-professionals in the field of digital photography were to their understanding to elicit reliable data from them. The issue of language barrier was dealt with to avoid information deficit from participants that could subsequently, lead to unreliable information. For example, the interview was conducted in English as stated in section 3.4.2.2 to avoid information deficit. Based on the strategies of Easterby-Smith, *et al*., (2008) interview items were subjected for scrutiny with the help of competent scholars, to ensure reliable data.

3.7.3 TRANSFERABILITY

Generalization is inevitable in phenomenological research of this kind. However, in qualitative methods the concern often raised by critical minds in the cycles of academia is applying the outcomes to a wider population (Easterby-Smith et al, 2008). A far more difficult scenario is to prove that data is well triangulated, the findings are credible and conclusions are valid such that the results can be generalized. Transferability of findings to other geographical locations depend on time and context (Guba & Lincoln, 1982). There are cogent arguments put forth by researchers regarding generalization. Cecilia and Niklas (2014) made a unique reference to concerns raised by Shenton in their article *"seeing the world through a camera lens: Introducing the 'Expert-Amateur' photographer"*. Shenton argues that "the results of a qualitative study must be understood within the context of the particular characteristics of the organisation or organisations and, perhaps, geographical area in which the fieldwork was carried out. In order to assess the extent to which findings may be true of people in other settings, similar projects employing the same methods but conducted in different environments could well be of great value" (Cecilia & Niklas, 2014). On the contrary, Guba and Lincoln (1982) believe "generalizations are impossible since phenomena are neither time- nor context-free".

Findings from this study did not only revealed some clarity on specific field of the research but also demonstrated how universal the phenomenon of smartphone photography is in relation to visual communication; at least within the Ghanaian context. For this study, the researcher is not in a rush to generalize the findings due to the concern pushed forth by Guba and Lincoln (1982) in connection with "time" and "context". Rather, there are inferences and recommendation for further studies in this ever changing technologically converged world, which empirically may not be contested.

3.7.4 ETHICAL CONSIDERATIONS

Research is unavoidably rife with dialectics: the researcher/researched; emic/etic; and subjectivity/objectivity. Human-centred research conducted by anyone and anywhere (Creswell et al., 2011) requires deep ethical adherence and considerations (Cooper & Schindler, 2008). In view of these, the following ethical dimensions were considered: informed consent, which meant the despondence in the research will be voluntary participation, and their anonymity and confidentiality assured. In addition, the stated ethical considerations were adhered to throughout the study as stated by (Bell, 2005). All Participants had their independence to express their opinion on the subject matter and were not coerced by the researcher in order to elicit valid information.

In the case of Professional bodies in the media fraternity, written permission was administered to them for the data collection (Appendix C) but for non-professional bodies like amateur photographers, rapport was created and after a few moments of engagement they consented to give information willingly. None of the participants were coerced to endorse the consent form. Any other individual user of camera phones that is captured within the sampled population was asked to give oral consent. The negotiation for the consents was recorded on tape for administrative purposes.

During the data collection, participation/respondents were given the freedom to discontinue their engagement in the data gathering process any time they wished to without having to suffer any consequences (Bhattacherjee, 2012). All participants "were assured of confidentiality" (Kozinets, 2002). This was strictly adhered to by reporting data as whole but not by disclosing identity of individual participants. The data gathered was safeguarded to protect the anonymity of the participants and to avoid the content of the data to be used for any other purposes apart from the proposed research.

CHAPTER FOUR RESULTS AND DISCUSSIONS

4.1 INTRODUCTION

This chapter cataloged the structure of the reports on the raw data, its presentation and the analysis and subsequent interpretation of the findings. The result of these findings stemmed from coding of the raw data, followed by categorization and eventually developing themes. The analysis of the data comes in two fold: a thematic analysis of interviews and observations, and documents (content analysis of audio visual materials) in consonance with the theoretical perspective that underpins the study. The analysis attempts to answer the various research questions:

- ❖ **How has the introduction of camera into smartphones affected the activities of Digital Photography in relation to visual communication?**
  a. What are the user experiences of smartphone for visual communication activities?

b. How have the technologies (both native and third-party apps) permitted the easy use of smartphone?

c. What is/are the implication of DSLRs with regards to the innovative visual communication activities on the use of smartphones?

The aim was to explore the impact of smartphone activists as it influences traditional digital photography in relation to visual communication. The technologies that necessitate this phenomenon are also pointed out for discussion. In doing so, the study was to establish whether the DSLRs have reached its "dead end" This was against the fact that smartphone photography is pervasive, ubiquitous and trendy in the midst of professional digital photography practice. The results are captured in three themes as illustrated in (figure 4.1). This follows a rigorous data preparation prior to coding and categorization for the thematic analysis. The technique of horizonalisation was relied upon to help develop the themes for the analysis. The concluding part of the data preparation leading to the formation of themes are captured
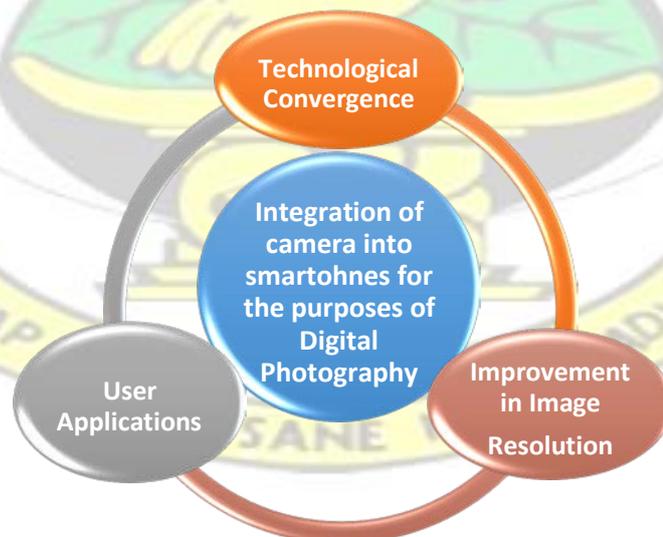
Figure 4.1: Diagram of themes generated from qualitative data analysis of interviews

4.2 DATA PRESENTATION AND DISCUSSION

In this section, the findings are presented and discussed thoroughly after analyzing the raw data in order to establish the knowledge claims set out in chapter one of this document. The thematic analysis adopted also established relevant relationships or patterns that existed in the use of smartphones for digital photography in relation to visual communication. The inconsistencies and nonaligned perspectives of the participants are also acknowledged accordingly. These discussions are intended to find answers to the knowledge claim position which were structured into the following research sub-questions:

a. What are the user experiences of smartphone for visual communication activities?

b. How have the technologies (both native and third-party apps) permitted the easy use of smartphone?

c. What is/are the implication of DSLRs with regards to the innovative visual communication activities on the use of smartphones?

In all, three themes were developed as shown in the diagram of themes Figure 13 and each addresses a sub-question which finds answers to the main research question: ***How has the introduction of camera into smartphones affected the activities of traditional Digital Photography in relation to visual communication?*** By this question, the study focused on only the integration of camera into smartphones for the purposes of Digital Photography.

The themes that were developed from the basis of the analysis are as follows:

a. *Theme one: Technological Convergence*

b. *Theme two: User applications*

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c. ***Theme three: Improvement in Image Resolution***

4.2.1 INTERVIEWS DATA

The interview, as stated in (section **3.4.2.2**) was appropriate and probably the most effective method in obtaining good understanding of lived experiences of the purposeful fully selected participants who have engaged in the use of smartphone for digital photography. The responses from this phenomenological research reveal thought provoking argument between pseudonym participants categorized into two. The stunning experiences of both professional and non-professionals on the use of smartphone would have been difficult to grasp with only observation, or by only administering questionnaire for statistical deductions. In spite of all these, in respect to smartphone photography, there exists a plethora of perceptions for and against its use. The responses were elicited through unstructured sets of questions as indicated in (Appendix A).

4.2.1.1 THEME ONE: TECHNOLOGICAL CONVERGENCE

The issue of technological convergence is a global phenomenon and has multi-faceted dimensions with regards to the advancements in visual communication for which smartphone photography thrives. The integration of digital camera into smartphones like other devices is a typical example of technological convergence. As Rouse, (2005) puts it, convergence is "increasingly prevalent in the IT world" There is a convergence whenever two or more different technologies are embedded in a "single device". Fowler (2010) also contends that:

> *Convergence has come to mean a moving towards the use of one medium as opposed to many. There are many drivers for convergence, but perhaps the most significant is a vision of the future: a more elegant world where everything is simpler. (Fowler, 2002).*

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The first theme is developed to address the first research question: ***What are the user experiences of smartphone for visual communication activities?*** Research reveals that the use of smartphone for digital photography is a preferred convenience in that the participants express their delight in the technology and the evolution of the 'fifth moment' (Cruz & Meyer, 2012, p. 213) which brought the opportunity for people to become avid photographers. Findings from this study show lots of inductive reasoning comparable to other literature.

The impact of smartphone photography on the traditional digital photography also showed prominently. Preferred convenience associated with the emerged technology which could be a positive impact was what the minor theme revealed: *perceived ease of use* (PEOU) and *perceived usefulness* (PU). Apparently, the supporting framework used in the study coincidentally speaks to PEOU and PU which takes its root from the Technology Acceptance Model (Davis, 1989). As a 'behavioural Intention (BI)' the participants contended that there are negative sides of the smartphone used for photography and this will be discussed in subsequent sessions.

Just like other studies done in other jurisdictions, the results of this study revealed that the usage of smartphones is spreading among the younger generation (Grimm, 2001; Curry, 2001, Wireless Phone Reliance, 2001) cited in (Addo, 2013). Even though this study is not drawing its strength from the demography of people using smartphone for photography, the data revealed similar phenomenon where young people were observed using the device for photography. It was noted during the study that participants were delighted to have had camera integrated into smartphones and this made visual communication transmission possible in real life due to the internet connectivity. This is seen in one of the respondents' comment:

If you want to communicate in real life, use smartphone with some data credit…fast! fast! I chat a lot with friends, business colleagues and even more importantly, with clients who expect my presence but maybe I cannot be there so I video chat... It is convenient, reliable and …had it not been camera on the phone …Apart from the video chat, images are easily transferred either by blue tooth or via internet **[PRO 5]**

I remember the first time I WhatsApped a friend I had not seen for a long time and instantly she replied. I was so happy to have seen her photographs that I requested for… as for profile picture, it's always staring at you. What amazes me is the technology with the smartphone is that, you take photographs inbetween chatting especially if you want the person at the receiving end to visualize something from you. If only you have internet, these action happen in split seconds… [AM8]

Technological convergence is the "coming together of two or more distinct entities or phenomena" and has accounted for the rapid changing of the IT world (Rouse, 2005). The study confirms the view held by Rouse that smartphone is a typical example of a converged technology which has a prevalent IT configuration. **PRO 1,** a communication designer who has been teaching visual communication in the University of Science and Technology (KNUST) for over 25 years, believes technology adoption and acceptance (Davis, 1989) is something that is affecting all spheres of the social life. He however, shared his views on technology convergence with the following remarks:

[...] you know, all these kind of things. Now, because of the digital movement [...], this idea of digitization is the biggest breakthrough in smartphone technology. Now, all these devices are synchronized. It's a universal application. From a computer, to a TV, to –you can watch on any TV- you can hook your camera to a TV and you only have big, large images of the things you shot. We have Clock, Radio, Microphone, Recorder, Telephone, PDAs and now digital camera. So I think we are at a point where everything is converging. As I said this is one of the biggest development in the history as well as the evolution of digital photography **[PRO 1].**

It is interesting to note that the professional photographer participants engaged in the study did acknowledge smartphone contributions to digital photography. By inference, smartphone is augmenting the use of DSLRs as a well-known digital photography tool. It is the view of the professionals that smartphones will continue to remain smartphones and DSLRs will also remain DSLRs. The study established that so long

as high budget production is concerned and more also highly professional work is concerned, DSLRs will be preferred to the smartphone. What is striking is that they are quick to acknowledge however that, the smartphone camera has come of 'age' and could be relied upon for some casual photo taking activities or in short, augmenting the DSLRs. The following remarks explained the contention expressed by the same Communication Designer:

> *… what we should know is that technology… you have to accept it as it is or you can see it as an enemy but this is […] In terms of the smartphone unlike the DSLR, has Wi-Fi. You can shoot and send instantly via internet […] you have to be in touch with our families and clients and the time that you go out to a location for a client for a shoot you want to do with the DSLR but then the client is waiting for you somewhere for you to show him the location so you put on the smartphone and send it to him on WhatsApp [PRO 1].*

There are issues of skepticism in connection with smartphone photography as a technologically converged phenomenon. This was in support with the view expressed by non-professionals whose emphatic suggestions in the interview reveal that smartphones are "powerful" 21st century devices when it comes to Information Technology and Communication (ICT) that has great technological influence on many aspects of the social life of people. Others also believe that had it not been the introduction of smartphone photography into the social systems, the culture of "selfies" and other instantaneous photo-taking tendencies would have been absent in the socio-cultural phenomenon. The comment by one of the participants below affirm their position:

Yea […] now, lo-looking at the picture quality, and err…the portability of smartphones- everybody's using it-instead of calling for the traditional photographers. Because, if I have my phone, I can easily give it to anybody to take a photograph, and I have it readily available on my phone [AM1]. There were some casual comments which lend credence to the suggestion that smartphone use for photography is in competition with DSLRs. Some comments include:

- *"smartphones images…sales of the device are increasing by the day; people are being recommended to buy smartphones instead of DSLRs";*
- *"I think it's pretty easy to use compared to that bulky type of…."*
- *"am not sure there are Wi-Fi facilities on the professional camera"*
- *"Look! I have good video recordings and clear sound quality...ok"*
- *"smartphone photography is all over every social gathering…"*

Perhaps these comments are the true reflections of what was suggested by some professionals during the study. At public functions, the phenomenon to see plethora of people with smartphone at their arm-length crisscrossing professional photographers to capture moments of events are becoming a nuisance. This assertion was expressed by some of the professionals who were interviewed during the study. The following is the lamentation of one of the interviewees:

> *[…] what is annoying is the fact that you see these people holding smartphone everywhere interfering with my work. Sometimes, you are compelled to push them away in other to have your peace you know […]. It has become a culture and you cannot help but to live with it. I with this practice could be checked somehow else… it could create unrepairable damage to our profession one day […']* **[PRO 3].**

Mobile visual communication as expressed by Harsha et al., (2011) in recent times deal with the data sharing using innovative approach to capture and distribute to people or organization by virtue of technological convergence (Addo, 2013) People consider smartphone photography as a medium to publish their visuals online. The convergence of the smartphone (Murphy, 2010; Rouse, 2005) supports that and the fact that the device which is seen "as an extension of hand" (Mäenpää 2000; Oksman & Rautiainen 2003a; Oksman and Rautiainen 2003b), provides the capabilities. Previous studies show how smartphone is turning every person holding smartphone into avid photographers or street reporters. Addo (2013) suggests that, 'Mobile visual communication has shown its power for collective activities as well as on individual life'.

This study agrees with Addo (2013) on how individuals indulge in the use of smartphone for reporting. The following comments states a position

> *[…] they provide key visuals in terms of reporting a story and taking photos [of] family out and trying to stay on the […] because when I go out to shoot a story and the story is a whole […] environment people turn to have a little resistance towards the camera […] what are you doing in the pictures […] it looks like a tool that is not intimidating and maybe you will be able to take pictures and record what is happening […] evidence to be given […] as a*

family day out and…it easy to color yourself and take pictures and not be so much worried about people harassing you when you use […] **[PRO 1].**

The study however identified various smartphone photography activities that are predominant in Ghana when it comes to visual communication. These activities include:

- Selfies/ personal photography
- Voyeurism
- Surreptitious photography
- Citizen Journalism
- Social media image circulation.
- Bar code scanning

Even though the study is not finding the frequency of smartphone use or which activities dominate users' preferences, the results suggest most of the activities undertaken by Ghanaians centred on 'selfies' (person photography). In 2014, a research conducted by Katie Warfield in Kwantlen Polytechnic University also points to the use of smartphones for 'selfies'. The major findings from his study revealed "the selfie does remind us of old-fashioned amateur photography and therefore to the family album, the nostalgic childhood images". Selfie also reminds us of selfportraiture. Warfield's study also revealed young women to have been the category of people with the phenomenon of 'selfie' (Warfield, 2014).

Selfie or what is academically referred to as personal photography is seen as one of the main activities of smartphones in Ghana according to the research. Almost all the participants in this reported study confirmed experiencing the phenomenon in one way or the other. During the interviews, one participant told me prior to the commencement

of the interview session, she had taken a 'selfie'. The following comments attest to that:

> *… I had done selfie this morning around 7:45am before leaving home. Selfie reminds me of myself ok… it's like, with the mirror, as soon as you take your face…out of the mirror…there's no memory of your face or yourself any longer …but with the smart phone, after you have taken a picture, you could go back and look at it. And see how you actually look at this minute. So the mirror one is like temporal something… I enjoy selfies. Can we take one together she asked? [AM5]*

> *Selfie at locations show evidence of being there. It serves as memory of oneself and it also provides self-confidence in people. To selfie mean to acknowledge and document the handy work of God. Doing selfie is easy and stress free because smartphones are easy to use and more importantly, am able to see myself instantly… [AM9]*

These opinions of smartphone users point to what happens when people adopt and accept technology. TAM, by Davies (1989) explained that people will be drawn to new innovation once it provides perceived usefulness and perceived ease of use. From all indications, the users of smartphones experience these attributes that Davies talked about.

The convergence of technology which made it possible for digital camera to be integrated into cellphones, is new in contemporary photography. Smartphone photography is democratizing design. It is democratizing television broadcasting. Digital cameras are now being integrated into so many devices like pens, goggles, wrist watches, buttons and many tinier gadgets. **[PRO1].**

The issue of security risks also came up strongly as a result of technological convergence of smartphone for digital photography. Human rights infringement like voyeurism is common with the use of smartphone photography. As Ku (2005) asserts:

The unique threat caused by camera phones is the marriage of surreptitious photography matched with the instantaneous ability to transfer the images worldwide through the Internet. Camera phones give any individual, not just the press, police, or paparazzi, the discrete ability to simultaneously capture, store, and disseminate images and videos of others (Ku, 2005, p. 697).

Smartphone cameras like other technologically converged devices such as pens, Goggles, and wristwatches including those devices with hidden cameras have the potential of recording high-resolution motion sequences and still images. Surreptitious Photography (secret filming) is associated with smartphone photography (Ku, 2005). The ergonomics to the device is such that whenever the phone is held in the hand, people who fall victim are unaware of secret recording that takes place because one cannot tell when a phone held in hand is being used for the purpose of texting or for filming.

This is not surprising because surveys conducted by individuals and institutions including an article published by Lars Rehm, on the 4th of July, 2014. Tilting "*Highresolution smartphone camera may pose security risk*" *prove this.* In that study, Rehm, identified a new smartphone called Oppo N1 (plate 4.1) that has "the current generation of high-end sensor resolutions" which until then could only be found in DSLRs. The article explained that not only does the main (rear) camera module provides high 'megapixel counts', but the front camera usually used for selfie (personal photography) and 'video chat' also offers acceptably sharp results (Rehm, 2014).

Plate 4.4: Oppo N1 "tiltable 13 mega pixel Camera" (Rehm, 2014).

But the improvement in the smartphone camera is not the issue, rather, the ergonomic of the device coupled with the fact that it has "tiltable 13MP camera" and customized app running on the phone. The swivel head of the camera phone, allows someone to remotely have access to the users' screen and capture the screen reflection in the eyes of the users allowing intruders to view the content of displays. The captured image was sharp. The research that brought this development to light was carried out by Technical University Berlin and Telekom Innovation. The findings of the research according to Rehm also reiterates that high resolution plus high megapixel offers detailed result, but in the same vein, 'pose a risk to user's privacy' resulting to capturing relevant '*personal information*' for instance *'when entering passwords*. The article concludes that, 'The *results were even better with users wearing glasses, allowing for the recording of key entries that were made on the touchscreen*' (Rehm, 2014)

A judicial corruption exposé by an investigative journalist in Ghana, Anas Aremeyaw Anas (Joy Fm, 2015) was possible by the use of hidden digital cameras. The revelation shows the power of integrating digital cameras into other devices as technology converges in recent times. This also means visuals or audio-visual communications

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have taken a new dimension in the media domain and that, the phenomenon of using other technological converged devices including smartphones, not DSLRs for visual communications will be a raging one with the coming decades.

In effect, people experience smartphone photography for visual communication because the device is portable, easy to use, there is personal fulfilment in using it. Smartphone photography creates self-identity of users. It is interconnecting relationships and bringing people much closer than before and this was as a result of technological convergence.

4.2.1.2 THEME TWO: USER APPLICATIONS

The second theme was developed to address research question two: *How have the technologies (both native and third-party apps) permitted the easy use of smartphone?* Smartphones run on two types of applications: the operating system (OS) application and the user or third-party application. Apart from the native application that allows the phone to run on an operating system like android and apple OS, features on the phone like the digital camera also run on developed technologies. There are user applications that also allow the camera to function in such a way that it persuades people to use it with much ease and with greater enhancement. The study, in spite of all these, looked at the role user application played in the activities of smartphone photography in relation to visual communication.

Indeed, the study revealed the phenomenon of smartphone photography thrives more due to the availability of numerous innovative user applications on both google play stores for android phones and Apple stores for iPhones. Most of the user apps employed by the participants are WhatsApp, Facebook. You tube and Instagram,

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camera 360 Pinterest. These Apps are used to share smartphone images, scanned images or even images stored on computer which is copied onto the phone via internet to friends and families.

The research identified one particular user software that smartphone photographers use to enhance their pictures. There are a lot of editing Apps that actually allow the images to be edited with the phone, like brightness, contrast and other minor editing. This capability of the phone is contributing significantly to the revolution of smartphone photography. The remark made by *[PRO3] and [AM4] attest to the findings.*

> *… yes, there's one particular App that I love so much- Camera 360. It smoothens the skin, making the subject look very nice. And with the –these days, there are filters … after you take the picture, the smart phone is able to give the picture a tone or different color temperature which…. It makes it a bit unique…so people are after that trend now. [PRO3]*

> *I like camera 360. I can use it to polish or edit my pix before post them on the internet. I don't think this is possible some years ago…thanks to technology [AM4]*

That the social media is driving smartphone photography is an understatement. All the respondents who participated in this research have a lived experience in one way or the other in terms of social media image circulation. Literature reveals that within three months after the introduction of Instagram Apps, over 80 million users were collected around the world (Instagram Press Center, 2013). Social networking is a new phenomenon of visual communication via internet connectivity platforms (Multisilta & Milrad, 2009; Okabe D., 2004). Visual images from smartphones instantaneously are transferred to friends and family members through the engagement of several large social networking tools and sites. Examples of these sites are YouTube, Facebook, Flickr, Vibe and WhatsApp which are all internet dependent platforms.

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This study suggests similar circumstances where images captured by smartphones are published on the Social media platform and this is seen to be revolutionalising digital photography practice. For example, one participant remarked:

> *… Yes, I post images on Social media. Right now, I am operating a Facebook page, where I have my shots there. So the client can easily get access to my pictures. Why a Facebook page is very important is-is that, with a platform where people are able to connect to…other family members, friends, business partners, and all important people all over the world…getting a Facebook page becomes very important- because the person can get access to you within his platform. You will not need to log on to a different website, to actually access your photography. So the Facebook page has become-let's say, a necessity these days…[PRO2]*

Beyond the social media as a conduit for sharing and transferring of smartphone images, other methods are available for sharing the images. One can either do that by means of wireless connectivity via Bluetooth or cable connectivity.

4.2.1.3 THEME THREE: AN IMPROVEMENT IN IMAGE RESOLUTION

The third theme was developed to address research question three: ***What kind of innovative visual communication activities necessitate the ubiquitous use of smartphone and whether the smartphones are in competition with DSLRs?*** The study revealed generally an improvement in the image resolution of the smartphone camera to be one other factor necessitating increasing use of the device for photography. Image resolution as discussed in **section 2.5.2** is one of the determining factors in the quality of digital image.

According to Dolcourt (2013), image resolution is not the only determining factor of better image quality. She admits that other contributing factors like sensor size and type and pixels play significant role in the quality of the smartphone image. In spite of all these, this reported research revealed that some participants are oblivious to these factors that make quality images. However, most of them reconciled the fact that these

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factors account for the decision to adopt the device for photography since its image quality keeps improving by the day. One could understand these conclusions reached by some of the participants, mostly the non-professional ones. The following explained the view of a participant:

> *[…] does it matter which device is producing the image, or … does it matter the quality or the so called resolution. When it comes to visual communication, I do not believe that image quality should be driving the choice of device, rather what can capture the moment that needs to be documented for records purposes. I always believe that smartphones are closer to the hand that other capture devices and everybody is holding one... How many people considers image quality before capturing digital photographs? I must say that even if it is important, for the sake image quality, it is not for visual communication…* ***[AM2]***

A research conducted by InfoTrends and Snapfish in 2006, also predicts that many consumers will prefer cameraphone to be their everyday camera (Rickard, 2004) just like what **AM2** believes. The InfoTrends result did not indicate whether image quality was a factor when people choose smartphones for visual communication rather, it focuses on the camera phone being the preferred choice for their lifestyle because of its portability and internet connectivity.

Whereas, the research by InfoTrends and Snapfish focused on everyday use of the smartphones, my study identified among others, the increasing development of megapixels of integrated camera into smartphones as it enhances chances of using the device in everyday lives of the social system. The following views affirm the point:

> *Cameras and phones started with images which were in kilobytes but now there are phones that can shoot over 28 megabytes. They provide key visuals in terms of reporting a story and taking a photos family and friends…* ***[PRO3]***

> *…Ghanaians are purchasing phones based on prestige not based on ehm …so, holding the latest smart phone, makes you the latest-you know, the biggest boy in town, and all that. But yes, smartphones over the years have improved image quality that could be driving them crazy…people are actually buying smartphones…top smart phones, which have good image quality, not because of the image quality, but because of prestige* ***[PRO3]***

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On the same theme of ***an improvement in image resolution***, views expressed by some of the professionals indicate that the integration of camera into smartphone makes no difference when it comes to choice of device and image quality for better output. Whereas, the professionals see the integration as "No big deal", the non-professionals hold the view that the integration of camera into smartphone is the best thing that ever happened to technology development in photography. To the non-professionals, had it not been the incorporation of digital cameras into smartphones, photography practices will continue to remain with the skilled-acquired trained photographers as existed in the decades past.

> *... as a Pro, the smartphone pictures can be unworthy sometimes...because...of image quality, because you know you can get everything better from a different device like the DSLRs if quality is of essence [PRO5]*

This particular participant takes a strong exception on the suggestions that smartphones will cause the 'dead end' of the DSLRs. According to him, his experience in the field of digital photography suggests otherwise. The manufacturers of DSLRs are not idle on their innovative developments in digital camera productions; instead, there are updates of firmware (application) for the device, all intended to improve the capabilities of the camera.

Stating his points much clearer, *[PRO5]* asserts that whilst the smartphone giants are improving the image quality of their devices, DSLR image quality is also becoming much better than before. The following transcript bears testimony:

> *... what is the point. But the truth is, people will always hire the professional photographer to make the pictures of the events that matter and photographers are after events that matter. Okay, so, I don't think the DSLRs are being jeopardized ...in the vein, the profession is not jeopardized in any way. For*

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instance, typical example is a wedding- nobody will use a smartphone to cover a wedding. Or… an eightieth birthday…or an advertising shoot… or a video commercial […] and that's what professional photographers are actually after. With your…normal shots, you can use your smartphone, no problem…because, Ehmm...of course, you want to avoid cost and all that, and you will forego a photographer, and use your smart phone. So now, smart phone has been really helping but in the minor sector of the photography industry **[PRO3]**

It was noted that, the non-professionals understand little on the technology of the DSLRs. This was evident in their comments regarding smartphone replacing DSLRs. To them, the proliferation of high-end smartphone with high fidelity of images produced by these devices mean a lot to users and they will always choose it over the DSLRs counterpart. Notwithstanding, it is the strongest opinion of the professional that smartphone photography which has become common in our society is in no way jeopardising their profession. In the following remarks **[PRO 2]** expresses his disappointment in those who hold the view that DSLRs will soon see its 'dead' end:

[…] who says DSLRs has gotten to its dead err… as a commercial advertising photographer phones camera don't even come in at all because obviously there are few things I want to say to you…when you're shooting a commercial for a client, unless it a shoot for a phone manufacturer… much more creativity […] the issue of phone camera for commercial work usually is two over hundred […] it hardly happens…in my view there is no way smartphone will 'retire' the professional digital camera. You know…just as the manufacturers of smartphone like Samsung and the rest trying to improve the image quality of their device err … may to compete with the traditional digital camera, so do the image quality of the DSLRs keeps improving by the time […]' **[PRO 2].**

Literature reveals some pertinent issues that border on the improvements made in smartphone camera development. This has to do with the dynamic range capability of the improved image sensors that are comparable to the sensors in DSLRs. For instance, the introduction of Binary Pixel Imagers by Rambus made it possible for smartphones

to 'capture the full spectrum of a scene from the brightest highlights to the darkest shadows' (Rambus, 2015).

Despite this development, many of the smartphones do not have the newly developed capability so they are not able to contrast the brightest and the darkest weather conditions of an exposure. It is not surprising this dynamic range issue is one of the greatest concerns raised by the professional during the study. For the nonprofessionals, they do not see the relevance of dynamic range to visual communication since what they need is a photograph and they are able to achieve that regardless of data loss in highlights or dark tones of the picture. The following comment confirms the disappointment of one of the participants:

> *I have very few images…. recently, I wanted to take a picture of the…clouds...in the afternoon…okay, but the smartphone wasn't smart enough…because, when I tapped focus on the skies, the camera metered for the clouds, and left the background dark* **[PRO3]**

4.2.2 OBSERVATION

This method was subsidiary to the unstructured interviews which is the main data collections methods for the study. The observation helped to confirm the understandings that I had after listening to respondent's personal narrations of lived experiences of smartphone photography. Generally, people who own smartphones will not hesitate to indulge in some sort of photography activity.

During the World Design Capital WDC, 2014, the practice was phenomenal. Scholars were seen capturing presentation slides on their smartphones as portrayed in the Plate 4.2.

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Plate 4.2: Freezing of power point presentations slides at the WDC conference, Cape Town, 2014 (Researchers' Library)

The culture of freezing power point presentations at conferences is also becoming a phenomenon among intellectuals. With the device held facing the projected screen, one is able to capture the slides one by one as the presenter flips through the slide pages.

Indeed, some of the participants in the study also confirmed seeing others in the social system using smartphone to do all kinds of visual communicative activities including freezing of power point slides. One of the Professional photographers admits the practice is convenient, quick and smarter in the sense that one gets to have visual information in a matter of split seconds. He however, noted the ethical issues in connection with that practice, a situation where no consent will be given before capturing someone's presentation slides.

> *We had a workshop the last time and resource person made a presentation on the role of the photographer in the digital Age. I just captured the four slides that were important to me for further observations of the content since I could not have access to his document and it was clear whether he will willingly give it out upon request* **[PRO 2]***.*

At Cape Town, the experience of the innovative use of smartphone was not only felt during the conference, instead, avid photographers are seen enjoying what they do best with camera phone (Plate 4.3).

Plate 4.3: Avid Photographers at Water Front, Cape Town, 2014 (Researchers' Library).

4.2.3 DOCUMENT

Audio–visual materials were downloaded from the internet and analysed to have a better understanding of the new development in the area of smartphone photography. These materials were carefully selected so that the information needed from them could be retrieved. This was done by playing the videos on a Laptop and viewing them several times until understanding was reached about the concepts of the productions. The videos contain documentaries about the new developments in smartphone in general and improvement in the integrated digital camera in particular. Other areas of interest which the material provides include, the capabilities and the functionalities of more advanced and technologically converged smartphones of all types.

Press releases from smartphone manufacturing companies were duly reviewed and relevant information derived from them to form the basis of the discussions. Furthermore, reviews of pundits in the field of smartphone technology were also considered and analysed.

TV commercials on Ghanaian Televisions were also looked at to see if broadcasting commercials also influenced the practice of smartphone photography. The following are the commercials:

- OLX (Sell it) by Tonato.Com
- Drop that Yam by Tigo
- Yenso Nkoan by Tigo
- Vodafone X (Selfie)

4.3 SUMMARY OF DISCUSSION

The study was conducted in an academic atmosphere with the aim to find answers to pertinent research questions. Appropriate design strategy was developed and followed

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to its logical end. The gathered data was analysed and relevant information extracted to answer the questions. Emerging views from the analysis of the qualitative interview data are summarized accordingly.

The study focused on two categories of users: professionals and non-professionals and the findings show 'mixed feelings' about the influence of smartphone photography in the mainstream digital photography. Both negative and positive influences were discovered in the study. By and large, the smartphone photography has emerged and will continue to thrive in the social system regardless of the ups and the downs that are associated with it. The DSLR will also continue to hold its position as the industry's favourite when it comes to professional photography. From the findings, the professionals in one hand, refuse to accept the notion that smartphone photography has diminished the 'master' influence of Digital Single-Lens Reflex Cameras (DSLRs). Some of the professionals however, entertain a little degree of fear that maybe in future, the rapid development in technology of camera integration could cause the smartphone to 'rub shoulders' with the DSLR. I must note that these expressed opinions are in the minority. The non-professionals on the other hand are full of great enthusiasm about the phenomenon of smartphone photography. To them, it is the best thing that ever happened to photography since its beginning many centuries ago. The amateurs who form the category of non-professionals, were delighted about the introduction of digital camera into the smartphone. The analyses of their views affirm the position that the smartphone has democratized digital photography. Interestingly, this particular view was also expressed by some of the professionals.

The issues of image quality were featured prominently in the results. As noted earlier in this session, the data revealed mixed feelings about the results, especially data that

was intended to answer research question 1 and 3, such data had in most cases split views between the professionals and non-professionals. In spite of all that, the issue image quality was fascinating and tipped to have been influencing the nonprofessional users since that is the best their device could provide for them. There was acknowledgement of the fact that manufacturers are up to date on improving the resolution of the smartphone cameras (Rambus, 2015) to make it competitive in the image making device market. There are researches supporting the claim of image quality improvement including the dynamic range of the image (Dolcourt, 2013).

On the subject of smartphone photography activities in the context of visual communication, Selfie also referred to as personal photography tops other activities the study revealed. From the analysis, both categories of respondents experienced the phenomenon of selfie. It became clear that selfies alone cause the non-professionals to become avid photographers. Other activities the study revealed are:

- *Voyeurism*
- *Surreptitious photography*
- *Citizen Journalism*
- *Social media image circulation/Photo sharing.*
- *Bar code scanning*

The issue of user applications that necessitate easy use of the device for photography include Instagram, Facebook, WhatsApp and camera 360 to be the most used applications. The internet is the vehicle through which these Apps are used to share images on the various social media networks.

It was also discovered that some TV commercials also promote the use of smartphone for photography. The purpose of these commercials are explained as follows:

- **OLX (Sell it)** by Tonaton.Com is an online platform that enables owners of products to advertise their goods for sale. What one has to do is just capture the asset or the property with the smartphone and post it on the platform for prospective buyers.

- **Drop that Yam** by Tigo is a promotion that seeks to advertise the network (Tigo) and share pictures via its high speed internet facility.

- **Yenso Nkoan** by Tigo again also persuades people to patronize the network in other to win Generators and smartphones.

- **Vodafone X** (Selfie) is a Vodafone promotion on television that specifically encourage people to buy customized Vodafone smartphone with high resolution camera to do selfies.

The issues of whether or not smartphone photography is jeopardising DSLRs was thoroughly analysed. The results prove the points made by the professionals that there is no way smartphone popularity would mean the "dead end" of DSLRs.

4.4 CONCLUSION

Qualitative data of interviews observation and documentation revealed some stunning findings. The use of smartphone for photography has come as a result of technological convergence. Even though digital photography evolves and is still evolving, the emergence of smartphone photography as a new genre in the media landscape was possible simply because of integrating camera into the cellphone.

CHAPTER FIVE SUMMARY, CONCLUSION AND RECOMMENDATION

5.1 INTRODUCTION

This chapter is the conclusion of an enquiry that attempts to look at digital photography as it evolves within the framework of technological convergence. The aim of the study was to explore and understand the influence of the integration of digital camera into smartphone and subsequent use for digital photography. It is against this background that the research posed the following main question and three sub-questions:

❖ How has the introduction of camera into smartphones affected the activities of traditional Digital Photography in relation to visual communication?

a. What are the user experiences of smartphone for visual communication activities?
b. How have the technologies (both native and third-party apps) permitted the easy use of smartphone?
c. What kind of innovative visual communication activities necessitate the ubiquitous use of smartphone and whether the smartphones are in competition with DSLRs?

The research identified relevant issues within the literature that form the basis of filling knowledge gap that made the study an academic pursuit. The study is supported by relevant and appropriate theory that hitched the philosophical assumptions of the knowledge claims for the development of relevant research questions and to direct the focus of the investigation. The research methodologies and procedures adopted for the study are summarized. The researcher makes recommendations based on results and finally concludes on the study.

5.2 SUMMARY

The rationale for the study comes in two fold: practical and academic. The practical rationale: this stems from personal experiences as a professional digital photographer who for over a decade observed the phenomenon of smartphone photography as it emerges hence the quest to establish and understand the phenomenon of the practice. The academic rationale: this also stems from the gap identified in the literature about the emerged phenomenon where the use of smartphone for digital photography has become a raging activity in recent times (Janssen, 2013; Roberts, 2011). Several studies focus on the risk associated with the use of smartphones, however, not much was done in respect to the influence of the device on digital photography with particular reference to a more improved digital camera integration.

In **Chapter two**, there was supporting evidence from authors, in the review of related literature that shows the evolution of photography from the *first moment* where photography started to the *fifth moment* (Cruz & Meyer, 2012, p. 213) in which photography practice is believed to have gone beyond the use of DSLRs to the use of smartphones as a medium in communicating visually. The convergence of technology in the field of mobile devices was reviewed in line with vertical integration policies adopted by companies to eliminate some bottlenecks from the supply chain of the respective organizations like Apple and Samsung electronics. It was understood that, one of the reasons accounting for the emergence of smartphone photography was the consolidation companies' resources in the manufacturing and supply chain divisions. These move to consolidate the supply chains of companies or synergies of technologies result to some new products emerging, for instance, the integration of camera into smartphone. Surveys have proven that most smartphone buying decisions

are based on the fact that paying for phone also means paying for digital camera (Zhang, 2015).

Theoretical frameworks and models that serve as the backbone of the study were reviewed. The framework, propounded by Everett M. Rogers, Diffusion of Innovation (DoI) (2003) has certain keywords that made the understanding of the phenomenon easier within the context of this research. These are: *'Adoption'* which refers to the stage in which a technology is selected for use by an individual or an organization. *'Innovation'* is the creative use of the new technology being adopted. *'Diffusion'* refers to the stage in which the technology spreads to general use of the technology. *'Integration'* connotes a sense of acceptance, and perhaps the understanding of the technology, within the user environment.

In addition to this framework (DoI), Technology Acceptance Model (TAM) by Davis (1989) is also used for the enquiry to explore behavioural intentions of people who adopt technology. This model explains the rationale for people to adopt and accept technology for the simple reason that they gain from the perceived ease of use (PEOU) and the perceived usefulness (PU) of a technology. Other relevant topics in line with the study were accordingly reviewed.

Chapter three provided the methodological road map in tandem with theoretical perspectives that underpin the research. Critical, was the strategy adopted in answering the main research questions. The use of a qualitative approach coupled with research strategy of phenomenology was adopted for the study. Again, the strategy is in line with an interpretivism or constructivism philosophy. By this paradigm, and the fact that the knowledge claim is multiple, the choice of methods that support making

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meaning of the subjective and constructive perspectives of individuals were highly considered. Enquiries that sought to explore experiences of people or individuals for better understanding falls under the purview of subjectivism. For this reason, the data collection process and analyses follows qualitative research approach in order to conform to the established worldview. Data sources, instrumentations, data gathering and management, coding, categorization and the development of themes for analysis were all done in accordance with the research philosophy. The concluding part of this chapter discussed the credibility, validity and trustworthiness of the findings as well as ethical consideration.

Chapter four outlined the result of the findings. They are presented and discussed based on the developed themes that emerged from the disintegration of the raw data. In all, three themes emerged and form the basis for the analysis to establish the influence of smartphones photography in the face of traditional digital photography practice. The answers for the research questions depend largely on who or the caliber of person using the device; professional or non-professional. The expression of the participants' opinion was subjective and that was expected because the knowledge claims or the philosophical assumption of the study supports the fact that there is *no single reality* so far as the understanding of the phenomenon of smartphone photography and its influence on digital photography is concerned.

The aim and objectives of the study were conclusive such that the various factors that account for the phenomenon of smartphone photography were identified and discussed appropriately.

Objective 1.

Exploring user experiences of smartphone for visual communication activities. The results from the study established both negative and positive influences that are

associated with smartphone photography. The negatives border on human right infringement, a situation where people are filmed or captured without their notice. A particular reference in point is smartphone voyeurism and surreptitious photography (Ku, 2005).

On the issue of positive influences, the findings revealed people now accept themselves as who they are because of the phenomenon of selfies. Personal photography referred to as "Selfies" is the representation or the relationship between 'self' and the smartphone. Sontag (1973) explained it to mean to identify oneself in a photograph. His idea was cited in a material published by Jill, Walker Rettberg in 2014. She asserts that, 'To photograph is to appropriate the thing photographed. It means putting oneself into a certain relation to the world that feels like knowledge and, therefore, like power' (Rettberg, 2014). The article that is titled, Seeing Ourselves through Technology: How we use Selfies, blogs and wearable devices to see and shape ourselves, look at the rationale of selfie contextualising visual communication. On the scenario of 'Time lapse selfies' Jill recounts a project undertaken by an artist.

> *On 11 August 2006, Ahree Lee uploaded a video of **herself** to YouTube. Four days later, 800,000 people had watched it (Washburn 2006). The video, titled **Me**, was a time-lapse video of photos Lee had taken of **herself** every day for three years. She began the project as a graduate student in graphic design and had exhibited it at several film festivals in 2003 and 2004, even winning awards, but posting it on YouTube gave it an entirely different kind of life as the start of a new genre* (Rettberg, 2014).

Objective 2.

Exploring the technologies that permit easy use of smartphone for digital photography.

The results identify various technologies in line with user Applications both native and third-party softwares that made it easy for the activities of smartphone photography to thrive. These Apps are available to be downloaded from both play store of Andriod

device and Apple store for iPhones. The main Apps identified during the study were Instagram, Facebook, WhatsApp, You Tube, Pinterest, Tumblr, Flickr, Twitter and Camera 360.

These Apps according to the study and to the personal knowledge of the researcher are internet dependent especially for social connectivity. Social networking is a new phenomenon of visual communication via internet connectivity platforms apart from voice and text communications (Multisilta & Milrad, 2009; Okabe D., 2004). Visual images from smartphones instantaneously are transferred to friends and family members through the engagement of several large social networking tools and sites. The contributions of user application to the development and the progress of smartphone photography cannot be understated.

Objective 3.

To find out whether the ubiquitous use of smartphone for digital photography will mean the 'death' of DSLRs

The third objective set out for the research is critical in establishing whether or not the success of smartphone photography will mean the death' of Digital Single-Lens Reflex (DSLRs). Worldviews expressed by respondent, disintegrated into developing themes for the analysis hold the strongest view that, the DSLRs will not be affected in anyway. There is tremendous improvement in the development of the DSLRs over the periods which makes it difficult for the smartphone to overtake its functionality more especially the image resolution, megapixel, dynamic range, image sensor size (crop or no crop) Light sensitivity, ISO, and storage capability among others.

In spite of all these strong oppositions to the notion that DSLRs will see its 'end' as a result of smartphone photography, there are cogent reasons to believe and accept the fact that there have been tremendous updates on the integrated camera of the

smartphone. Smartphones now have 41 megapixel and advanced technology in dynamic range capability of the newly manufactured image sensors.

Integration of camera into smartphone is as a result of technological convergence. Due to that, peoples' ingenuity in the use of the camera component of the smartphone necessitates the enquiry into the influence it has on traditional digital photography. In order to understand the phenomenon of smartphone photography as a new genre in digital photography, thematic analysis was used to extract relevant perspectives of users which were purposefully chosen with the intent of understanding the essence of their lived experiences. Better understanding was reached in finding out the influence perhaps because the study was conducted in a natural setting (social gathering and homes for non-professionals and studios, offices and homes for professionals).

The contributions of these findings satisfies the rationale of the study which is filling knowledge gap and adding to the repository of knowledge; and also satisfying the curiosity of the researcher as a practicing professional digital photographer who would like to know about the unknown. It was established in the study that the most common visual communication activities engaged with using smartphone include: Personal photography popularly known as Selfie, voyeurism, Citizen Journalism, Barcode scanning, secret photography and the obvious social media image circulations.

The **last** and **final chapter** summarizes the overall research design of the study. Bases on the findings, the recommendations made are believed to be significant in providing both theoretical and practical implications to guide in future enquiry in line with visual communication, digital photography and the convergence of technology in the 21st century and beyond.

5.3   CONCLUSION

This research aims to explore the influence of smartphone on digital photography with particular focus on the integration of camera. Over the past decade, the camera phone has undergone total transformation from its core function as a portable communication device with low fidelity image quality to high fidelity image quality in recent times. Photography to a large extent has 'mesmerized worldwide masses' according to Ballenger (2014) and in this ever changing era of technology where people now use 'smartphone for visual trace everyday' via social media. This is because the smartphone can be used anywhere and anytime for visual communication and people who previously might not have engaged in photography because of the notion that it is the preserve for technically skilled personnel have the potential of taking snap shots with ease (Ballenger, 2014).

The study revealed some issues of dilemma on the part of professional photographers on the ever growing phenomenon of smartphone photography. While some believed strongly that smartphone photography will not affect or jeopardize the mainstream digital photography and that rather it is augmenting the practice instead; others also hold the view that unlike those days that you have to be trained to master photography, the situation is different due to availability of easy to use point and shoot cameras and smartphones in the system. In all of these, one variable at the center of the development is the convergence to technology that translate into image quality of smartphone.

Photography thrives on technology and if technology is evolving (Rambus, 2013) then photography must evolve, and this research shows that photography has come a long way from the first moment to the fifth moment as debated by scholars (Cruz & Meyer, 2012). The fifth moment according to Cruz and Meyer, stand for the era in which

smartphones are used for digital photography. This moment is significant to the 'lovers' of smartphone photography.

It must be noted that technology is dynamic and it is expected that the producers of all these technologies are making digital photography become less complex and more enjoyable to use. It was possible for the study to tell what revolution is expected in the capabilities of smartphones camera and Digital Single Lens Reflex Cameras (DSLRs), however, no such predictions will be made. It is important to note again that, today's research might not explain the phenomenon of tomorrow's situation very well even though some predictions could be made nonetheless, this research can only explain the phenomenon of smartphone photography in relation to visual communication as a test case this particular time. Whenever this study is relied upon for future research, the aim or the goal of the study should not be taken out of context or for granted in order to maintain the objectivity of the study and yet to be conducted one.

By this study, smartphones still remain a preferred digital camera especially high-end ones for amateurs. For professional photographers, smartphones can augment the practice but not replace DSLR which is noted for high resolution images. A much stronger case was made in response to the notion which suggests that the success of smartphone photography means the death of DSLRs. Evidence in this study reject this notion in that whilst there is ample evidence that shows exponential improvements in smartphone, DSLRs are also being improved. Finally, I must say that the results from the study found answers to the research questions posed in accordance with the objectives. The worry however, is whether the findings can be generalised.

5.4 RECOMMENDATIONS

This research was successfully conducted not to make a case for smartphones, no matter how improved their image quality is resulting from advancement in technology to be replacing DSLRs. Rather, it was to explore the integration of digital camera into smartphone and its influence on traditional digital photography in relation to visual communication. The findings make a strong case for DSLRs as not having reached their dead end as a result of the emergence of smartphones into the mainstream digital photography. The study rather indicates the coexistence of the use of these devices (Smartphones and DSLRs) for visual communication activities by the social system and this will remain for a long time considering the depth of information gathered and the findings that were derived from it. The following recommendations are therefore based on the findings from this study.

5.4.1 POLICY AND PRACTICE

Since technology is ever changing especially when it comes to digital photography, there is the need for policy guidelines to regulate the use of smartphones especially at restricted or security areas. Whenever a smartphone is held in a hand, you cannot tell whether the user is text messaging or filming /taking pictures. Security could be compromised where photography is prohibited, by simply using smartphone to freeze frames of actions of activities of restricted areas and posting them on the social media.

There are countless human rights abuses associated with the use of smartphone to film naked and private moments which has lots of security implications. Seakomo (2012) made reference to distinguished security expert, Bruce Schneier, when he asserts that, *"The future of digital systems is complexity, and complexity is the worst enemy of security" (Seakomo, 2012, p. 13)*. Seakomo himself recognized the need to be security conscious with technology adoption and acceptance more especially since mobile

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devices that are redefining user interactivity and implications. He however said: '…*mobile phones which are a kind of digital system have their future in complexity but this complexity makes them more vulnerable and hence implies increase need for security….*' *(Seakomo, 2012, p. 13).*

One critical area that needs urgent attention is the internet connectivity infrastructure on the smartphone. A survey conducted by TechRadar Pro and presented at the Mobile World Congress, (MWC 2014) indicated that *'over 37 billion new things will be connected by 2020'.* Other issues on publication at the conference that suggests the internet will remain with all converged technology also includes: 'THE INTERNET OF EVERYTHING IS HERE; as internet evolves, so will we'. This means that transferring of digital images across platforms will also remain with mobile photography. The ramification is what (Ku, 2005) pointed out in connection with human right abuses when it comes to surreptitious photography and voyeurism.

5.4.2 EDUCATOR AND DESIGNERS

The researcher recommends high-end smartphones for training students in multimedia institutions. In as much as the professional camera (DSLRs) are the preferred device for training students in Digital Photography, learning outcomes that require basic knowledge in photography could be handled with a high-end smartphone. For instance, development of photography concepts in creativity, composition and basic knowledge in digital imaging, the smartphone could be used. This recommendation is as a result of increased improvement in the image sensor of the smartphone that is making it possible to produce even High Dynamic Range (HDR) images. As a converged device, the smartphone could be used by researchers on the field for

capturing moments during observation periods, especially research on visual methodology invigorated narrative analysis (Kingsley, 2009).

Furthermore, short film makers could rely on the capabilities of advanced smartphone with an improved image sensor and image resolution to produce low budget productions. With the introduction of the *'Binary Pixel technology'* that dramatically improves image quality to a high fidelity one, the image credibility has improved tremendously. According to Rambus Inc. (2013), the development is a '*breakthrough technology that provides single-shot high dynamic range and improved low-light sensitivity in a single exposure'*.

By this introduction, there is hope for the future when it comes to the functionality of camera phones as industry 'player' can be assured that the device has come of age in the technologically convergeance process and its role in augmenting the traditional imaging devices like the DSLRs. The Rambus Company believes that:

> *As improvements are made in resolution and responsiveness, more and more consumers are using the camera functionality on their smart phone as the primary method for taking photos and capturing memories. However, high contrast scenes typical in daily life, such as bright landscapes, sunset portraits, and scenes with both sunlight and shadow, are difficult to capture with today's compact mobile sensors – the range of bright and dark details in these scenes simply exceeds the limited dynamic range of mainstream CMOS imagers (Rambus 2013).*

What professionals in the media fraternity should not do is to shy away from accepting the smartphone photography as an emerged phenomenon in our social system of endeavors. The challenges, limitations, complexities, implications and all other issues that are interconnected with mobile photography must rather be used as an advantage in the delivery of good services to clients who will at all times call on the professional for a high fidelity work of digital photography.

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5.5 FURTHER RESEARCH

This study did not provide demographic information about the users of smartphone for photography because the focus of the study was to find out user experiences of selected participants. Even though the findings are satisfactory by the standard of the objectives, new gaps emerged from the research that need to be filled. For instance, several literature suggests massive improvement in the smartphone image quality especially the introduction of a binary pixel imager that made the device capture High Dynamic Range images due to a more robust image sensor. How can these improvements in recent times be exploited to the advantage of teaching and learning of digital photography? Other related areas that require further study include:

- A quantitative research to find how much influence smartphone has over the DSLRs in percentage terms

- Exploring smartphone photography for visual methodology in remote clinics.

- Digital story telling using smartphone photography

- The extent to which smartphone photography has affected the photography business in Ghana.

- Exploring the use of smartphone as a PBL tool for teaching and learning of Visual Communication in tertiary institution

REFERENCES

Adatto, K. (2008). *PICTURE PERFECT: Life in the Age of the Photo Op* (New Editio). United Kingdom: Princeton University Press.

Addo, A. (2013). The adoption of mobile phone: How has it changed us socially? Retrieved from http://www.journalissues.org/articles/1374101588.pdf

Admin. (2014). Accra Mall Management Ban Photo Taking Inside Mall. Retrieved from http://www.spyghana.com/accra-mall-management-ban-photo-takinginside-mall/

Alvarez, S. (2015). National Geographic Expeditions. Retrieved July 23, 2015, from www.nationalgeographicexpeditions.com/expeditions/san-franciscosmartphone-photography-workshop/detail#sthash.tSW2HWqs.dpuf

Appiah, E. (2014). *An exploration of ICT for graphic design education at a public university: issues of ideation and pedagogy*. Cape Peninsula University of Technology, CPUT.

Artz, L., & Kamalipour, Y. (2003). The Globalization of Corporate Media Hegemony. *SUNY Press Publications*.

Athow, D. (2014). Mobile World Congress 2014: Live business coverage from TechRadar Pro. Retrieved August 18, 2015, from http://www.techradar.com/news/world-of-tech/mwc-2014-live-businesscoverage-from-techradar-pro-1227071

Authority, V. R. and Q. (2012). *Visual Communication Design*. (R. Learner, Ed.). Australia: Victorian Curriculum and Assessment Authority.

Ave, N. B., Stern, J., Litt, E., Cai, C. J., Baxter, K., Guan, Z., … Zhang, G. (2014). Photographing Information Needs : The Role of Photos in Experience Sampling Method - Style Research, 1545–1554.

Babbie, E., & Mouton, J. (2001a). *The practice of social research*. Cape Town: Oxford University Press.

Babbie, E., & Mouton, J. (2001b). *The practice os social research*. (P. Vorster & P. Boshoff, Eds.). Cape Town: Oxford University Press.

Ballenger, H. B. (2014). *Photography : A Communication Tool*. Georgia State University. Retrieved from http://scholarworks.gsu.edu/art_design_theses/147

Bell, J. (2005). *Doing your Research Project* (4th ed). Buckingham, UK: Open University Press.

Benner, M. J., & Tripsas, M. (2012). THE INFLUENCE OF PRIOR INDUSTRY AFFILIATION ON FRAMING IN NASCENT INDUSTRIES : THE EVOLUTION OF DIGITAL CAMERAS, *302*(July 2011), 277–302. http://doi.org/10.1002/smj

Berners-lee, T., Hendler, J. & Lassila, O. (2001). The Semantic Web. Scientific America. Retrieved June 3, 2014, from http://www.cs.umd.edu/~golbeck/LBSC690/SemanticWeb.htm

Bhattacherjee, A. (2012). *Social Science Research: Principles, Methods, and Practices* (2nd ed. Op). Retrieved from scholarcommons.usf.edu/ao_textbooks/3 Birks, M., Chapman, Y., & Francis, K. (2008). Memoing in qualitative research: Probing data and processes. *Journal of Research in Nursing*, *13*(1). http://doi.org/10.1177/1744987107081254

Bischoff, P. (2014). "China's mobile internet users now outnumber its PC internet users".

Bockaert, V. (2007). "Sensor sizes" Digital Photography Review.

Burrell, J., & Anderson, K. (2009). New Media & Society and communication technology use among Ghanaians living abroad. *SAGE*. http://doi.org/10.1177/1461444807086472

Busch, D. D. (2006). *Digital Photography All-in-One Desk Reference For Dummies* (3rd ed.). USA: Wiley Publishing, Inc.

Campbell, S. W., & Park, Y. J. (2008). Social Implications of Mobile Telephony : The Rise of Personal Communication Society, *2*, 371–387.

Cecilia, F., & Niklas, M. (2014). *Seeing the world through a camera lens: Introducing the "Expert-Amateur" photographer*. Lund University.

Choudrie, J., & Culkin, N. (2013). A qualitative study of innovation diffusion : the novel case of a small firm and KTP, *20*(4), 889–912. http://doi.org/10.1108/JSBED-03-2012-0047

Chtourou, M. S., & Souiden, N. (2010). Rethinking the TAM model: time to consider fun. *Journal of Consumer Marketing*, 336–344. http://doi.org/10.1108/07363761011052378

Cochrane, T., & Bateman, R. (2010). Smartphones give you wings : Pedagogical affordances of mobile Web 2 . 0. *Australasian Journal of Educational Technology*, *26*(1), 1–14.

Cooper, D. R., & Schindler, P. S. (2008). *Business Research Methods* (10th ed., Vol. (10th edn)). Boston, MA and Burr Ridge IL: McGraw-Hill.

Corbin, J., & Strauss, A. L. (1990). 'Grounded theory research: Procedures, canons, and evaluative criteria. *Qualitative Sociology*, *13*(1), 3–21.

Creswell, J. W. (2003). *Research Design: Qualitative, Quantitative and Mixed Methods Approaches* (2nd ed.). London: SAGE Publications.

Creswell, J. w. (2007). *Qualitative enquiry & research design,choosing among five approaches*. (J. Robinson, Ed.)*Book* (2nd ed., Vol. 2nd ed). London: Sage Publications, Inc.

Creswell, J. W. (2007). *QUALITATIVE INQUIRY & RESEARCH DESIGN: Choosing Among Five Approaches* (2nd ed.). London: Sage Publications, Inc.

Creswell, J. W. (2007). *Qualitative Inquiry and Research Design: Choosing Among Five Approaches* (Second Edi, Vol. 11). Thousand Oaks: Sage Publications.

Creswell, J. W., Ebersohn, L., Irma, E., Ferreira, R., Nataliya, I., Jansen, D. J., … Der, W. C. van. (2011). *First Steps in Research*. (K. Maree, Ed.) (1st ed.). Pretoria: Van Schaik Publishers.

Cruz, E. G., & Meyer, E. T. (2012). Creation and Control in the Photographic Process : iPhones and the emerging fifth moment of photography. *Routledge*, 37–41. http://doi.org/10.1080/17540763.2012.702123

Davis, F. . (1989). Perceived usefulness, perceived ease of use, and adopter acceptance of Information technology. *MIS Quarterly*, *13*(3), 319–340.

Denscombe, M. (2007). *The good research guide: for small-scale social research projects* (3rd ed.). Buckingham: Open University Press.

Dolcourt, J. (2013). Smartphone innovation: Where we're going next (Smartphones Unlocked). Retrieved January 1, 2015, from http://www.cnet.com/news/smartphone-cameras-whats-coming-nextsmartphones-unlocked/

Dorresteijn, M. (2012). *The Status of the Photographic Image in Post Media Cultural Production*. *New Media / Master's Thesis*. University of Amsterdam. Retrieved from martijn@martijndorresteijn.com

Drenttel, W., & Heller, S. (2006). *LOOKING CLOSER 5*.

Duchemin, D. (2009). *Drawing the eye*. vancouver.

Dvorak, J. C. (2012). Should We Consider the Smartphone a Computer? Retrieved from http://www.pcmag.com/article2/0,2817,2412850,00.asp

Easterby-Smith, M., Thorpe, R. Jackson, P. & Lowe, A. (2008). *Management Research*. London:Sage. Echevarria, J. I., & Gutierrez, D. (2011). Mobile Computational Photography : Exposure Fusion on the Nokia N900, *0*(0).

Eismann, K., Duggan, S., & Grey, T. (2004). *REAL WORLD DIGITAL PHOTOGRAPHY* (2nd ed.). Berkelly, California: PEACHPIT PRESS.

Englander, M. (2012). The Interview: Data Collection in Descriptive Phenomenological Human Scientific Research*. *Journal of Phenomenological Psychology*, *43*(1), 13–35. http://doi.org/10.1163/156916212X632943 Eto,

D. (2012). IT news Africa, National Communication Authority.

Evers, J. (2005). "Microsoft to phase out Pocket PC, Smartphone brands & Hardware."

Fowler, T. B. (2002). Convergence in the Information Technology and Telecommunications World: Separating Reality From Hype. *The Telecommunications Review*, 11–30. Retrieved from http://www.noblis.org/NEWSPUBLICATIONS/PUBLICATIONS/TECHNICALPUBLICATIONS/TELECOMMUNICATIONSREVIEW/Pages/2002TelecommunicationsReview.aspx

Frascara, J. (2004). *Communication Design: Principles, Methods and Practice*.

Freeman, M. (2011). *The photographer ' s Mind: Creative thinking for better digital photos*. London: Focal Press.

Fuente, J. D. La, Santiago, J., Román, A., Dumitrache, C., & Casasanto, D. (2014). *When you think about it, your past is in front of you: How culture shapes spatial conceptions of time*. *Psychological Science* (Vol. 25). New York: Farrar, Straus & Giroux Cover. http://doi.org/10.1007/s13398-014-0173-7.2

Gai, B. (2009). A World Through the Camera Phone Lens : a Case Study of Beijing Camera Phone Use, 195–204. http://doi.org/10.1007/s12130-009-9084-x

Galer, M. (2007). *Photography Foundation for Art & Design: the creative photography handbook* (4th ed.). UK: Focal Press, Elsevier Ltd.

Gennuth, I. (2012). Steven Sasson: The Dawn of Digital Photography. Retrieved July 5, 2015, from www.megapixel.co.il/english/archive/35884

Giorgi, A. (2009). *The descriptive phenomenological method in psychology: A modified Husserlian approach*. Pittsburgh: PA: Duquesne University Press.

Given, L. M. (2008). *The Sage Encyclopedia of Qualitative Research Methods*. California: SAGE Publications.

Gray, E. D. (2004). *Doing Research in the Real World*. London: SAGE Publications Ltd.

Gray, E. D. (2014). *Doing Reseach in the Real World*. (Jai Seaman, Ed.) (3rd ed.). London: SAGE Publications Ltd.

GSMA. (2015). *The Mobile Economy*. London EC4N 8AF. Retrieved from http://www.gsmamobileeconomyindia.com/GSMA_Mobile_Economy_India_R eport_2013.pdf

Guba, E., & Lincoln, Y. (1982). Epistemological and Methodological Bases of Naturalistic Inquiry. *Educational Technology Research and Development*, *30*(4), 233.

Gye, L. (2007). Picture This : the Impact of Mobile Camera Phones on Personal Photographic Practices Picture. *Journal of Media & Media Studies*, (September 2014), 37–41. http://doi.org/10.1080/10304310701269107

Hall, S. (Ed.). (1997). *Representation: Cultural representations and signifying practices*. Thousand Oaks, CA: Sage.

Holloway, I., & Wheeler, S. (2002). *Qualitative Research in Nursing* (2nd ed.). United Kingdom: Oxford, Blackwell Publishing.

Horn, R. E. (2001). Visual Language and Converging Technologies in the Next 10-15 Years (and Beyond), 1–11.

IStore. (2014). iPhoneography. South Africa. Retrieved from Marcforrest.com

Jacobs, D. E., Gallo, O., & Pulli, K. (2014). Dynamic Image Stacks. In *Computer Vision and Pattern Recognition Workshops*. http://doi.org/10.1109/CVPRW.2014.27

Janssen, C. (2013). Techopedi. Retrieved from www.techopedia.com/definition/23659/phonetography

Jenkins, H. (2006). *Convergence culture: where old me and New Media Collide.* New York: New York Press.

José, van D. (2008). Digital Photography: Communication, Identity, Memory. *Visual Communication*, *7*.

Kandice, R. (2013). Selfies and the history of self-portrait photography. Retrieved August 11, 2015, from http://blog.oup.com/2013/11/selfies-history-self-portraitphotography/#sthash.Z4v8imua.dpuf

Kang, Y. M., Cho, C., & Lee, S. (2009). Analysis of Factors Affecting the Adoption of Smartphones. *National Research Foundation of Korea*.

Kano, N. (2001). Life cycle and creation of attractive quality. In *4th International QMOD Conference*.

Keightley, E., & Pickering, M. (2014). Media & Society photography. *New Media & Society*, *16*(4), 576 –593. http://doi.org/10.1177/1461444814532062

Keimig, L. (2010). *Night Photography: Finding your way in the dark*. UK: Focal Press, imprint of Elsevier.

Kellehear, A. (1993). *The unobtrusive researcher: A guide to methods*. New South Wales: Allen and Unwin.

Kerr, S., Thinyane, H., & Foster, G. (2009). Mobile Phone Performance Analysis for Camera Based Visual Interactions, 80–86.

Kim, H., & Kwon, Y. (2012). Exploring Smartphone Applications for Effective Mobile-Assisted Language Learning, *15*(1).

Kingsley, J. (2009). Visual Methodology in Classroom Inquiry : Enhancing Complementary Qualitative Research Designs. *The Alberta Journal of Educational Research*, *55*(4), 534–548.

Kothari, C. R. (2004). *Research Methodology: Methods and Techniques* (2nd ed.). India: New Age International (P) Ltd.

Kozinets, R. (2002). The field behind the screen: Using netography for market research in online communities'. *Journal of Marketing Research*, *9*(1), 61–72.

Kreimer, S. F. (2011). PERVASIVE IMAGE CAPTURE AND THE FIRST AMENDMENT: MEMORY, DISCOURSE, AND THE RIGHT TO RECORD. *University of Pennsylvania Law Review. Founded 1852*, *159*, 335–409.

Ku, A. K. (2005). Talk Is Cheap , but a Picture Is Worth a Thousand Words : Privacy Rights in the Era of Camera Phone Technology THOUSAND WORDS : PRIVACY RIGHTS IN THE, *45*(3).

Lasén, A., & Gómez-cruz, E. (2009). Digital Photography and Picture Sharing : Redefining the Public / Private Divide. *Springer*. http://doi.org/10.1007/s12130009-9086-8

Liu, S. B., Palen, L., Sutton, J., Hughes, A. L., & Vieweg, S. (2008). In Search of the Bigger Picture : The Emergent Role of On-Line Photo Sharing in Times of Disaster. In F. Fiedrich and B. Van de Walle (Ed.), *5th International ISCRAM Conference*. Washington, DC, USA.

Lundberg, N. (2013). *Smartphones and (smart) people: How smartphones affect personal interactions*.

Maeda, J. (2012). *one of 1,000+TED talks*. Recorded at TED GLOBAL.

Manovich, L. (2001). *The Language of New Media*. Cambridge: MIT Press.

Marshall, G. (2015). Best camera phones 2015: is your smartphone a super snapper? Retrieved August 14, 2015, from https://www.androidpit.com/best-cameraphones

Maxwell, J. A. (2011). Designing a qualitative study. In L. Bickman & J. R. Debra (Eds.), *The Sage handbook of applied social research methods* (2nd ed., pp. 214–253). Thousand Oaks, CA: Sage.

McLennan, T. (2013). Killing Time: New Memory and Smartphone Photography. In *The Asian Conference on Media and Mass Communication* (pp. 1–10). Osaka, Japan. Retrieved from www.iafor.org

McNamara, D. (2012). What is mobile photography? Retrieved August 6, 2015, from http://davidsmcnamara.typepad.com/sixbysix/2012/06/what-is-mobilephotography.html Meyer, E. T. (2008). Framing the Photographs : Computerization Movement. In K. L. Kraemer & M. S. Elliot (Eds.), *Computerization Movements and Technology Diffusion: From Mainframes to Ubiquitous Computing* (pp. 173–199). Medford, NJ: Information Today, Inc.

Mobile, R. L. and P. E. P. (Eds). (2005). Mobile communications : re-negotiation of the social sphere. In *Mobile communications : re-negotiation of the social sphere* (Ling Rich , p. 454). London: Springer-Verlag London Limited. Retrieved from http://www.loc.gov/catdir/toc/fy0609/2005925180.html\nMaterials specified: Table of contents only http://www.loc.gov/catdir/toc/fy0609/2005925180.html\nMaterials specified: Publisher description http://www.loc.gov/catdir/enhancements/fy0663/2005925180-d.h

Moran, M. J., & Tegano, D. W. (2005). MOVING TOWARD VISUAL LITERACY: PHOTOGRAPHY AS A LANGUAGE OF TEACHER INQUIRY. Retrieved September 12, 2015, from http://ecrp.uiuc.edu/v7n1/moran.html Accessed:

Moustakas, C. (1994). *Phenomenological research methods.* Thousand Oaks, CA: Sage.

Multisilta, J., & Milrad, M. (2009). Sharing Experiences with Social Mobile Media, 18–20.

Murphy, C. D. (2010). Mobile Convergence and Mobile Adoption.

Murray, S. (2008). Digital Images, Photo-sharing, and our shifting Notions of everyday Aesthetics. http://doi.org/10.1177/1470412908091935

Nieswiadomy, R. (1993). *Foundations of nursing research* (2nd ed.). Norwalk: CT:Appleton & Lange.

Nieuwenhuis, J. (2007a). Introducing qualitative research. In K. Maree (Ed.), *First steps in research* (First, pp. 46–68). Pretoria: Van Schaik.

Nieuwenhuis, J. (2007b). Qualitative research designs and data gathering techniques. In K. Maree (Ed.), *First Steps in Research* (First, pp. 69 – 96). Pretoria: Van Schaik.

Nunoo, E. M. (2013). MASTER'S THESIS Smartphone Information Security Risks. Retrieved November 5, 2012, from public.wsu.edu/~taflinge/research.html

Ofosu-Asare, K. (2011). Mobile Phone Revolution in Ghana's Cocoa Industry.

International Journal of Business & Social Science, *2*(13), 91–99. Retrieved from http://search.ebscohost.com/login.aspx?direct=true&db=bth&AN=64758555&site=ehost-live

Okabe D., and I. M. (2004). *Camera phones changing the definition of pictureworthy. Japan Media Review*. Annenberg School for Communication, USC. Retrieved from http://ojr.org/japan/wireless/1062208524.php Ostrowski, A. (2013). *Mobile*. CALGARY.

Paashuis, V. (2014). *Blissfully Ephemeral : a Genealogy of a Photographic Paradox*. Leiden University, Leiden.

Patton, M. Q., & Cochran, M. (2007). A Guide to Using Qualitative Research Methodology.

Pauwels, L. (2008). Visual Literacy and Visual Culture : Reflections on Developing More Var- ied and Explicit Visual Competencies, *0032*(0), 79–85.

Poushter, J., & Oates, R. (2015). Cell Phones in Africa : Communication Lifeline.

Prakel, D. (2009). *The Visual Dictionary of Photography*. AVA Publishing.

Prakel, D. (2010). *The Fundamentals of Creative PHOTOGRAPHY*. SA: AVA Publishing SA. Retrieved from 2181181184n_CVR_web-126x144.jpg

Prodger, P. (2007). Photography and its discontents. In A. Klein (Ed.), *Words without pictures*. Los Angeles: Wallis Annenberg Photography Department.

Pruitt, A. (2015). A community of smartphone enthusiasts. Retrieved August 11, 2015, from https://plus.google.com/communities/104142753526585579402

Rambus. (2015). Binary Pixel Imagers. Retrieved August 15, 2015, from http://www.rambus.com/emerging-solutions/binary-pixel/

Rayner, P., Wall, P., & Kruger, S. (2004). *Media Studies: The Essential Resource*. New York: Routledge Publishing.

Rehm, L. (2014). High-resolution smartphone cameras may pose security risk Lars. Retrieved September 28, 2015, from http://connect.dpreview.com/post/9560862817/oppo-13mp-rotating-camera

Rettberg, J. W. (2014). *Seeing Ourselves Through Technology*. UK: PALGRAVE MACMILLAN. http://doi.org/10.1057/9781137476661

Rice, P. (2006). *Master Guide for Professional Photographers*. (M. Perkins, Ed.). N.Y.: Amherst Media.

Rickard, S. (2004). *Colour My World. The Consumption Junction Meets Digital Lifestyle*. Australia. Retrieved from sric3@student.monash.edu

Ritchin, F. (1999). *In our own image: The coming revolution in photography*. New York: Aperture Foundation.

Roberts, S. C. (2011). *The art of iphonography: A guide to Mobile creativity*. United Kingdom: The Ilex press Limited.

Rockwell., K. (2014). "Nikon 18-300mm VR DX AF-S G ED NIKKOR, $1,000."

Rogers, E. . (1995). *Diffusion of Innovation*. New York: Free press.

Rogers, E. M. (2003). *Diffusion of innovations* (5th Ed.). New York: The Free Press.

Rouse, M. (2005). convergence. Retrieved August 16, 2015, from http://whatis.techtarget.com/definition/convergence

Rushton, K. (2012). Number of smartphones tops one billion. Retrieved April 28, 2013, from www.telegraph.co.uk/finance/9616011/Number-of-smartphones tops-one-billion.html

Sarvas, R., & Frohlich, D. M. (2011). *From Snapshots to Social Media - The Changing Picture of Domestic Photography*. New York: Springer London Dordrecht Heidelberg. http://doi.org/10.1007/978-0-85729-247-6

Saunders, M., Lewis, P., & Thornhill, A. (2009). *Research Methods for business students* (5th ed.). Pearson Education Limited.

Scott, C. (2008). Mobile Technology and the Body: Apparatgeist, Fashion, and Function. In James E. Katz (Ed.), *Handbook of Mobile Communication studies*. London, England: The MIT Press. Cambridge, Massachusetts.

Seakomo, S. (2012). *MASTER ' S THESIS Mobile Phone Users ' Information Security Practices*. LULEÅ UNIVERSITY OF TECHNOLOGY.

Sekula, A. (2014). The Traffc in Photographs. *Art Journal*, *41*(1), 15–25.

Senft, T. M., & Baym, N. K. (2015). What Does the Selfie Say ? Investigating a Global Phenomenon Introduction. *International Journal of Communication*, *9*.

Skinner, P. (2007). *Sports Photography: How to capture Action and Emotion*. New York: Allworth Press.

Sless, D. (1981). Learning and visual communication, p.187.

Song, Y., & Han, J. (2009). Is Enjoyment Important? An Empirical Research on the Impact of Perceive Enjoyment on Adoption of New Technology. In *2009 International Conference on Information Management, Innovation Management and Industrial Engineering, Ieee* (pp. 511–514). http://doi.org/10.1109/ICIII.2009.582

Stapley, J. (2014). Best Free Smartphone Photography Apps. Retrieved September 11, 2015, from http://www.whatdigitalcamera.com/roundup/accessoryroundup/best-free-smartphone-photography-apps-232 Stuart, R. (2009). What is Visualisation?

Taflinger, R. F. (1996). Introduction to Research. Retrieved November 5, 2012, from public.wsu.edu/~taflinge/research.html

Thomas, P. Y. (2010). *TOWARDS DEVELOPING A WEB-BASED BLENDED LEARNING ENVIRONMENT AT THE UNIVERSITY OF BOTSWANA*. UNIVERSITY OF SOUTH AFRICA.

Thompson, C. (1989). High-technology theories and public policy, *7*(July 1988), 121–152.

Tim, S. (2014). Know your smartphone : a guide to camera Hardware. Retrieved from http://www.techspot.com/guides/850-smartphone-camera-hardware/page4.html

Vergara, R. A. G. (2012). Samsung Electronics and Apple , Inc .: A Study in Contrast in Vertical Integration in the 21 st Century. *American International Journal of Contemporary Research*, *2*(9), 77–81.

Vickers, R. (2006). *"Photography as New Media: From the Camera Obscura to the Camera Phone." 4th International Symposium of Interactive Media Design*. Turkey: Yeditepe University, Istanbul. N. pag. Print.

Villi, M. (2010). *Visual mobile communication: camera phone photo messages as ritual communication and mediated presence*. Finland: WS Bookwell Ltd. Retrieved from www.taik.fi/bookshop

Warfield, K. (2014). Making Selfies / Making Self : Digital Subjectivites in the Selfie. In *Fifth International Conference*. Germany: Freie Universität, Berlin. Retrieved from http://kora.kpu.ca/facultypub Part

Winston, J. (2013). Photography in the Age of Facebook, *6*(2).

Yin, R. K. (2011). *Qualitative research from start to finish*. New York: Guilford Press.

Yoo-chul, K. (2010). Sony, Apple, Dell are Samsungs big buyers. Retrieved June 15, 2010, from http://www.koreatimes.co.kr/www/news/tech/2010/09/133_67730.html 81

Zhang, M. (2015). The Importance of Cameras in the Smartphone War. Retrieved September 5, 2015, from http://petapixel.com/2015/02/12/importance-camerassmartphone-war/

KWAME NKRUMAH UNIVERSITY OF SCIENCE AND TECHNOLOGY
FACULTY OF ART
COLLEGE OF ART AND BUILT ENVIROMENT
DEPARTMENT OF COMMUNICATION DESIGN (DECODE)
Email: design.communication@yahoo.com, **Tel/Fax**: 233-03220-63683

RESEARCH AREA:

Digital Photography: influence of Smart phone usage in relation to Visual Communication.

MPhil candidate, Communication Design

Research Question: How has the introduction of smartphones into the social system affected the activities of Digital Photography in relation to visual communication? The followings will be used to achieve the answers:
- What are the factors that have influenced the use of smartphone over the traditional Digital camera?
- How has the technologies (mechanism/applications) permit the easy use of smartphone?
- What kind of innovative visual communication activities necessitate the ubiquitous use of smartphone?

INTERVIEW PROTOCOL

PART A: PROFESSIONAL PHOTOGRAPHERS

INTRODUCTION

1. What is your name
2. Studio name and how long have you been practicing as a professional Digital Photographer?
3. What is your specialization in the field of Digital Photography?

Main Guides: Smartphone activities for digital photography

1. Digital Photography (DSLRs) replaces Analog Photography (SLRs) in recent times, what is the significance of camera integration in to smartphone on professional Digital Photography?
2. What type/brand of smartphone do you use?
3. How do you find the usefulness and (perceived) easy to use of smartphone for digital photography?
4. How would you describe the image qualities of smartphone to (DSLR) camera?
5. What are the user apps on smartphone that enable its ease of use? Describe their function
6. What does it mean to employ the use of smartphone for any sort of photography work even though you have a professional digital camera?
7. Do you see people using the device especially for digital photography?
8. What are some risk associated with the smartphone photography practice?
9. Your views on smartphone voyeurism (sexual gratification) and its publication via social media.
10. What would you say about smartphone surreptitious (secret) photography?

11. As a (specialty, i.e. Photo Journalist) recount how you use the device to transfer data (images in frame or sequence) to another person or organization.
12. In which way do you think traditional Digital Photography practice is jeopardised by the introduction camera into smartphones especially the high-end ones?
13. In which ways does the following TV commercials promote the use of smartphone:

OLX (Sell it)

Tonato.Com

Drop that Yam by (Tigo)

Vodafone X (Selfie)

Concluding remarks (interviewee)

PART B: NON-PROFESSIONAL PHOTOGRAPHERS

AMATEURS (GENERAL PUBLIC INCLUDING STUDENTS)

INTRODUCTION (Brief Comments)

1. What is your name?
2. Occupation?
3. Smartphone and DSLR, which one will you refer for digital photography and why?

Main Guides: Smartphone activities for digital photography

1. What type /brand of smartphone do you use?
2. How well do you enjoy taking Photos with your smartphone? Could you share with me some experiences?
3. How easy and useful is it to use smartphone for digital photography?
4. What type of user apps running on smartphone facilitate easy activity of digital photography?
5. If you have high-end smartphone, will you still require the services of (DSLR) for photography?
6. How would you compare the image qualities of smartphone to DSLR camera?
7. With smartphone at hand will you still employ the services of professional to audiovisually document your events?
8. Do you see people using the device especially for digital photography?
9. How would you store and manage the data files (photos) from smartphone?
10. How would you share smartphone data files (photos) and through which media?
11. Your views on smartphone voyeurism and social media.
12. What are some risk associated with the use of smartphone for of digital photography?
13. What would you say about surreptitious photography?
14. In which ways does the following TV commercials promote the use of smartphone:

OLX (Sell it)

Tonato.Com

Drop that Yam by Tigo

Vodafone X (Selfie)

Concluding remarks (interviewee)

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PARTICIPANT INFORMED CONSENT FORM RESEARCH

TOPIC:

Digital Photography: influence of smart phone usage in relation to visual communication.

Researcher: Prosper Kofi Dzukey
MPhil Candidate, Communication Design
Email: imaging.flamgh@gmail.com
Cell Phone: 0208198830 and 0244206655

You are being asked to participate in a research study. Please take your time to review this consent form and discuss any questions you may have, or words you do not clearly understand, with the researcher. You may take your time to make your decision about participating in this study and you may discuss it with your friends or family before you make your decision.

The purpose of this research is to explore the effect of smartphone activities on traditional digital photography in relation to visual communication. Your participation will be in the form of an interview about the activities of the ubiquitous smartphone and other digital devices and their implication on digital photography.

All information you provide will be kept strictly confidential and will only be used to create a general picture of the effect of smartphone activities on traditional digital photography. I will also ask if you would be willing to be contacted at a later date in case there is the need for clarification on any of the responses given in the interview. All personal information you provide will be kept strictly confidential, separate from the interview data and kept on a digital file for the duration of the study. Access to personal information will be restricted to the researcher and the trustworthy assistant only. The interview will be approximately one-hour long. You are at liberty to stop participating at any time without providing reason. In the event of withdrawing from the study, state what should be done to the already gathered data. You are free to ask any questions that you may have about your rights as a research participant. If any questions come up during or after the study, contact the research supervisor's details below.

If you are comfortable, please sign to confirm in the tabulation below. **(Please tick box as appropriate)**:

1.	I have read and understood the information about the project, as provided in the Information Sheet dated _____.	☐
2.	I have been given the opportunity to ask questions about the project and my participation.	☐
3.	I voluntarily agree to participate in the project.	☐
4.	I understand I can withdraw at any time without giving reasons and that I will not be penalised for withdrawing nor will I be questioned on why I have withdrawn.	☐
5.	The procedures regarding confidentiality have been clearly explained (e.g. use of names, pseudonyms, anonymisation of data, etc.) to me.	☐
6.	If applicable, separate terms of consent for interviews, audio, video or other forms of data collection have been explained and provided to me.	☐
7.	The use of the data in research, publications, sharing and archiving has been explained to me.	☐
8.	I understand that other researchers may have access to this data only if they agree to preserve the confidentiality of the data and if they agree to the terms I have specified in this form.	☐
9.	Select only ONE of the following: • I would like my name to be used and understand what I have said or written as part of this study will be used in reports, publications and other research outputs so that anything I have contributed to this project can be recognised.	☐
	• I do not want my name used in this project.	☐
10.	I, along with the Researcher, agree to sign and date this informed consent form.	☐

Name of Participant (BLOCK LETTERS):
_____

Signature of Participant: _____ Date: _____

Participant Address (if consented to provide)
_____

Email: _____ Cell
Phone: _____ **Researcher:**
I, the undersigned, have fully explained the relevant details of this research study to the participant named above and believed that the participant has understood and has knowingly given their consent.

Researcher's Signature _____ Date:
_____ **Contact information:**

If you have any further questions or concerns about this study or if any problems arise, please contact the research supervisor on **0208129073** or send an email to **eddappiah@gmail.com**.

APPENDIX C: LETTER OF INTRODUCTION

DEPARTMENT OF COMMUNICATION DESIGN

Faculty of Art
College of Art and Social Sciences
Kwame Nkrumah University of Science and Technology
Kumasi-Ghana
Email: design.communication@yahoo.com
Tel/Fax: 233-03220-63683

CASS/CD/DF/4   16th April, 2015

TO WHOM IT MAY CONCERN

INTRODUCTORY LETTER
MR. DZURKEY KOFI PROSPER

I write to introduce to you Mr. Dzurkey Kofi Prosper, a Second Year M. Phil. Communication Design student of the Faculty of Art, College of Art and Built Environment.

As part of the Post Graduate requirement for Master of Philosophy in Communication Design, the above researcher is undertaking a research project on the topic, "DIGITAL PHOTOGRAPHY: INFLUENCE OF SMARTPHONE USAGE IN RELATION TO VISUAL COMMUNICATION." The Purpose of the research is to explore the effect of Smartphone activities on traditional digital photography.

I would be grateful if you could assist him with any information needed for the study.

Attached is a photocopy of the student identity card.

Your cooperation is highly anticipated.

Thank you.

Yours faithfully

ERIC FRANCIS ESHUN (PhD)
HEAD OF DEPARTMENT

APPENDIX D: ANALYSIS FROM PARTICIPANTS' RESPONSES

Labels	Minor Themes	Major Themes
Selfies, identity, Memory, Cost, Evidence of being there, Secret Photography, Democracy, Risk, Photo Elicitation, Barcode Scanning	Technology Diffusion	Technological convergence
	Perceived Ease of use (PEOU)	
	Personal Photography	
	Smartphone is all in one device	
Types of smartphones, Social Media, Facebook, You tube, Viber, WhatsApp, Tweeter	Internet Infrastructure	User applications
	Downloading Opportunities	
	Processing speed of smartphones	
Ubiquity of Smartphones, Voyeurism, Democracy of photography, Memory capacity, Ubiquitous of Smartphones, Innovation, Portability and easy to carry.	Smartphone Vs DSLRs	Image Resolution
	Depending on the Nature of work	
	Attractive quality as a factor for choice (Kano's Theory)	
	Sensor size (High and Low image quality)	
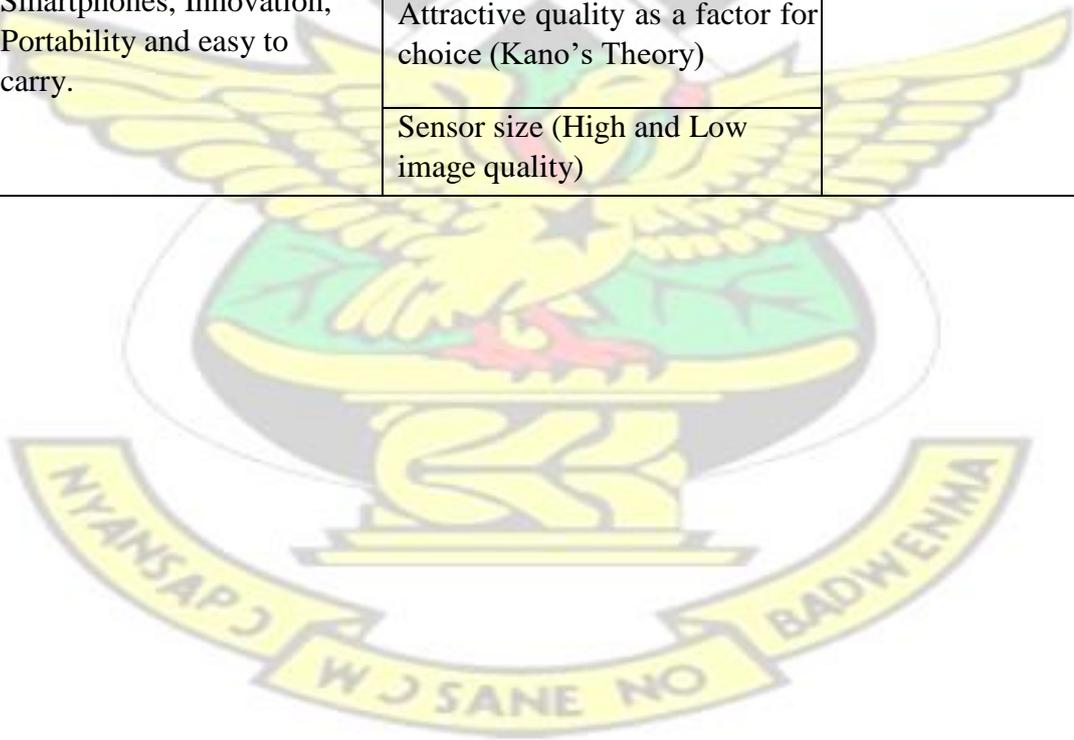
APPENDIX E: OBSERVATIONAL PROTOCOL AND RECORDING SHEET

Digital Photography:
Influence of smart phone usage in relation to visual communication.

OBSERVATIONAL PROTOCOL AND RECORDING SHEET

Foreshadowed Questions:
• What kinds of smartphone photography activities are engaged by the participants?
• What types of smartphones are being used?
• How are images shared?

Date of observation: _____

Time of observation: _____

Setting: _____

Participants: _____

Observer: _____

Person(s)	Comments	Actions

Observer's Reflections:

_____