
IMAGE: A MAP OF THE STARS OF THE ORION CONSTELLATION

Print ISSN: 2515-5784 Online ISSN: 2515-5792

# JournalPreview

London Journal of Research in Humanities and Social Sciences

Volume 22 | Issue 15 | Compilation 1.0

London Journals Press

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# Journal Content
## In this Issue

London Journals Press

# A Not-So-Short History of Deaf Technology

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## ABSTRACT

Different social groups construct the meanings of physical difference to fit competing ideologies and interests. In the case of deafness, there are two primary ways of understanding the condition. The first perspective is a cultural perspective, which understands deafness to be a difference, not a disability, and American Sign Language (ASL) is used as the language technology. The infirmity, or medicalized model, of deafness considers deafness to be a disability that advanced technology can cure or treat. Each of these two perspectives of deafness- the infirmity model and the cultural model- informs the kinds of technology that are developed and adopted for, by, and about deaf people. The infirmity model of deafness encourages technologies that correct the deaf body - to correct the deaf body to be hearing. The cultural model of deafness, on the other hand, encourages the development of technologies that allow deafness and hearing to co-exist.

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*Classification:* DDC Code: 613.2 LCC Code: RM216

*Language:* English

London Journals Press

LJP Copyright ID: 573333
Print ISSN: 2515-5784
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## I. INTRODUCTION

The social shaping and definition of normality and abnormality, and disability and ability, involve considerations of morality, conformity, purity, and resistance. Different social groups construct the meanings of physical difference to fit competing ideologies and interests. When a condition or state is identified as abnormal or disabling, corrective procedures and technologies are often offered to the afflicted individual(s) to restore or gain normality, morality, and purity.

Deafness and hearing loss is a condition or state of being whose meaning is contested. The biomedical, or infirmity, understanding of deafness is that hearing loss is a disability (Lane 1999) that, in many cases, can be cured or ameliorated through advanced technological devices and procedures, including surgery and internal and external prostheses. From a biomedical perspective, the extent of hearing loss determines the degree of disability, and the primary aim of corrective techniques is to reduce hearing loss to the greatest possible extent, thereby reducing disability. Identifying, and medically addressing hearing loss at the youngest possible age, including infancy (National Center for Hearing Assessment and Management 2009), and even pre-conception (Popovsky 2007), is crucial to this understanding of deafness.

Alternately, a cultural understanding of deafness understands deafness to be a physiological difference around which a rich linguistic and cultural heritage has evolved (Cherney 1999; Lane 2005). The cultural model does not understand deafness as something to be corrected, but rather as a natural, healthy state. Deaf proponents of the cultural understanding of deafness identify as members of a linguistic minority and culture group, referred to as the Deaf-world[1] (Lane 2005). This perspective is personified in the words of Deaf activist John Limnidis, "Deafness is not a handicap. It's a culture, a language, and I'm proud to be deaf. If there was (sic) a medication that could be given to deaf people to make them hear, I wouldn't take it. Never. Never till I die" (quoted in Cherney 1999).

Each of these two perspectives of deafness- the infirmity model and the cultural model- informs the kinds of technology that are developed and adopted for, by, and about deaf people. The infirmity model of deafness encourages technologies that aim to correct the deaf body and

[1] Throughout this paper, I use the language conventions typical in Deaf scholarship. Hyphenated words are glosses of American Sign Language (ASL) words, and are not direct translations. The word 'Deaf' refers to members of a cultural group that identify as a linguistic minority, whereas 'deaf' refers to an audiological condition.

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achieve normality- in other words, to correct the deaf body to be hearing. The cultural model of deafness, on the other hand, encourages the development of technologies that allow deafness and hearing to co-exist. These technologies support alternative ways of communicating other than speech and hearing and allow for a bridge between the Deaf and the hearing. Deaf people who adopt technologies informed by a cultural understanding of deafness use technology to resist a medicalized, disability understanding of their bodies.

In this paper, I explore the socio-technical history of technological devices for the deaf. I explore three different eras; I've chosen these time periods because these are time periods in which a major technological shift occurred. The first era, starting in the 1810's, began with Thomas Hopkins Gallaudet founding the first ASL school for the deaf in the US. In the second era, starting in the 1870's, early hearing assistance devices and surgeries were developed, later followed by in-ear hearing aids. The third era, beginning in the 1980's and reaching into the present, represents the increasing use of cochlear implants. I will first provide some background on Science & Technology Studies (STS), which is the academic tradition which I am following in this paper, and then will begin the review of the historical development of hearing technologies.

## II. STS (SCIENCE & TECHNOLOGY STUDIES) SCHOLARSHIP OVERVIEW

Technology can be a space for resistance and empowerment (Scholtz 2016, Woodcock 2017, Cant 2019), and cochlear implants are no different. As a technology, cochlear implants can bring people "back" or "to" the land of the hearing, and so can engender normality in that way. Science and Technology Studies (STS) is a specific multi-disciplinary academic field that studies how science and technology recursively inform each other (Bijker 1997). STS includes areas such as the history of science, philosophy of science, sociology of scientific knowledge, politics of technology and economics of innovation (Martin 2020). Thomas Kuhn's "Structure of Scientific Revolutions" (1962, Fu 2012. Zhang 2012) birthed the field of STS by stating that technological change was revolutionary in nature; later theorists have disputed this and have shown that technological change tends to be recursive, political, and glacial. Bijker demonstrates in his book, "*Of Bicycles, Bakelite, and Bulbs*" (1997) this recursiveness in the development of the bicycle. He emphasizes the development of the bicycle was a series of "detours." It was not a straight path from the hobby horse to today's $12,000 carbon fiber bikes. I see the same sort of detours in the development of hearing technology. In his book, Bijker (1997) shows how the development of the bicycle was recursive— early prototypes were developed, problems were found with them, sent back to the developers who made changes, sent the bike back to the public, who found more problems, who sent it back, and etc. (Bijker 1997). The same process can be seen in the development of the audiphones and dentaphones, as well as the cochlear implant.

Bijker maintains the role of power in the mutual shaping of technology and culture (1997). Technological decisions, including medical diagnoses such as a deafness diagnosis, are socially shaped under the broader social context (Kuiper et al., 2021). STS frameworks have been utilized in disability studies (Blume et al., 2014), and these studies have found that in industrialized societies, the medical profession has authority over the determination of who should count as disabled while "assistive technologies" enable "specific kinds of subject positions" (Blume et al., 2014). STS frameworks have been used specifically to study cochlear implants and other hearing technologies. Laura Mauldin (2019), whose research on parents of deaf children is described above, used an STS informed approach that placed the CI within a complex sociotechnical system and examined cochlear implant "failure." Singleton et al. (2019) explored deaf technologies utilized by older deaf adults and concluded that this population should be included in the recursive process to refine and adapt technologies.

STS is a valuable framework from which to examine deafness and cochlear implants. Technological change is not the "revolution" that

Kuhn described (1962), but, rather, it is a circular process by which users use the device and find problems with it, the device goes back to the developers, who address the specific problem, users find different problems that garner different solutions, etc. My contribution to the STS literature on cochlear implants and deafness is that I consider issues of normality and medicalization and go beyond examining how specific technologies are iteratively co-constructed by developers and users. Instead, I show that this iterative process is driven by pressures to be normal and to medicalize previously non-medicalized conditions.

## III. METHOD

I rely on the analysis of historical newspaper and magazine content, as well as utilizing primary sources that I initially located in secondary source material. To gather this material, I visited the Rutgers University library website, and accessed the database "Lexis Nexis" (now known as "Lexis Uni"). I chose this database for my search because it houses full-text newspaper and magazine articles, both historical and present-day. Using the search engine, I searched for "news + deaf" and "news + hearing aid." Because I wanted to document the history of hearing loss technologies, I selected the date range for each search to be January 1, 1700 (which was the earliest available data), to December 31, 1910. I chose 1910 as the end date because battery-powered hearing aids were beginning to be made available by this time, and thus, the modern era of hearing aid technology was ushered in. The search "news + deaf" returned 28 articles from this timeframe, and the search "news + hearing aid" returned 34 articles, from sources such as the *New York Times* and *The Youth's Companion*.

I specifically searched for popular articles, rather than peer-reviewed articles from sources such as JAMA (*Journal of the American Medical Association*), which first started publishing in 1883, or the *New England Journal of Medicine*, which first started publishing in 1811, because I wanted to capture the rise of the public perception and reception of deaf technology. Although the influence of powerful organs of medicine such as JAMA and NEJM are important to include, in this analysis I focused on popular conceptions of deafness and deaf technology only. Future research should include an analysis of the messages coming from these powerful institutions and how they framed and shaped the narrative and public discourse around deaf technology in these eras. Once I had the data compiled from the Lexis Nexis search I began the two-sort open coding process. I used an open coding approach (Strauss and Corbin 1998) that evolved into a more focused coding approach once codes emerged. Open coding allows the data to speak for itself (Strauss and Corbin 1998) and invites codes to emerge from the dataset. The two-sort approach first sorted the materials into broad categories, and then a more focused approach took those broad categories and made them more specific and narrower. These categorical and coding choices were enlivened by my knowledge of the literature, but, as the open-coding method demands, were primarily driven by the data itself. My information about the development of hearing aids and cochlear implants comes largely from peer-reviewed journal articles, as well as a personal interview I conducted with Dr. William House near the end of his life, who is widely considered one of the fathers of cochlear implants.

Figure 1: A Deaf Technology Timeline of Invention and Adoption from 1750s to Present (2020)

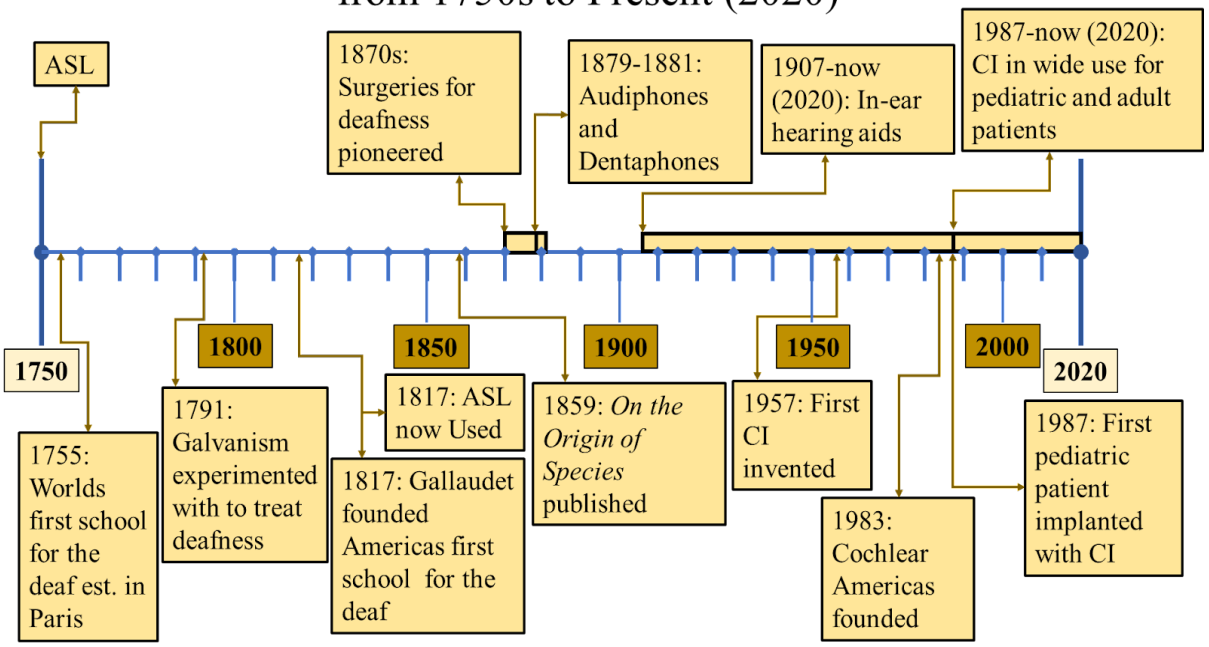


*Fig.1:* A Deaf Technology Timeline of Invitation and Adoption from 1750s Present (2020)

Figure 1 shows the global development of hearing technologies, beginning with the world's first school for the Deaf, in Paris, France, in 1755. This school became the foundation on which American ASL schools were based, although the first American school for the Deaf wouldn't be founded until nearly 70 years later.

### *4.1 First era: ASL as a Language Technology*

The use of ASL as a standardized communications technology in the early 1800s arose as a direct result of the understanding of deafness as being a spiritual or religious crisis. Deaf people were seen to be isolated from God, and were therefore, damned (Baynton 1996). In 1755, the world's first school for the deaf was established in Paris, France by Abbe' De l'Epee in an attempt to connect deaf children to God (Winefield 1987)[2]. De l'Epee utilized the manual[3] language already used by French deaf people, and by 1790, the school, run by De l'Epee's successor Abbe' Sicard, was entirely a manual school (Winefield 1987). Manual teaching methods are poised as an alternative to oral methods of education, which teach speech to deaf children. In 1815, an American minister, Thomas Hopkins Gallaudet, visited a British school for the deaf and Sicard's French school in order to learn methods for teaching the deaf. The British school utilized oral methods of teaching the deaf, but the school refused to divulge the secrets of teaching the oral method to Gallaudet (Winefield, 1987). The manual French school was more welcoming, so Gallaudet learned the manual method of teaching deaf children (Baynton 1996; Winefield 1987). He returned to the states with a French teacher, Laurent Clerc, who became the first teacher of the deaf in the US at the American Asylum for the

[2] However, the ancient Greeks and Romans used a fingerspelling system that was not reserved for the deaf (Friend's Weekly Intelligencer, 1851).

[3] There are two broad methods of teaching the deaf: oral methods which rely entirely on speech training and residual hearing, and manual methods which rely entirely on signed languages. Mixed methods also exist which combine some elements of each method.

school[4]. Edward Miner Gallaudet, Thomas Hopkins' son, formed Gallaudet University in 1864. I mark the 1810s, when ASL was first taught in the US at residential schools, as the beginning of the first era I explore, in which the problem of deafness was identified as a lack of connection to God and the technological solution was ASL.

As a testament to the perception that ASL was the accepted normal and natural way for deaf people to communicate, deaf residential schools, in which ASL was taught and used exclusively, were commonplace prior to the 1880s (Baynton 1996; Winefield 1987). These schools, while founded by ministers for religious purposes, served to nurture what later became a robust and unique Deaf culture. Within the residential schools, children learned not only how to communicate with each other, but also about Deaf culture, norms, and expectations. The earliest residential schools gave birth to Deaf art, Deaf theater, and a tradition of manual storytelling (Baynton 1996). Within the residential schools, children often met their spouses and lifetime friends (Lane 1999). The residential schools served as an important anchor for the nascent American Deaf culture, fomenting resistance to oral methods of deaf education, especially as medical options for deafness such as hearing aids and cochlear implants became widely available.

When the problem is speaking to God, key concepts associated with deafness are lost, pathetic, pitiful, damned, and doomed. These themes show up in the source documents that Baynton relies on, as well as in the primary sources I located. The technological goal in this case would be to achieve speaking, or communication, which could be achieved through education via ASL. Ministers and educators became the mediators between God and the deaf students, and ASL became the medium of communication. ASL came to be seen by Protestant evangelists (who ran the Deaf schools) as a means to connect otherwise heathen people to God, and indeed, saw ASL as a special gift from God to deaf people (Baynton 1996). Most important for Gallaudet was connecting deaf children to God. As he puts it, "They knew nothing of God and the promise of salvation, nor had they a firm basis for the development of a moral sense" (Baynton 1996).

As a technology, ASL accomplished the goal of connecting the deaf to God and to a Christian community. The use of ASL in the early 19th century did not offer a medicalized view of the deaf, instead it offered a solution to a spiritual problem. ASL was perceived by many as a beautiful, pure, emotional, and, above all, *natural* language provided by God for the deaf (Baynton 1996). Until the middle of the 19th century, ASL and the manual method of teaching children remained the preferred pedagogical and communication method for the profoundly deaf.

### *4.2 Second Era- Hearing assistance and hearing aids*

By the beginning of the second era I explore, which began around 1870, with the technological "turning point" being when early hearing assistance devices and surgeries were developed, later followed by in-ear hearing aids, ASL was no longer seen as the "normal" method of communication for deaf people, as ASL was considered primitive and obsolete. With Charles Darwin's publication of "On the Origin of Species," (1859) people became concerned about developing "positive evolution" and promoting the reproduction of people who represented the "pure" and finely evolved human being. Since speech was seen as one of the primary attributes that delineated humans from animals (Baynton 1996), deaf people who used sign language were seen as not as evolved as hearing and speaking people. Sociologist Charles Cooley (1911) said, "the achievement of speech is commonly and properly regarded as the distinctive trait of man, as the gate by which he emerged from his

[4] Signed languages, like spoken languages, are not universal, and all countries have regional or local signed languages that distinct and incompatible with each other. ASL, for example, is fundamentally different from BSL (British Sign Language) and Auslan (Australian Sign Language), and Deaf individuals from these three countries would need interpreters to communicate with each other. Signed languages, including ASL, are organic, natural languages with their own grammar, syntax, and vocabulary. Signed languages are not a translation of the national spoken language in which it resides.







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pre-human state." From this perspective then, any technology that did not encourage speech, and secondarily, hearing, separated deaf persons from the preferred, evolved, and evolving species of human.

By the beginning of the 20th century, immigration into the US was a main concern among Americans. Immigrants were seen as inferior to native-born citizens, and immigrants were the object of prejudice and stereotyping. Deaf people, especially those who used ASL, were seen as foreigners in their land. With deaf people perceived as suspect, other, threatening to the nation, or as indicators of a fractured nation, ASL was no longer a sufficient technology to address these problems. Instead, the primary goals of the new correctional devices were to achieve speaking and hearing and eliminate difference. There was a wealth of hearing technologies used during this time frame— from audiphones, dentaphones, and, slightly later with the invention of the micro-battery, the in-ear hearing aid. Technological managers such as research scientists, inventors, and surgeons mediated between the alienated deaf and the rest of the nation. Next, I will explore the surgical and medical technologies that tried to address the problems of being deaf as they were understood in the late 19th century through the early part of the 21st century.

Some of the earliest external aids began their life in the early 19th century, when ASL was still the dominant technology and the problem of deafness was considered to be a spiritual problem. ASL was more commonly used for children with little or no prior language development (Baynton, 1996), whereas the earliest precursor to today's external aids, the ear trumpet, was used to assist those adults with prior language acquisition. The ear trumpet only helped people with minimal hearing loss and was generally used to cut out ambient noise during conversation. In 1812, the metronome inventor Johann Maelzel made four different ear trumpets for Beethoven (Ealy 1994). However, it soon became apparent that holding an ear trumpet is incompatible with playing the piano, so Maelzel invented a special hands-free headband for his ear trumpet (Ealy 1994). And voila'— the first no-hands hearing aid!

At approximately the same time as ear trumpets reached their peak usage, other types of hearing technologies were being experimented with. Like with the ear trumpet, most of these technologies were developed for post-lingual deaf adults, as no external amplification aid can help a congenitally deaf infant with no residual hearing. Small private experiments in 1815 and 1817 demonstrated that objects held between the teeth could send vibrations into the head and thus create a sense of "hearing" (Ealy 1994; New York Medical Magazine 1815). These discoveries were the precursors to a type of hearing aid that swept the US for about one very intense year in the 1880's, even though they may have been completely useless in supporting hearing (Smith 1880). These devices, the audiphone and dentaphone, and their close cousins, eventually led to the behind-the-ear aids as we have today and were also consistent with oral methods of education which become predominant in this time period (Baynton 1996).

The first audiphone was invented in early 1879, by a man named Richard Rhodes (New York Times 1879). Rhodes was a deaf man in Chicago who had discovered the property of "hearing" through ones teeth accidentally when he placed his teeth next to his pocket watch and learned he could hear the tick of the watch through his teeth (*The American Socialist* 1879). The Rhodes audiphone consisted of a collector plate shaped like a large, vulcanized rubber fan that was curved to collect sound waves. The fan was attached to a handle that was placed against the teeth of the user (*Scribner's Monthly* 1880). Soon after its release to the public, however, the first complaint about the Rhodes audiphones came in: it was difficult to be used by those with false teeth (*Medical and Surgical Reporter* 1880); Rhodes immediately responded and provided a modified mouth plate for false teeth. At the same time as Rhodes was making this adjustment however, denture makers had discovered that well-fitted vulcanite dentures were the best sound conductors and encouraged clients to purchase new dentures (*Medical and Surgical Reporter* 1880). Also, for patients with no teeth at all, false vulcanite teeth were fitted directly into the roots in such a way as to be conducive to using the Rhodes audiphone

*(Medical and Surgical Reporter* 1880). In this way, the audiphone became connected to the denture industry, which was expected because in many cases the customers for both products were the same.

As quickly as audiphones flooded the hearing aid market, they were gone, and as early as February 1880 a new product, the dentaphone, came onto the market (*Western Christian Advocate 1880b*) and largely supplanted the audiphone. What explains the audiphone's rapid rise and fall? In addition to the denture issues mentioned above, there were other critical issues that ultimately led to its demise. First, with an audiphone in one's mouth, one cannot speak[5]. Recall that by the early 1880's, the problem of deafness had become a problem of both hearing and speaking, so a technology that did not allow for speech did not sufficiently address the problem as it was conceptualized in that era. Also, the audiphones only worked, if at all, with patients who did not have a damaged auditory nerve (*Philadelphia Medical Times* 1880b; *Scientific American* 1879), severely limiting its consumer base. Also, like ear trumpets, audiphones were physically cumbersome and conspicuous (*Medical and Surgical Reporter* 1880). A year after their advent, medical opinion was suspicious that vibrations to the small bones in the head jarred the brain, causing brain damage (*Philadelphia Medical Times* 1880b). Additionally, audiphones were seen to be too expensive (about $10) (*New York Times* 1880; *Western Christian Advocate* 1880), and the hardened rubber used in the devices was so fragile that they cracked in the winter (*New York Times* 1880). These concerns led to the invention of a device that was 1/10$^{th}$ of the price as the standard audiphone and that used pasteboard instead of rubber as the collection device (*New York Times* 1880). However, this last device, invented in Geneva, did not stop the decline of the audiphone, and by the middle of 1880 most hearing aid innovation focused on a different, but related product known as the dentaphone. The dentaphone suffered the same problems as the audiphone and disappeared from the hearing technology market almost as soon as it entered it. The same fate befell the Otocoustic fan, a device similar to the audiphones and dentaphones, and by the end of one frenzied year, audiphones, dentaphones, and Otocoustic fans were a thing of the distant past.

The most preferable methods to intervene in deafness during the late 19$^{th}$ century and early 20$^{th}$ century were interventions directly in the ear to enable hearing, and, by extension, speech. Successful technologies could actually eliminate deafness at its source. The surgical intervention of deafness has been recorded at least as early as the 1790's. In 1791, a deaf Versailles man experimented in surgery by blowing air and liquid into the tympanum through the Eustachian tubes; he claimed to cure his own deafness through this method (Lane 1999). Also, in 1791, Luigi Galvani experimented with Galvanism[6] for the treatment of deafness, and at least one child was claimed cured with the use of an electrostatic generator (Ealy 1994). Both of these techniques were done with no anesthesia, no antibiotics, and no electric lights, and both had lots of complications (Ealy 1994; Lane 1999). By the 1870's, early versions of surgeries still performed today, including stapes and fenestration[7] surgeries began to be performed (Lempert 1951). The first stapes surgery had the benefit of both anesthesia and electric lights, and eventually evolved into the modern fenestration surgery in the 1920's (Lempert 1951). Fenestration was expensive, invasive, and required at least 3 weeks recovery, however, for adult-onset deafness, it had an 80% success rate. However, the risks of fenestration meant that very old patients were not qualified for the surgery, and so by 1952, the first modern stapes surgery was performed by Dr. Samuel Rosen (Fowler 1981) although it was modified substantially in

[5] Although the Rhodes audiphones specifically advertised the audiphone's ability to help the deaf learn speech (American Socialist, 1879; Medical and Surgical Reporter, 1880), pre—lingually deaf children were generally not helped by the audiphones to learn speech or speech recognition when spoken to (Scientific American, 1879).

[6] The contraction of a muscle with electric current.

[7] Stapes surgery refers to the loosening of the small stapes bone in the inner ear; fenestration surgeries create a "window" in a small bone, with the aim to make the bones in the inner ear move more freely.







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1956 by Dr. John Shea (Shea Ear Clinic 2009). These newer, more relaxed stapes surgeries involved gentle, pulsing pressure to release the stapes bone, but they, like fenestration, only work for patients with hardening of the bones in the inner ear, or osteosclerosis. There are multiple factors that influence the changing techniques of the ear. First, as the causes of deafness change so does the technology. For example, only older adults with hardening of the stapes bone are candidates for either the stapes or fenestration surgeries, as childhood illness or inherited conditions tend to be less amendable to surgical interventions. Secondly, as the meaning of deafness changes so does technology. Although there were some attempts to surgically correct hearing in the 18th and early 19th centuries, these attempts became more concentrated during the time periods when deafness was seen as a threat to humankind and to the nation. Although when the meaning of deafness changes, the technology changes, it is also true that as technology changes, the meaning of deafness changes. For example, during the earliest attempts at hearing surgeries, there were no electric lights, antibiotics, or an understanding of germ theory and hygiene (Ealy 1994; Lane 1999; McCoy 2015). Once these scientific advances occurred, it became possible for more advanced surgeries to be developed. When stapes surgeries, and micro-battery behind-the-ear hearing aids became common place, the meaning of deafness changed from "connection with God," to "connection with the nation," This is because, as a language technology, ASL was able to address a perceived isolation from God, and since ASL presumedly allowed communication with God, ASL was sufficient technology for the problem at hand. However, as the meanings of deafness expanded to include isolation from humankind and isolation from the nation, ASL was no longer a sufficient technology, and thus new technologies were invented to address these new problems of deafness. These changes happened in dialectic with each other—one did not lead the other. Lastly, as medical, and scientific knowledge of the ear and acoustics change, so does technology. For example, in 1863, the German physician Helmholtz "discovered" the middle ear bones required for hearing (Rosen 1958), of which knowledge led to both the stapes and fenestration surgeries.

In 1886, a full seven years after the release of the first audiphones, the Blodgett Microaudiphone was invented (*Scientific American* 1886). The microaudiphone looks like a modern in-ear hearing aid and was made of hard xylonite with a vibrating diaphragm (*Scientific American* 1886). By 1907, similar devices were being powered by small electric batteries (*New York Times* 1907); the age of the in-ear/behind the ear hearing aid had finally arrived. The first battery operated hearing aid was invented in 1898 by Miller Reese Hutchinson (Hearing Systems 2020), although an argument could be made that Alexander Graham Bell's invention of the telephone was actually the world's first hearing aid, as it included features such as controlling the loudness of the receiver (Winefield 1987). In 1913 the first mass marketed hearing aids were available; however, they were not very portable (Hearing Systems 2020). Vacuum tube hearing aids were produced in the '20s, and this was the main kind of hearing aid available until after WWII and the invention of the transistor. Transistors quickly replaced vacuum tubes as they were smaller, needed less battery power and had less distortion (Hearing Systems 2020; Healthy Hearing 2020). In the 1970s the transistor gave way to microprocessors and ushered in the use of digital technology (Hearing Systems 2020; Healthy Hearing 2020). At this point, hearing aids started evolving rapidly with the creation of high-speed processors in the 1980s, and the appearance of the first all-digital hearing aid in the 1990s. Today, hearing aids are paired with Bluetooth devices for even more flexibility.

### *4.3 Third Era: Cochlear Implants*

As noted earlier, the meanings of deafness help shape the technologies that evolve to address it, and technologies, in turn, shape the meaning of deafness. As cochlear implants were in their infancy in the 1950s and 60s, so were the social ideals of white middle-class success (Ciciolla et al., 2017; Jamal 2020; Schaus 2018). These two artifacts from that era- middle-class success and cochlear implants, shaped each other into

existence. When technology became available to provide near-normal hearing, the goal of having "normal" success became possible. I mark the 1980s and the founding of the first CI manufacturer in the US as a turning point where the problem of deafness shifted to success and the technological solution became CIs.

A cochlear implant is a small electronic device that provides a sense of sound to the wearer— it does not increase volume like a hearing aid does. The implant consists of an external portion that sits behind the ear and a device that is surgically placed under the skin. As shown in Figure 2, an implant has the following parts:

- A microphone, which picks up sound from the environment.
- A speech processor, which selects and arranges sounds picked up by the microphone.
- A transmitter and receiver/stimulator, which receive signals from the speech processor and convert them into electric impulses.
- An electrode array, which is a group of electrodes that collects the impulses from the stimulator and sends them to different regions of the auditory nerve (National Institute of Health 2017).

An implant does not restore normal hearing. Instead, it can give a deaf person a useful representation of sounds in the environment and help him or her to understand speech (National Institute of Health 2017).

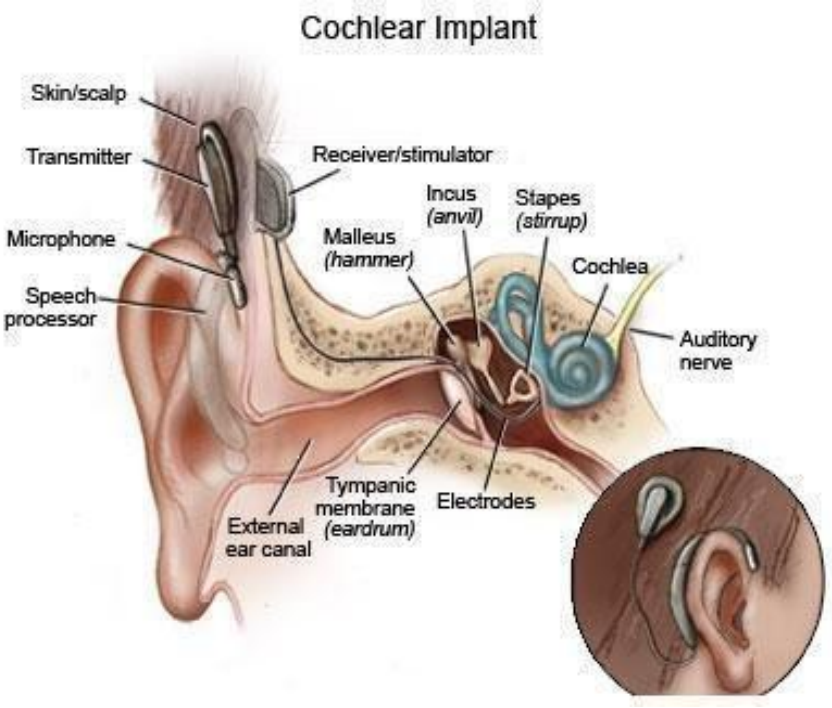


*Figure 2:* Diagram of a Cochlear Implant from the National Institute of Health (2017)

The National Institute of Health (2017) explains hearing with a cochlear implant in this way:

A cochlear implant is very different from a hearing aid. Hearing aids amplify sounds so they may be detected by damaged ears. Cochlear implants bypass damaged portions of the ear and directly stimulate the auditory nerve. Signals generated by the implant are sent by way of the auditory nerve to the brain, which recognizes the signals as sound. Hearing through a cochlear implant is different from normal hearing and takes time to learn or relearn. However, it allows many people to recognize warning signals, understand other sounds in the environment, and understand speech in person or over the telephone.

French physicians André Djourno and Charles Eyriès are credited with inventing the original cochlear implant in 1957. Their original design was a single-channel device, starkly different from







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the modern 22-channel device (Svirsky 2017). Djourno, a physician working within an academic research environment, was interested in applications of electricity in medicine. He experimented by placing little coils in small animals such as frogs and rabbits (Seitz 2002). The earliest of these coils were implanted in the animals' diaphragm with the intention of implanting the coils into humans to aid in breathing after surgery (Seitz 2002). While doing these experiments, Djourno contemplated using his implants to stimulate the cochlear nerve in deaf people. Eyriès first met Djourno four years after Djourno considered using the implant to stimulate the cochlea. Eyriès was an Otologist working within the medical establishment and had recently done surgery on a deaf man using electricity, and the man reported that he could hear during the surgery (Seitz 2002). The two physicians collaborated on an implantable device for the cochlea and implanted it into Eyriès' patient. On March 9th, 1957, the two physicians, along with 2 colleagues, published their first article about Eyries' patient. The patient was a 50-year-old man who had profound loss of hearing in both ears caused by infection. Five months after the surgery, he was able to identify a short list of words like "mum," and "allo" (French for "hello") (Seitz 2002). Unfortunately, a few months later, the implant broke, so the patient was re-implanted, which, like the first, worked for several months and then broke. The two then implanted a deaf woman, but six months after surgery she left the country, so they were not able to follow her progress. Djourno and Eyries argued about the commercial value of their implant. Djourno was adamant that an invention of this potential deserved to be in in the public domain, so refused to patent it, however, Eyries wanted to patent it for financial gain (Seitz 2002). By 1959 Djourno's team had 12 publications, two patients, and mountains of experimental data. Key among these data was a prototype of a multichannel cochlear implant, the true forebear of today's cochlear implant (Seitz 2002).

It is widely cited that Dr. William House invented the cochlear implant (Martin 2002), and, to his credit, he was the first to implant a child in 1980 (Eisenberg & House 1982), but as more researchers read the work of Djourno and Eyriès, it is becoming evident that they, in fact, should be recognized as the first scientists to invent the cochlear implant. House read their publications and relied on their experiences to make his inventions. House's four channel implant was invented in 1961 (Martin 2002).

House was originally a dentist and experimented with fenestration surgery, a surgery that opens a new hole in the bony labyrinth in the ear to correct certain types of hearing loss in older people (House, 2011). His interest in fenestration and hearing loss made a natural transition to cochlear implants. A colleague showed him the Djourno and Eyriès article and he "became excited" about it. He writes in his memoir (2011),

> I became very excited about this. I had seen that deaf children with some residual hearing who could hear a degraded signal with a hearing aid could learn lip reading. It seemed possible that if an implant could give totally deaf children some hearing, they could learn lip reading, be successful in an oral school, understand the English language and learn to read.

House's first implants were of two adults in 1961. Things proceeded as expected, with the adults hearing ambient noise, but then they both developed infections and House ex-implanted both patients. House's influence on the development of cochlear implants can't be underestimated. He followed in the footsteps of his predecessors, Djourno and Eyriès, and made steps forward by implanting additional patients and advancing the technology. In 1964, Blair Simmons and Robert J. White implanted a six-channel electrode in a patient's cochlea at Stanford University (Mudry and Mills 2013). That implant had limited success in terms of hearing and speech results but was one of the first implants that didn't have complications requiring re-implantation.

Another crucial step in this period involved the independent evaluation of cochlear implants. The first such evaluation was published in 1977 by the

audiologist and neurophysiologist Robert Bilger (Bilger & Black 1977) from Pittsburgh. Over the course of 5 days, Bilger's group evaluated 13 patients with implants (11 who had undergone implantation by William House with a single-channel electrode, and 2 by Michelson) and remarked that "[t]he implant surgical procedures were well-tolerated by the subjects and did not disrupt middle ear function" (Bilger and Black 1977) The patients "did score significantly higher on tests of lipreading and recognition of environmental sounds with their prostheses activated than without them" (Bilger and Black 1977). They concluded as follows: "To the extent that the effectiveness of single-channel auditory prostheses has been demonstrated here, the next step lies in the exploration of a multichannel prosthesis" (Bilger and Black 1977).

The modern multichannel cochlear implant was independently developed and commercialized by Graeme Clark, an independent inventor from Australia, and, independently from Clark, Ingeborg Hochmair and her future husband, Erwin Hochmair. The Hochmairs first implanted a person in December 1977 and Clark's was first implanted in August 1978. (Lasker Foundation 2013). Clark hypothesized that hearing might be reproduced in people with deafness if the damaged or underdeveloped ear were bypassed, and the auditory nerve were electrically stimulated to reproduce sound. Clark's first multi-channel cochlear implant operation was done at the Royal Victorian Eye and Ear Hospital in 1978 by Clark and Dr. Brian Pyman. (Lasker Foundation 2013) The first person to receive the implant was Rod Saunders who had lost his hearing at age 46 (Roche and Hansen 2015). Less than one year later, a second patient was implanted. In 1982 Clark supervised the initial clinical studies mandated by the Food and Drug Administration (Clark 2006). After a world trial in 1985 the FDA granted approval for his multi-channel cochlear implant for adults 18 and over who had hearing before going deaf (Clark 2006). It thus became the first multi-channel cochlear system to be approved as safe and effective by the FDA (Clark-2006). In 1990 after a detailed analysis of results the FDA announced that the 22-channel cochlear implant was safe and effective for congenitally deaf children from two to 17 years of age (Yawn, et al., 2015).

After Clark and the Hochmair's first implantations the challenge came to manufacture the implant en-mass and convince surgeons the devices were safe and effective. This was accomplished by the rise of three companies: Cochlear America in 1983 (Cochlear America 2018b), Advanced Bionics in 1993 (Advanced Bionics 2018), and Med-El, based in Europe, in 1990 (Med-El 2018).

In 1987 Holly McDonnell, at the age of four, was the first pediatric recipient of the commercial Nucleus (a Cochlear America product) cochlear implant. She still has her original implant and has had five sound processor upgrades since then. "With my cochlear implant, I was able to happily attend mainstream schools and successfully achieve my own personal and career goals" said Holly at age 26 (Cochlear America 2018).

The global cochlear implants market size was valued at USD 1.1 billion in 2015 and is projected to grow at a compound annual growth rate (CAGR) of 10.5% (Grand View Research 2018). This high growth can be attributed to the advancements in cochlear implants, growing penetration of implants due to expanded geographical reach of market players, and government support, such as the fact that Medicaid covers cochlear implants (Grand View Research 2018). Technological advancements, strategic initiatives by the industry players, and favorable insurance reimbursements for cochlear implantation surgery are the other key drivers of the market.

## V. CONCLUSION

I have covered technological advancements in both hearing aids and cochlear implants. This technological analysis demonstrated that it takes an army to make a technological advancement—one person or group makes the original attempt, and then other people take that attempt and make it better. There is a feedback loop from user groups (such as the feedback that audiphones did not work well for people with false teeth, which







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then transferred the technology back to the developers to address the problem). This kind of discovery was apparent with the audiphone and dentaphone— competing inventors came up with over four different audiphones and dentaphones in the scope of one year! Simultaneous attempts on different continents are also possible, such as the cochlear implant advancements made by Graeme Clark in Australia and the Hochmairs in Europe.

The meaning of deafness is a socially constructed viewpoint of what deafness means, both to those who are deaf as well as those who are hearing. In the early 1800s, the meaning of deafness was the fear of being isolated from God. Minister-run residential schools that taught ASL were the solution to this problem. Residential schools became the cultural center of Deaf culture, where friendships and marriages were often begun. In later eras, the meaning of deafness was related back to other social problems, such as a growing awareness of evolution and struggles with immigration, and in these time periods, deafness meant isolation from humankind and from the nation. The idea of deaf people as being threatening is salient in this second era— in the 1880s, deaf people were considered evolutionarily "behind," and were seen as a threat to an advanced gene pool. With regards to immigration, deaf people were seen, much as Irish, Italian, or Jewish immigrants, as threatening to an intact nation. In the modern, or third, era, I identified "success" as the meaning of deafness. Success as the meaning of deafness is tied back to white, middle-class American ideals that emerged in the post-war period in the 1950's. Only cochlear implants, and not ASL or hearing aids, can offer hearing and speaking to congenitally deaf children in such a way that success, as it is typically defined, in terms of school, friendships, childhood sports, college, career, and marriage, can be achieved.


## ACKNOWLEDGEMENT

The author is grateful for the encouragement and assistance in preparing this manuscript from Phaedra Daipha and Maura Kelly.


*Declaration of Interest statement*

The author has no conflicts of interest regarding the publication of this paper.

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# The Necessity of Theoretical Science Education in Bangladesh: Insights, Issues, Prospects

*Md. Nayem Hasan Muntasir & Sadman Shabab Azad*

## ABSTRACT

In modern times, the progress of a country largely depends on its Science Education facilities. Coordination between two significant wings of Science Education, i.e., Theoretical Science Education, and Practical study Oriented Science Education together boost innovations by accelerating the journey toward digitalization and modernization. However, practical study-oriented science education is blind provided that theoretical Education is disregarded. And when Theoretical Science Education is enriched, open and profound, Practical Education oriented fields of a country become more dynamic. Bangladesh turned out to be a middle-income country in the year 2019. Provided that the country plans to achieve its long-cherished aim, i.e., 'Vision 41 Digital Bangladesh', it's high time to revisit its Theoretical Science Education facilities and strengthen the field to exert human potentialities in the development of science and Technology sectors.

*Keywords:* theoretical science, bangladesh, globalization, developing world.

*Classification:* DDC Code: 510.71073 LCC Code: QA13

*Language:* English

London Journals Press

LJP Copyright ID: 573333
Print ISSN: 2515-5784
Online ISSN: 2515-5792

London Journal of Research in Humanities and Social Sciences

Volume 22 | Issue 15 | Compilation 1.0

# The Necessity of Theoretical Science Education in Bangladesh: Insights, Issues, Prospects

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## ABSTRACT

*In modern times, the progress of a country largely depends on its Science Education facilities. Coordination between two significant wings of Science Education, i.e., Theoretical Science Education, and Practical study Oriented Science Education together boost innovations by accelerating the journey toward digitalization and modernization. However, practical study-oriented science education is blind provided that theoretical Education is disregarded. And when Theoretical Science Education is enriched, open and profound, Practical Education oriented fields of a country become more dynamic. Bangladesh turned out to be a middle-income country in the year 2019. Provided that the country plans to achieve its long-cherished aim, i.e., 'Vision 41 Digital Bangladesh', it's high time to revisit its Theoretical Science Education facilities and strengthen the field to exert human potentialities in the development of science and Technology sectors. Bangladesh's endeavor to standardize people's livelihood through utilizing the blessing of science and technology may no longer be a matter of dependency and intervention by foreign companies if the country wanders toward a widespread plan on improving the quality of theoretical Science Education.*

*Keywords:* theoretical science, bangladesh, globalization, developing world.

*Author α σ:* Institution: Mirzapur Cadet College.

## I. INTRODUCTION

### *1.1 Background Research*

In the modern era, the countries which are progressing in the field of science and technology have already started working on enhancing self-sufficiency a long time ago to transform their citizens into significant assets by providing them with proper science education facilities (both theoretical and practical) by nurturing their capability of direct contribution in their economies. Even though the developed countries have produced adequate skilled citizens to look after their significant scientific sectors and scientists to work for required advanced innovations to keep pace with the global competition in this era of Globalization, the developing countries fail to do the same due to insufficient resources and manpower with that level of expertise.

### *1.2 Problem Statement*

Bangladesh, despite being a third-world country, has pulled on immense interest and efforts for the modernization of its leading science-based sectors to ease people's lives and accelerate the progress of livelihood development. Besides, the widespread roots of corruption, poverty, illiteracy, natural disasters, and lack of access to Higher Education are several serious factors increasing its dependence upon other countries in science sectors.

### *1.3 Research Objectives*

The research paper mostly reflects the necessity of theoretical Science Studies in Bangladesh by considering some crucial factors like benefits, circumstances, goals, and ability of the country.

In this entire research paper, we will be working on some of the most demanded and necessary theoretical science subjects like Astronomy, Astrophysics, Nuclear Science, Quantum Physics, Theoretical Physics, Earth Science, Space Science, and so on.

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## II. THEORETICAL SCIENCE EDUCATION ACROSS THE BORDERS

### *2.1 Theoretical Science Education in Developed Countries*

The developed countries started their progress in theoretical science education way long before Yuri Gagarin first traveled to space or Neil Armstrong walked on the moon. If we look at the Physical Science Research Index, the United States is leading the list while China has done significantly better in the last few years [1]. Thereafter Germany, France, Switzerland, and Japan lead the list. In Switzerland, CERN has brought seven of its finest discoveries under light (Higgs Bosons, GOD particles to the World Wide Web), all of which are significant innovations in the field of theoretical science Education throughout the world. In the USA, there are more than 100 Universities that include Quantum physics as one of the majors in their courses. In all of the countries which are mostly termed as Developed; Space Science, Astrophysics, Astronomy, and Nuclear Science Studies have been included decades ago in their Higher Education Curriculum and most of those have conducted several research works based on the Education they have been offering to their students.

Besides meeting the demand of contribution in their own countries, graduates of the developed countries are often offered decent jobs in third world countries in nuclear Electricity fields, Satellites Administration, and in universities to teach theoretical science subjects as these countries fail to produce that sort of expertise to meet their demands.

### *2.2 Bangladesh and Theoretical Science Education*

The Higher Education facilities in Bangladesh are not enriched enough despite having a good number of Universities and Colleges within her small territory. Putting the entire higher Education faculty aside, if we talk about the science Education facilities, this sector is also standing below standards. The country has already begun constructing two 500 MWe nuclear reactors (costs of US $2.9-3.7 Billion) with a target to produce 600 MWe units and 1000 MWe, the country has become the 57th country in history to have an artificial satellite of its own, the country is often said to have Uranium in few of its mountains, nevertheless, the country is not having a decent education facility in Universities for producing skilled citizens for maintaining and leading all of these above-mentioned science-based significant projects for the country. However, Theoretical Science Education can be an answer.

#### *2.2.1 Higher Education Facilities in the Universities of Bangladesh*

Higher Education in Bangladesh is a legacy of the British Colonial Education System. At present, there are 85 Universities, of which 30 are public, and 55 are Private.[2] Even though the number of private Universities is double the number of Public Universities, most local parents tend to send their children to public Universities due to unaffordability. As a result, the competition in public universities is so hyped compared to that of private Universities.

Of the total number of universities, five are 'Science, Engineering, and Technology based, while ten are general and others are mostly divided into Agricultural and Open Universities. The number of students in each University is huge, the ratio between teachers and students is too unbalanced, and only an average of 23% of students get jobs related to their subjects after graduation. For illustration, the Bangladesh University of Engineering and Technology (BUET) has ranked 185th worldwide this year in the QS ranking.[3]

#### *2.2.2 Theoretical Science Education in the Bangladeshi Universities*

At this point, the most significant discussion that we must understand does begin. We have researched all of the Universities providing Science-based Education facilities in Bangladesh and have collected data about their available majors. Among a total of 67 such Universities, the number of universities that offer Quantum physics as a major is three. (Jahangirnagar

University, Islamic University of Technology, Rajshahi University). The number of universities providing opportunities to study Space Science, Astrophysics, and Astronomy is even less. The University of Dhaka has the oldest Physics Department, established in the year of 1921. Nevertheless, in the journey of 101 years, it couldn't include some other significant physics-related majors like Quantum physics, Nuclear Physics, Astrophysics, Cosmology, and so on. Theoretical majors like Nuclear Engineering, Nuclear Science, and short courses are offered at Dhaka University, Chittagong University of Science and Technology, Military Institute of Science and Technology, and Khulna University respectively. However, even though the Universities are claiming these subjects to be available, mentionable outcomes and results from these Departments are completely absent.

#### *2.2.3 Theoretical Science Education in Local Universities*

Dhaka University has a Department of Nuclear Engineering since 2010. However, this department doesn't have a well-equipped computer lab for the students and faculty members (Reactor simulators like MCNP, DRAJON, and GEANT4 are important in this case).

Another factor is that the University mostly focuses on studies about running Nuclear Power Plants. The department cited, "The Government of Bangladesh has decided to build some nuclear power plants within the shortest possible time to ensure energy security and sustainable economic growth in the country. A number of highly trained nuclear engineers will be needed for the planning, design, construction, installation, maintenance, and operation of these power plants. Considering the expansion of nuclear-related activities for power generation and the increased demand for skilled engineers, scientists and researchers, the department has been established. The syllabus is designed to provide a clear idea to the students about the various aspects of Nuclear Science and Engineering and peaceful applications of nuclear energy." [4]

Military Institute of Science and Technology (MIST), a renowned Semi-Government University established its NSE (Nuclear Science) Department in 2014 and the department is claimed to be the first accredited NSE Dept. in Bangladesh. Here, students can study modern nuclear techniques for acquiring skills in nuclear security and safeguards, radiation-based therapy, and contraband detection. Whatsoever, the scientists produced from here are destined to be employed in nuclear power plants, power industries, and nuclear medicine centers in Bangladesh as well as abroad. It provides facilities like radiation detection and medical application lab, nuclear technique and materials lab, nuclear reactor and control system design lab, etc. [Official website: NSE-MIST]

## III. THE NECESSITY OF THEORETICAL SCIENCE EDUCATION IN BANGLADESH

In our surveys, we even asked people whether they think that the concerns for Theoretical Science Education should emerge in Bangladesh despite every possible oddity like financial constraint, lack of resources, and so on. In the response, we found that 1106 persons or 89.3% of all responses agreed that it is urgently required to teach Theoretical Science Education in Bangladesh as soon as possible, while 3.5% said no.

A developing country, Vietnam used to be much dependent on its agriculture like Bangladesh is today. However, if we look at Vietnam's success in Science and Technology fields, the record will seem very uncongenial to what usually happens in a developing country. In Vietnam, Electronics has emerged as a spearhead of the sector. In 2013, high-tech products contributed 28.7% to the country's GDP. By 2014, Vietnam was ranked 3$^{rd}$ in the Sub-Continental Region and 12$^{th}$ in the world in the export of electronics.[5] There cannot be a better contribution by the technology sector of a developing country than the ability to export electronics and stand out in the world ranking.

Now we will focus on how Astrophysics and Astronomy can contribute to progress. We have mentioned at the beginning of the paper that

Bangladesh became the 57th country to launch an artificial satellite. An important note is that the Bangladesh Government is planning for 'Bangabandhu Satellite-02' in the near future. [6]

Bangladesh is marching gradually to incorporate the uses of nuclear science and technology in medicine, industrial, agricultural and environmental sectors. There is a long-standing need for nuclear scientists, engineers, and professionals to take care of nuclear infrastructure, equipment, and material such as nuclear power plants, nuclear fuels, and radioactive waste, especially for power generation, industrial development, and healthcare diagnostics. Therefore, Nuclear Science education is very important, necessary, and demanding for Bangladesh. Besides, the research opportunities if created through Nuclear Physics in Bangladesh, may keep remarkable contributions to the advancement of nuclear energy production in Bangladesh. Keeping our statements unchanged here we reemphasize the demand for nuclear physics and science to ensure quality maintenance of the massive project of Bangladesh like the Ruppur Power Plant.

## IV. REASONS BEHIND HAVING LACK OF THEORETICAL SCIENCE EDUCATION FACILITIES IN BANGLADESH

If we talk about the reasons behind our inability to establish Theoretical Science Education facilities in a developing country, precisely Bangladesh, financial constraints or lack of affordability will undoubtedly be the biggest factor. However, while researching the reasons, we have found ample drawbacks and loopholes which are going to hold back any kind of greater initiative to start the journey of these facilities. From those, some of the major factors are pointed out below:

### *4.1 Financing the Universities and financial constraints*

Most public universities are dependent on the government for funding. However, of the 26 public universities, the National University is financially independent of the government and very solvent. It collects funds from registration and examination entry fees. The 'Open University of Bangladesh' is able to bear almost 30% of its expenses from the fees collected in entrance exams and the rest is usually financed by the Government through the 'University Grants Commission' of Bangladesh. [7] Since the budget is fixed for almost every year, it doesn't become possible to open an entire Science faculty from that budget. As a result, it's impossible for a university to take steps for establishing enriched Theoretical Science Education facilities. In fact, only the government has the affordability to take the initiative and make it happen.

In Bangladesh, public universities cost TK. 12 (about 20 US cents) per month for the educational needs of the thousands of meritorious students and the amount has remained unchanged for the last 75 years. [8] In reality, the sum can't even cover the cost of maintenance records. As a result, these universities are dependent on the government for 95% of their total expenditure. One catching sector of the revenue expenditure on the educational sector is that an estimated 71% of the fund allocated for education was spent on teachers' salaries, pension, and fringe benefits, and the rest 13% only was available for education contingency in the year 2019-2020. [9]

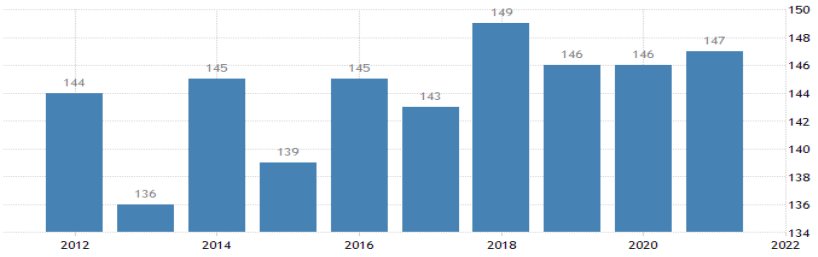
### *4.2 Lack of Job Opportunities*

Even though we have mentioned nuclear power plants in Bangladesh and its artificial satellite, these sectors cannot be adequate for the graduates to rely on as job opportunities after graduation. From 'The Bangladesh University of Engineering and Technology', 27% (approx. 90000 students according to UNESCO) of the total students graduating every year go abroad for Higher Education, and 18% of them never come back to Bangladesh as the country fails to provide jobs in such a crucial sector like Engineering.

> *In our survey, we asked the attendees whether they were interested in studying theoretical Science. Among the students who are below 12th grade or are in 12th grade, 33.3% replied negative while 26.7% responded in the affirmative.*

### *4.2 Corruption*

The deep-rooted corruption and dirty politics within the University Administration and students respectively are hindrances to the interest of theoretical science education among the students of our country. Transparency International's 2021 'Corruption Perceptions Index' ranks Bangladesh in 147th place out of 180 countries in the Index, where the country perceived to be most corrupt is ranked 180. [10]




*The Solution*: 'The Six Thinking Hats

To proceed further, we have decided to use the Six Thinking Hats techniques for presenting the issues, prospects, solutions, and understanding multiple scenarios through cognitive analysis. According to mindtools.com, "*'Six Thinking Hats' is a way of investigating an issue from a variety of perspectives, but in a clear, conflict-free way.*"

*The Six Thinking Hats are as follows:*

*The White Hat: Facts, Insights, and Analysis*

- The annual report-data of the University Grants Commission (UGC) in 2020 shows that out of 46 public universities in the country, a number of 38 universities have spent a total of Tk. 72.91 crore in the research sector while from 107 private universities, a number of 77 universities have spent tk. 111.73 crore on research. In the 2019-2020 national fiscal year, emphasizing the research sector, the government passed budgeted funds only for research purposes. What's shocking is that a total of 35 universities did not spend any amount on research and around 50 universities did not make a single publication throughout the year 2020. [11] Although Public Universities are offering education to a massive number of students every year while Private Universities are limited, Private Universities are doing a better job and utilizing an impressive amount of research despite not receiving any help from the government. If Theoretical Science Education in Bangladesh begins its journey, the feasibility and the expected outcomes may not bring a positive picture due to the above-mentioned failures of the Public Universities to utilize research funds.
- According to the 'Global Knowledge Index' 2020, Bangladesh ranked 112th with a score of 35.90 in the pre-university education category while in the higher education sector, the country ranked 129th with a score of 24.1. [12] The rankings are quite disappointing in comparison to our expectations for Theoretical Science Education.
- As of 2020, the percentage of unemployed graduates is 66, which includes all who have completed bachelor's degrees and post-graduation from more than 2000 public and private colleges affiliated with the National University. [13] The future prospects of public university graduates in the country's job market have been dire for the last decade. Even though public universities are claimed to be far better than private universities, such a job market threatens the initiatives that we are discussing here.

*Survey-Report: In our survey, we asked people whether the limitations in theoretical science education areas of Bangladesh are one of the biggest reasons why Bangladesh University fails to come up with important innovations. Here, 81% of the responses agreed with the necessity while 19% disagreed.*

*The Yellow Hat: The benefits that Bangladesh will witness if Theoretical Science Education facilities are provided*

Let's have an optimistic view on our topic. We are going to have a direct look at what the people (mostly the survey respondents) think of all the facilities we have been talking about:

- Emphasizing the research field, one survey *respondent* said, "Basically a large amount of research is needed for the development of a country, and to get an effective outcome in research fields one needs to study pure science subjects like Theoretical Physics, Mathematics, and Chemistry."
- Another irrational opinion that we received: "As per my opinion, theoretical science education is the precondition of the practical invention. If we want to explore and hereby want to develop science, precisely want to use science for the sake of humanity; first, we need theoretical science knowledge and only then we can move to the practical use of it."
- Our last comment, "Theoretical science is the science which leads to the creation of theories, though it may sound utopian for Bengalis. The European renaissance had occurred by dint of theoretical sciences, hence when our students or people are capable of developing new theories, they can also contribute to the creation of better technologies."

*The Black Hat: Drawbacks that Bangladesh might witness if Theoretical Science Education facilities are provided*

We have, after a long time, moved to one of the most important hats. Some points arise:

- According to UCG, "Many people were not interested in conducting research in the country in the previous years but preferred to go abroad to do the job." [UCG 46th Report-2021] Students well-studied in theoretical science subjects may leave the country, too, due to the lack of proper jobs. Ultimately, the tendency may cause no benefit to the country.
- Every year, 61% of the students from public universities rush into the competitive examination of Government jobs like BCS (Bangladesh Civil Service), Banks, Jobs at Secretariat, Military Services and all of which do not provide any opportunity to pursue a career on what they have learned during receiving higher education. The tradition has created fierce competition among the graduates and often brings failure of a large number of graduates.

*Survey Report: In our surveys, when students were told if they are provided with the opportunity to study theoretical subjects like Astronomy or Nuclear Science, only 57.1% agreed to receive the opportunity. Interestingly, when they were asked the same question again, but with the assurance of their jobs, 97% of students were happy to study the above-mentioned majors. That means the students are interested in studying theoretical-based subjects. but bitterly, the only main barrier that works between them is the lack of job opportunities.*


*Figure:* Two results presenting two different circumstances on the question where the responders were asked whether they would study Theoretical Science Education or not. The first figure presents theoretical science education without job assurance while the second one represents the answers when job opportunities were assured

*The Red Hat: Is it really possible for Bangladesh to ensure Theoretical Science Education in Bangladesh?*

In this research paper, we have already talked about the issues that may stand as obstacles to the possibilities of achieving an enriched Theoretical Science Education facility. In this section, we will throw some constructive views on whether the aforementioned barriers can really hamper the journey toward enriching Theoretical Science Education facilities in Bangladesh.

As we have repeatedly addressed the lack of affordability or financial constraints for fulfilling this project, now we can discuss these issues thoroughly. As the public universities are the only place for most of the Bangladeshi students aspiring for Higher Education, regardless of their parent's eligibility, we shall consider the Government's initiative as one of the most feasible ways for making this project true. Here we will be looking at how much of the budget is being fixed for the overall expenditure of the public universities of Bangladesh. According to a report in 'The Daily Star', the UGC approved a budget of 1067 million USD for 49 public universities in the country for the 21-22 fiscal year. Of the amount aforementioned, the size of the revenue budget is Tk 5,875 crore and the development budget is Tk 4,157 crore according to UCG. In 2021, UGC approved Tk 8,485 crore budget for public universities. [14] From the amount mentioned above, 'The University of Dhaka' received the highest allocation and 'Habiganj Agriculture University' received the lowest this year. If the News is analyzed, the positive side is that the amount of the budget is increasing every year. Now, if the government doesn't increase the allocation in the next year, instead, if the government allocates an increased budget for Theoretical Science Education, starting up with a new set of Theoretical Science departments at the top tier Universities of Bangladesh is never going to obstructed by financial constraint or lack of affordability.

Although teachers and students at universities have always complained about a research environment and financial inadequacy, almost the entire amount of allocation by the government every year remains almost unspent. In the 2019-2020 fiscal year, placing priority on the research sector, the government allocated funds for public university teachers for purposes of research in science and technology, arts and humanities, social sciences, business studies and science and technology. Prof HM Jahirul Haque, Vice-Chancellor of 'The University of Liberal Arts Bangladesh' said: "We always aim at ensuring research-based education and producing skilled human resources to take part in the Fourth Industrial Revolution. [15]

But the picture is harsh yet. If we think practically, we can count the lack of job opportunities as a long-lasting problem in this country. If Job opportunities can be created by expanding the slightest of possibilities,

Bangladesh can go ahead with the dream of achieving an enriched Theoretical Science Facility

*The Green Hat: Ways to get started with Theoretical Science Education*

Some other points regarding how to introduce this new arena to the infrastructure of developing Bangladesh:

- Bangladesh Government's Education Ministry may appoint an ambassador to represent Bangladesh in different renowned foreign universities and negotiate resource exchange with those.
- Bangladesh may negotiate on Faculty Exchange programs with the world universities for getting qualified teachers of theoretical science education until Bangladesh produces undergraduate students who are eligible to teach the subjects like Quantum Physics.
- For subjects like Astrophysics and Astronomy, Bangladesh may reach out to developed countries for important equipment like telescopes for now. Even the neighboring country India has been doing several research on astronomy, if India shows generosity, Bangladesh can propose for assistance from India as well.
- The nuclear power plant of Bangladesh is under construction. The Bangladesh Government may use a specific Zone in this place for research purposes so that students studying Nuclear Science may get precious chances for research.

*The Blue Hat: Concluding Remarks*

- The project is going to take time to get started in full swing.
- Bangladesh is less likely to afford the entire project without asking for support from other countries for resources.
- Without ensuring job opportunities, the possibility of achieving an enriched theoretical science education facility is negligible.
- As Lab equipment is going to be one of the most crucial and necessary resources in Theoretical Science Majors, Bangladesh will have to ensure it from the very beginning.
- Provided that the quality of the project is not ensured, the tendency of going to foreign Universities for Higher Studies but not coming back will always remain the same as today.

## V. CONCLUSION

According to the research findings, it is understandable that theoretical science Education in Bangladesh is hindered mostly because of financial constraints mostly among other issues. The surveys that we have conducted have found a positive response among the majority of the responders on whether Bangladesh should proceed on this path. Through surveys, we can confidently come to the decision that Theoretical Science Education facilities will be widely accepted among Bangladeshi students.

Now, it comes to the question of how much Bangladesh can afford. Even though it is going to be quite tough for Bangladesh to start this project to a large extent, it is time for the country to enrich its theoretical science education as much as it can afford. However, the budget for Higher Education in Bangladesh must specify a significant amount of budget for this purpose. Else, the project may progress but will never succeed.

Even though a huge budget is allocated every year for education purposes, it has been claimed that the money is never spent properly due to corruption. As our findings show that it is a major obstacle in the path of this goal, therefore, the government must revisit the entire budget allocated for Higher Education and sort out the loopholes.

This is certain that Bangladesh will have to enroll in an enriched Theoretical Science Education facility if it really wants to prosper and succeed 'Vision 2041: A digital Bangladesh'. The earlier it happens, the better the outcomes will be.

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*Survey Links:*

1. Survey 1. <https://forms.gle/GKb7Cu8ivkBHegED9>
2. Survey 2. < https://forms.gle/u3LQgdz3JFRWxHXE7>

*Websites and Documents*

- The Six Thinking Hats: < https://www.mindtools.com/pages/article/newTED_07.htm>
- UCG annual report <http://ugc.portal.gov.bd/sites/default/files/files/ugc.portal.gov.bd/annual_reports/0b944cc5_aa77_44b7_b1db_cc1a20e0eb37/2021-09-08-06-49-e0bf991565e624555d9915b54629624d.pdf>
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- Department of Physics, University of Dhaka: <https://du.ac.bd/faculty/FACSCI>
- SPARSO: <http://www.sparrso.gov.bd >

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# The African Union's Security Architecture: Operational Mandate and Challenges for Actualisation of the Responsibility to Protect

*Dr. Olukayode Bakare*

## ABSTRACT

The objectives of this study were to examine the African Union security architecture within the purview of its operational mandate and challenges for the actualisation of the Responsibility to Protect (R2P) in Africa. The scope of this study was also based on the AU institutional mechanisms in resolving African conflicts since its inception, in 2002. This study further examines the rationales behind the transformation of the OAU into the AU, and how the AU has been responsive to the various internecine conflicts on the continent of Africa since the entrenchment of the Principle of the Responsibility to Protect by the United Nations Security in its Charter, in 2005. It also investigates the power of the Peace and Security Council of the AU to intervene militarily in African conflicts under Article 4(h) of the AU.

*Keywords:* african union, african union constitutive act, protection, responsibility to protect.

*Classification:* DDC Code: 341.584 LCC Code: KZ6369

*Language:* English

London Journals Press

LJP Copyright ID: 573333
Print ISSN: 2515-5784
Online ISSN: 2515-5792

London Journal of Research in Humanities and Social Sciences

Volume 22 | Issue 15 | Compilation 1.0

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*The objectives of this study were to examine the African Union security architecture within the purview of its operational mandate and challenges for the actualisation of the Responsibility to Protect (R2P) in Africa. The scope of this study was also based on the AU institutional mechanisms in resolving African conflicts since its inception, in 2002. This study further examines the rationales behind the transformation of the OAU into the AU, and how the AU has been responsive to the various internecine conflicts on the continent of Africa since the entrenchment of the Principle of the Responsibility to Protect by the United Nations Security in its Charter, in 2005. It also investigates the power of the Peace and Security Council of the AU to intervene militarily in African conflicts under Article 4(h) of the AU. The main method of data collection for this paper has been through the secondary data. This paper draws on the AU-led peacekeeping missions in Burundi (2008) and Darfur (2004), as well as the political impasse in Sudan. The secondary data include information derived from journal articles, books, the African Union and the United Nations sources. The findings of this study reveal that, since the creation of the AU, the body has remained an effective continental body, in resolving African deadly conflicts, although with some challenges, including the AU financial constraints, the small size of the AU force and its inability to enforce binding decisions on warring parties, as well as the power politics between Nigeria and South Africa in reaching a common ground on the AU strategic goals.*

*Keywords:* african union, african union constitutive act, protection, responsibility to protect.

## I. INTRODUCTION

The AU was founded in May 2001, and launched in July 2002, in Durban, South Africa. The Constitutive Act (Kristiana, 2005: 4) of the African Union and its Protocol Relating to the Establishment of the Peace and Security Council, laid a new emphasis on building a continental security regime capable of preventing, managing and resolving conflicts in Africa. In addition to this security framework, the principles underlying the AU dynamic and emerging peace and security agenda rests on the idea of a protectionist mechanism, as stipulated in the ICISS report, *The Responsibility to Protect*. The Responsibility to Protect clearly specifies the provisions for intervention in the internal affairs of member states through military force, if necessary, to protect vulnerable populations from the infraction of human rights and genocide (Kristiana, 2005: 4). The creation of the African Union was also based on the realisation by African leaders that the OAU had achieved its hitherto stated objectives of decolonisation, eradicating apartheid regimes and maintaining the colonially inherited artificial boundaries after independence, and the ideological struggle, in which Africans found themselves entrapped, which had resulted in a shift of attention in respect to the challenges of peace, development and security facing the African states (Aning, 2016: 209).

The transformation from the OAU into the African Union was further triggered by the expectation among the African leaders that the new international institution (AU) would have the

strength and the capacity to deal with the security dilemma facing the continent (Aning, 2016: 209). Meanwhile, the shift in international thinking and debates concerning military intervention after the Kosovo conflict of 1999, the Somalian war of 1993 and the Rwandan genocide of 1993-1994 led for the first time to the endorsement of the concept of 'Responsibility to Protect' by the United Nations General Assembly (UNGA), in 2005 (Omorogbe, 2012: 143). The emerging African Union's responsibility to protectionist regime, as would be discussed in this paper, underscores the AU commitment to undertaking a robust military intervention towards the prevention, and resolution of conflicts on the continent of Africa. Therefore, the paper examines the AU Constitutive Act and its emerging security architecture at the level of the African Union's Peace and Security Council. Also, the paper delves into the role of the Peace and Security Council in selected conflict zones (Burundi and Darfur) in Africa. Finally, the paper considers the challenges militating against the AU normative mandate to peace initiatives and security management in Africa.

## II. CONCEPTUAL CLARIFICATIONS

### *2.1 Protection*

This article employs The Principle of Responsibility to Protect to conceptualise the AU commitment and mandate to intervene in conflict situation in Africa. The concept of "protection" informs the use of military intervention to protect the vulnerable population, or non-combatant during armed conflicts. This paper notes that the AU intervention in Burundi and Darfur points to a constituted legal enforcement purpose for the protection of civilians. However, the first AU humanitarian protection (Peacekeeping Operation) on African continent was deployed to Burundi in 2003-2004 to facilitate the implementation of various cease-fire agreements that were signed by the rebels. The AU took the Burundi's conflict upon itself and deployed troops because the condition was not conducive for the UN to deploy its troops. The African Union's peacekeeping mission in Burundi were made up of Ethiopian, Mozambican, and South African soldiers that facilitated disarmament and demobilization exercises of about 20,000 ex-combatants, and thus prepared the ground for the UN which later took over the peacekeeping mission in June 2004 (Abdellaoui, 2010: 28). In Sudan, the African Union deployed its troops in Darfur region in 2004. The AU mission in Darfur has been the biggest peacekeeping operation since its inception in 2002. As the conflict expanded, the UN was called to intervene, though was rejected by the Sudanese government. Ultimately, the UN and the AU collaborated to form the Hybrid force UNAMID (United Nations-African Union Mission in Darfur), which later failed despite the huge resources to mount the operation (Abdellaoui, 2010: 28). However, this paper may still be a useful inquiry as much as it investigates the AU normative principle of "responsibility to protect" and the strategies it employs, as well the challenges it faces in building an effective security architecture in sub-Saharan Africa.

## III. THE PRINCIPLE OF THE RESPONSIBILITY TO PROTECT (R2P)

The most fundamental developments in global politics in last decade has been a significant focus that state sovereignty comes with responsibilities – a theoretical ideal that resonates on domestic and international – to protect people threatened by devastating and mass atrocity (Thakur and Maley, 2015: 1). However, the global call and responsibility to protect came into limelight on 16 September 2005 when the United Nations General Assembly took a historical resolution to end crimes against humanity. At this time, the world leaders took a collective decision to end turmoil and crimes perpetrated against humanity (Cooper and Kohler, 2009: 1). The resolution reached in the meeting affirmed, "Each individual State has the responsibility to protects its population from genocide, war crimes, ethnic cleansing, and crimes against humanity" (Glanville, 2014: 1). In 2007, the International Court of Justice ratified the resolution that, all states shall have legal obligation within the existing law, to protect people from genocide, ethnic cleaning, and crimes against humanity (Bellamy and Dunne, 2016: 3).

international society to stop or respond to complicity to mass killings underscored a rethinking of traditional definition of state sovereignty (Tutu and Havel, 2012: xxv). As argued by Tutu and Havel (2012: xxvi), responsibility to protect may be described as the responsibility of the international society or sovereign's body to protect its population from genocide, ethnic cleansing and crimes against humanity.

The debates on the responsibility to protect has gained prominent since the 2005 World Summit, which emphasises the requisite obligation of the international community to protecting population from genocide, ethnic cleansing, war crimes and crimes against humanity (Cunliffe, 2011: 1). The concept of responsibility to protect came into international focus, in 2001 by the correspondent report of the International Commission on Intervention and Sovereignty (ICIS). The report was initiated and sponsored by the Canadian government as a step towards reviewing the long-awaited disputed humanitarian intervention by individual state or international community (Besada; Goetz, and Werner, 2010: 2). Following the release of the report by the ICIS, the African Heads of state held a World Summit, in 2005 to discuss the R2P. The summit rests squarely on three major pillars. These pillars describe the condition and criteria by which an intervention may be carried out in the case of genocide, war crimes, and crimes against humanity. They include the following:

- The of the state to protect its population from genocide, war crimes, ethnic cleansing, anresponsibility d crimes against humanity, and from their incitements.
- The commitment of the international community in meeting up these obligations; and
- The responsibility of the member states to respond in a timely and decisive manner when a state is manifestly failing to provide such protection (Tutu and Havel, 2012: xxvi).

In response to the above, according to Article 2(4) of the UN security system, no State or States shall be allowed to use military force for humanitarian purpose unless such intervention has been expressly and explicitly granted or authorised by the UN Security Council (Kuwali, 2011:149). Consequently, in March 1999, the North Atlantic Treaty Organisation (NATO) launched a military intervention against the government of former Republic of Yugoslavia to protect the Albania people Kosovo. NATO's intervention in Kosovo was declared illegal. It was morally justified for humanitarian purpose but lacked the international legitimacy and approval of the UN Security Council (Badescu, 2011: 1).

## IV. THE AFRICAN UNION OPERATIONAL MANDATE AND THE RESPONSIBILITY TO PROTECT

The AU has a functional legal framework otherwise known as the Constitutive Act of the AU, established in July 2000, by the OAU Assembly of African Heads of states at its Thirty-Sixth Ordinary Session (Packer and Rukare, 2002: 371). According to Ben Kioko, one of the central objectives for co-operation among the African States under the new legal instrument of the African Union was to promote respect for human rights, condemnation of unconstitutional changes of government and democratic governance (Kioko, 2003: 807). The transformation of the OAU into the African Union was a turning point and a shift from a governing principle of non-intervention, thus empowering the Union the right to intervene in a Member State pursuant to a decision of the Assembly in respect of grave circumstances, namely: war crimes, genocide and crimes against humanity (The Constitutive Act of the AU, 2000), whereas Articles II and III of the OAU placed a premium on sovereignty, territorial integrity and non-interference in member states' internal affairs (Frankel, 2008: 232). The Constitutive Act of the African Union (CAAU) Act includes important provisions (The Constitutive Act of the AU, 2000). First, Article 3(f) of the Constitutive Act of the AU aims to "promote peace, security, and stability on the continent" (The Constitutive Act of the AU, 2000: Art. 3f). The AU peacekeeping mandate is sacrosanct as was enshrined in Article 4(h) that "the Union shall

have the right to intervene in a Member State according to a decision of the Assembly in respect of grave circumstances, namely: war crimes, genocide, and crimes against humanity" (The Constitutive Act of the AU, 2000).

In May 2004, the AU launched the Peace and Security Council (PSC) (Williams, 2009: 603). The Protocol Relating to the Establishment of the Peace and Security Council was adopted in 2004 by the Assembly of the AU at its First Ordinary Session for Conflict Prevention, Management, and Resolution and specified the operational goal and objectives of the AU Peace and Security Council (Bernan Press, 2004: 236). As argued by Williams (2009: 604), the PSC was not an embodiment of the African Union Constitutive Act (AUCA), but rather adopted in Lomé, Togo in July 2001. It metamorphosed out of *ad hoc* efforts to "reform the Mechanism for Conflict Prevention, Management, and Resolution, which had been adopted by the Organisation of African Unity's (OAU) Assembly of Heads of State and Government in June 1993" (Williams, 2009: 604). The AUPSC was acknowledged to have joined the ranks of the Economic Community of West African States Mechanism on Conflict Prevention, Management, and Resolution, Peace-Keeping and Security (ECOWAS Mechanism) and the South African Development Community Organ on Politics, Defence and Security Cooperation (SADC Organ) as one of three African institutional security mechanisms created to prevent and manage conflict through military intervention on the African continent (Levitt, 2003: 110).

## V. THE PEACE AND SECURITY ARCHITECTURE OF THE AFRICAN UNION AND R2P

The most powerful body of the AU is the Peace and Security Council. It has the capacity to project the will and action of the Union (Aning, 2011: 31). The PSC represents the 'Board of Directors' of the AU, with specific reference to its collective security apparatus, while the chairperson of the AU Commission serves as the chief executive officer (CEO) (Aning, 2011: 31). The power and functions of the PSCAU are highlighted in Article 7 of its Protocol to anticipate and prevent disputes and conflicts; to undertake and carry out peace-building functions; authorise the mounting and deployment of peace support operations; lay down general guidelines and rules governing the operational efficiency of the Union; implement the common defence policy action of the Union; ensure the implementation of the AU's convention on the Prevention and Combating of Terrorism and other relevant international, continental and regional conventions to combat international terrorism; approve the modalities for intervention by the Union in a Member State, in reference to a decision made by the Assembly, pursuant to Article 4(j) of the AU Constitutive Act, and support and aid humanitarian action in situations of armed conflict or major natural disasters (African Union, 2000).

The new legal framework has three main organs; the Panel of the Wise, the Continental Early Warning System, and the African Standby Force (Levitt, 2003: 120). According to Article 11(3) of the PSCAU, the Panel of the Wise "advises the Peace and Security Council and the Chairperson of the Commission about the promotion and maintenance of peace, security, and stability in Africa" (African Union, 2002). It is made up of five eminent African personalities of impeccable character who have made "outstanding contributions and success to the cause of peace, security, and development in Africa" (African Union, 2002). Article 12 of the Peace and Security Council Protocol provides for the establishment of the Continental Early Warning System (CEWS) to facilitate the anticipation and prevention of conflicts (African Union, 2002). The Commission works and collaborates with the United Nations, its agencies and other relevant international organisations to facilitate the effective implementation of the Early Warning System (African Union, 2002). It has eight Regional Mechanisms which are considered to be part of the operational structure of the CEWS, including the "Intergovernmental Authority for Development (IGAD), the Economic Community of West African States (ECOWAS), the Southern African Development Community (SADC), the Arab Maghreb Union (AMU), the East African

Community (EAC), the Common Market for Eastern and Southern Africa (COMESA), the Economic Community of Central African States (ECCAS) and the Community of Sahel and Saharan States (CEN-SAD)". (Tiruneh, 2009: 3-4). The eight Regional Mechanisms work at different regional levels. It is argued that the Intergovernmental Authority for Development (IGAD) and the Economic Community of West African States (ECOWAS) can be considered the most effective and integral to the overall security architecture of the Union (Cilliers, 2005: 9).

Pursuant to the Article 4(h) and (J ) of the Constituitve Act of the African Union, the Peace and Security Council of the AU is responsible for the establishment of an African Standby Force (ASF) for "observation and monitoring missions" (African Union, 2002). The Peace and Security Council of the African Union derives its authority from article 20 of the African Union Constitutive Act (as codified by article 9 of the Protocol on Amendments to the Constitutive Act 2003), and pursuant to article 2 of the 2002 Protocol Relating to the Establishment of the Peace and Security Council of the African Union (African Union, 2002). The PSCAU stands as a key decision-making organ for the prevention, management, and resolution of conflicts, as well as serving as "collective security and early-warning system to aid timely and efficient response to crisis and conflict situations in Africa". (African Union, 2002). Central to the norms and objectives of the Protocol Relating to the Establishment of the Peace and Security Council of the African Union, article 22 of the PSC thus replaced the Cairo Declaration and the decisions of the OAU relating to the Mechanism for Conflict Prevention and Resolution (MCPMR) in Africa (African Union, 2002). Article 3 of the Protocol Relating to the Establishment of the Peace and Security Council of the African Union (PREPSCAU) stated that the objectives of the Peace and Security Council should be to promote peace, security, and stability in Africa, prevent and anticipate conflicts; promote and implement post-conflict reconstruction activities; coordinate and harmonise continental efforts in the prevention and combating terrorism; develop a common defence policy for the Union; promote and encourage democratic practices, good governance and the rule of law, and protect human rights and respect for the sanctity of human life (African Union, 2002).

The statutory composition of the AUPSC is not unique. Its composition and structure were formed in line with the United Nations Security Council (UNSC), particularly on issues concerning membership, core function, and the electoral process (Levitt, 2003: 116). This is because most of the AU staff relied on the UNSC staff and experts during the drafting process of the Protocol (Levitt, 2003: 116). Perhaps it can be argued that central to the principle of democratic representation, the AUPSC membership is more democratic than the UNSC permanent membership, as it is composed of fifteen Members, elected by equal rights, that serve by two and three-year terms (African Union, 2002).

In addition to the democratic principle of the AUPSC, membership election is also based on "the principle of equitable regional representation and rotation" (African Union, 2002). while the representation and election of members into the AUPSC shall be based on the criteria of "the capacity and commitment to shoulder the responsibilities entailed in membership". "willingness and ability to take up responsibility for regional and continental conflict resolution initiatives", "contribution to the Peace Fund and/or Special Fund created for specific purpose," respect for the norms of democratic governance as stipulated by the Lomé Declaration, and commitment to the financial obligations of the AU (African Union, 2002). The UN Security Council remains the only jurisdictional and appropriate international organisation which can endorse military intervention for humanitarian purposes as may be requested for approval by such regional or sub-regional organisations (AU, ECOWAS, and SADC) in respect to the UN Chapter VII (African Standby Force, 2006). In respect to the Constitutive Act of the AU and the AU Peace and Security Council Protocol, however, the right of the AU to military intervention in a member state is governed by specific norms. These norms place importance on sovereignty but also the

responsibility of the Union to conduct a military intervention for humanitarian purposes in member states; this tension poses serious ambiguities in respect to both the constitutive act and the protocol. For example, Article 4 specifies the legal mandate and right of the AU to intervene through military force. In February 2003, pursuant to Article 2 of the 2002 Protocol Relating to the Establishment of the Peace and Security Council of the AU, the assembly of the AU heads of states and government amended Article 4(h) of the protocol which extends the right of the Union to military intervention in member states in conditions of "grave circumstances, namely war crimes, genocide and crimes against humanity" (African Union, 2002).

As was rightly stressed in the Charter of the United Nations, however, article 4(h) of the Constitutive Act of the AU explicitly derived its source from the normative principle of the responsibility to protect. The right of the AU to intervention in conflicts lies on the power and approval of the UN Security Council (Kuwali and Viljoen, 2014: 1). Although the intervention of the AU after the 2007-2008 electoral crisis in Kenya, the political impasse in Cote d'Ivoire and Libya, the deadly conflicts in Democratic Republic of Congo (DRC), the Central African Republic (CAR), Darfur in Sudan, Northern Mali and Somalia, have made the implementation of Article 4(h) of the AU to be brought to the intellectual focus (Kuwali and Viljoen, 2014: 3).

Furthermore, the right to intervention under Article 4 (h) of the AU overshadows the place of sovereignty of the States over the citizens. The normative principle draws a sharp disparity to, the principle of State sovereignty and non-intervention, the very fundamental clause of the defunct Organisation of African Unity. All the AU member States agreed that sovereignty is not a licence to perpetrate illegalities, but a responsibility to protect citizens in the time of war crimes, genocide, and crimes against humanities. Central to the responsibility to protect, Article 4(h) of the AU affirms the treaty-based or statutory intervention by the AU to prevent or stop genocide, war crimes and crimes against humanities (Kuwali, 2014: 13).

Based on this normative act, with respect to the legal mandate and the right of the AU governing military intervention, it means that both the AU Constitutive Act and the security protocol have unparalleled powers to override the sovereignty of a state to protect a vulnerable population and to restore peace and security. In respect to democratic governance and human rights, the AU Constitutive Act outlines the norms to address unconstitutional change of government and "respect for democratic principles, human rights, the rule of law and good governance" (African Union, 2002). Dan Kuwali (2014: 25) has noted that the main purpose of Article 4 (h) intervention is not to fight against the targeted State, but to deter and stop genocide, crimes against humanity and war crimes in Africa.

Similarly, in 2007, the AU adopted a more comprehensive framework known as the African Charter on Democracy, Elections, and Governance to strengthening and promoting democratic governance in Africa. The Charter specifically broadened the scope and definitions of unconstitutional and undemocratic change of government and forms of sanctions that may apply to states or individuals. The Charter notes that unconstitutional changes of governments are mostly responsible for insecurity and conflicts in Africa (African Union, 2007). According to Article 5, "state parties shall recognize popular participation through universal suffrage as the inalienable right of the people" (African Union, 2007). Also, Article 10 affirms that "state parties shall entrench the principle of the supremacy of the constitution in the political organization of the State" (African Union, 2002).

Nevertheless, the capacity of the AU and its member states to successfully initiate the R2P against targeted state depends largely on and measured by the ability of the Peace and Security Council of the AU to mobilise efficient and rapid reactions forces capable of diffusing and mitigating violence against vulnerable population. For this purpose, the African Standby Force is expected to offer rapid response, tactical, strategical and logistical advantages of African security architecture (Dallaire, 2010: xxi). Unfortunately, the ASF has been hampered by its

inability to respond fully without depending on external support in the areas of transportation and training (Dallaire, 2010: xxi). Therefore, there is need for the African Union to be independent and strengthened to enable it carry out its mandate, particularly as stipulated in Article 4 of the Constitutive Act of the AU.

The African Union Constitutive Act has a robust and sophisticated "responsibility to protect" three years before the UN adopted it as a global responsibility, although has some challenges in implementing this successfully. It has been argued that Africa has both recorded progress and retreats in normative and practical human rights advancement. Although the principle of the responsibility to protect has been embedded into the African Union security architecture of "non-indifference," but the problem lies on how these two negative normative frameworks are to be implemented (Mills, 2015: 4). Record shows that thirty-four African states are members of the International Criminal Court (ICC), but the AU has seldomly found accusing the IICC of being biased against Africa and advocated for withdrawal of all allegations and cases levelled against African states (Mills, 2015: 4).

For example, in respect to the AU commitment to the enforcement of, and compliance with human rights in Africa, the case in Darfur, is a good example. The International Federation for Human Rights (IFHR) noted that the African Heads of State and Government at the conference of the African Union, held in Sirte on 3 July 2009, took a unanimous decision to prevent the arrest of President al-Bashir who has been accused of a war crime by the ICC (Worldwide Movements for Human Rights, 2009). The African Union had accused the International Criminal Court (ICC) of interfering in the peace efforts in the region, as well as unfairly targeting African leaders (BBC, 2013) within the ambit of the ICC's watch. In addition, Nigeria, as an advocate of peace efforts in Africa, especially in Darfur, also hosted al-Bashir in 2013 during the African Union World Summit in Abuja after the AU decision in 2009 that no member state should enforce any sanctions issued by the ICC against the Government of Sudan (BBC, 2013). Ultimately, if Nigeria, an African regional power, and other AU members had failed to ensure compliance to arrest al-Bashir by the ICC during his visit to Nigeria, then it is valid to assert that the AU has compromised and failed in its commitment to enforce the AU Constitutive Act (Article 4), which is premised on the principle of the responsibility to protect the people of Sudan from the Sudanese government's act of crimes against humanities.

Linked to the above, is the question of sovereignty, which remains sacrosanct as the ultimate symbol of state power to a legitimate order. Mills (2015: 5) has noted that polarisation among Africa leaders, coupled with reversion and adherence to Westphalian understanding of sovereignty, serves as the major challenge against full realisation of human rights protection in Africa. African states tend to aspire for greater and fair participation in global politics, advocating, for example, more representative seats in the UN Security Council, and even a more robust collaboration and partnership between the AU and the UN (Mills, 2015: 5), but the will power and political will to implement the responsibility to protect have always be the challenges.

The problem of division among African states or leaders has further historical reference point on the principle of responsibility to protect by the AU. For example, on 10 March 2011, South Africa, Nigeria and Gabon had initially voted for a "no fly zone" over Libya to protect Libyan population against the repressive regime of Muhamad Ghadaffy. South Africa under Jacob Zuma later renounced its decision, citing the view that NATO overstepped the bounds of the relevant UN resolution (Khadiagala and Nganje, 2016: 1572). Zuma's back-pedalling on the Libya crisis raised doubts about policy consistency regarding Pretoria's commitment to the AU's Constitutive Act on peace and security architecture in Africa (Khadiagala and Nganje, 2016: 1572). The inconsistency of Pretoria in respect to regional democracy, peace and security is what Khadiagala and Nganje describe as "South Africa squandered the opportunity provided by the Arab Spring to reassert its leadership on peace, security and democracy promotion, particularly since Libya and most of North Africa had for a long time

remained strongholds of authoritarianism in Africa" (Khadiagala and Nganje, 2016: 1572). It may however be valid to assert that South Africa, which has a greater influence in the Southern African region and the AU, has failed and contradicted the collective decision of the African Union in Libya's political crisis. Then, one could affirm that the dictum of "African responsibility to protect" may be described as a "mere illusion of collective and rhetoric agenda."

On the other hand, an advancement in regional security framework is credited to the AU approach in dealing with African conflicts. For those that berated the African Union's approach to protecting the vulnerable population during genocidal act, war crimes and crimes against humanities, records about the contribution and supply of troops to the United Nations peacekeeping missions underline the active involvement and contribution of the African states in peace operation (Dallaire, 2010: xxi). Evidently, as of 2008, three out of 10 contributing countries that supplied troops to the UN peacekeeping operations are African countries. Nigeria ranked fourth, Ghana fifth and Kenya ninth, and South Africa tenth. These figures underscored the responsiveness and willingness of the African states to the issues of peacekeeping missions in Africa. The deployment of 700 troops to the African Union Mission in Burundi in 2003 to monitor the deadly security situation there, underlined the ability of the AU to enforce the R2P to bring peace to the African continent (Dallaire, 2010: xxi). It has been argued that except for Europe, Africa has developed, notably in peacekeeping enforcement, although with varying degrees of successes. However, Somalia and Democratic Republic of Congo (DRC), among other troubled states on the continent of Africa, offered a critical illustration on the successes and failures of the AU in peacekeeping (Mills, 2015: 5). A few of these states in this paper include Darfur in Sudan, Burundi and Kenya.

## VI. THE AFRICAN UNION FIRST PEACEKEEPING MISSION IN BURUNDI - A LITMUS TEST OF THE RESPONSIBILITY TO PROTECT (R2P) DOCTRINE

A critical analysis of the African Union's role in conflict management in Burundi demonstrates the importance the AU lays on the responsibility to protect civilian population in conflict zones. Burundi is a small country, with a total population numbering over 8 million. About 400, 000 killed and roughly 800,000 fled the country, some were internally displaced (Howard, 2011: 5). Burundi, located on the Great Lakes Region, has encountered series of wars since the period of its independence on 1 July 1962. Of these wars, two major conflicts have resulted in its greatest political and social upheaval. Historically, in April 1972, a group of rebels of southern origin, hiding under the springboard of Tanzania, attacked the country (Burundi) via the province of Bururi, where Tutsis were vehemently slaughtered, which was signaled by strong repressive reaction of the Burundian Army took the form of equal reprisals against Hutu members of the population, including the members of the elite in the country (Boshoff; Very and Rautenbach, 2010: 3).

The Burundi civil was significant in the innovative long-term leadership initiative training and decision-making that focus on the leaders across all the society, designed to develop and build strong foundation that sustains peace that enables a country to effectively tackle the arrays of challenges of post conflict reconstruction in Africa (Henri; Boshoff and Rautenbach, 2010: 3). The first round of peace negotiations through the AU mission in Africa took place in Arusha, Burundi from 15 to 21 June 1998, with seventeen parties on attendance: the government of Burundi, the National Assembly, Front pour la Dêmocratie au Burundi (FRODEBU- the Burundian Democratic Front), Union pour le Progrês Nation (UPRONA- Union National Progress), Centre National de la Dêfense de la Dêmocratie (CNDD- National Centre for Defense of Democracy), Parti pour Rêconciliation Nationale (PARENA- Party for national Reconciliation), the Parti Libêral (PL-

Liberal Party), Parti Indêpendant des Travailleurs (Independent Workers' Party), Parti Social-dêmocrate (PSD- Social Democratic Party), Alliance Burundo-africaine pour le Salut (ABASA-Burundi-African Salvation Alliance). The parties to the peace negotiation were both led by Julius K. Nyerere (Crisis Group, 1998).

The Central Organ of the Mechanism for Conflict Prevention, Management and Resolution of the African Union (AU) convened its 91st Ordinary Session in Addis Ababa, Ethiopia, on 2 April 2003, in a bid to review its readiness for the deployment of the African Mission in Burundi (AMIB). The meeting took place under the chairmanship of Ambassador Basa Sangqu, Permanent Representative of South Africa (SA) to the AU. Under the peace building arrangement by the AU in Burundi, the AU Commission on the situation in Burundi ordered the deployment of an AMIB for an initial period of one year. The deployment of the AMIB was subject to renewal by the Central Organ, pending deployment of a UN peacekeeping force to be mandated by the UN Security Council, and as agreed by both the UN and AU (Henri, Boshoff and Rautenbach, 2010: 3).

In 2003, the AU intervened in Burundi's war to maintain peace and the formation of strong UN peace operations. To restore peace and orderliness in Burundi, an African Union Mission in Burundi (AMIB) was established. The Mission represented the AU first peace enforcement entirely initiated, planned and carried out by its members, and the AMIB was mandated to build peace in dynamic situation in Burundi. In reference to the AU Constitutive Act, Article 4 (h), (j), the AMIB upholds a responsibility to protect. The AMIB mandate was to protect politicians returning to take active position in the transitional government. Other peace building tasks involved by the AU in Burundi was premised on opening secure demobilization centers and helping the Mission to reabsorb former militia members back into the society. The peace building tasks by the AMIB led to the establishment of Disarmament, Demobilization and Reintegration (DDR) and creating the condition conducive for the internal displaced persons and refugees across the entire eight Burundian provinces, coupled with three refugee camps in Tanzania, and to return to their respective homes (Henri; Boshoff, & Rautenbach, 2010: 3).

Also, as part of the tasks and mandate of the AU peace building efforts in Burundi, it established a conducive platform for the United Nations peace operations to settle in Burundi and decimated the insurgencies. Initially, the UN was reluctant to engage in a situation in which there existed the impending reversion into conflict. AMIB role was focused in creating atmosphere conducive through which peace, albeit a fragile one could be established in the country. Moreover, throughout the AMIB operation, it has succeeded in de-escalating a potentially volatile condition, and later in 2004, the UN evaluation team reiterated that the country was peaceful to establish a UN peacekeeping operation in the country (Henri; Boshoff, & Rautenbach, 2010: 3).

However, despite the successful peacekeeping operations by the AMIB, a host of challenges remained in Burundi. As the UN Peace Mission was planning to take over from the AMIB, it faced the challenge of reintegration of internally displaced person (IDPs) and refugees and how the returnees would have access to land to ensure their livelihood. By 21 May 2004, the UN Security Council passed Resolution 1545 to deploy a peacekeeping mission in Burundi. Also, by 1 June 2004, Kofi Annan, former UN secretary-general, appointed a special representative, Ambassador Berhanu Dinka, to head the commission. In the same vein, the entire troops of the AMIB were absorbed into the UN Peace Operation in Burundi (ONUB). Between 2006 and 2010, military personnel in Burundi have been demobilized, but lacked economic opportunities, which posed a potential security threat in Burundi (Nhlapo, cited in Murithi, 2007: 76).

Admittedly, the African Union Mission in Burundi has clearly demonstrated *a self-inward-looking approach,* that obviously rested on the ability of the institutional and internal mechanisms in peacekeeping operation in Burundi. The commission serves as a *litmus-test* and a testing ground where the AU applied for the first-time

peace and security operationalization in conflict situations in Africa. Also, the commission was able to restore order in Burundi before the interception of the UN Peace Operations. The next section discussed the AU's mission in Darfur region.

## VII. THE AFRICAN UNION'S MISSION IN SUDAN, DARFUR REGION: EXPERIMENTING R2P

Sudan is one of the African countries that have experienced devastating civil wars in history, although the country has recently experienced a political impasse, which had resulted into a power sharing between the opposition and the Supreme Military transitional government, after Al Bashir, the former dictator was ousted from power. Darfur is a region in Southwestern Sudan. The crisis in Darfur began in February 2003, when two militia groups emerged to challenge the National Islamic Front (NIF) government in Sudan. During the upsurge of this great calamity in Sudan, the Sudan Liberation Army (SLA) and the Justice and Equality Movement (JEM) alleged that the government of Sudan discriminated against Muslim African ethnic groups in Darfur. The crisis has claimed roughly 300,000 lives, with an estimated figure of 1.9 million people being displaced and dispersed across neighbouring countries (Ted, 2005). For example, Chad had hosted roughly 110,000 refugees from Darfur (IRIN, cited in Murithi, 2007: 6). Despite the evidence and calls for intervention by the International Crisis Groups (ICG), Human Rights Watch (HRW), Amnesty International (AI), Nick Krist of the New York Times and Juan Mendez, then UN Secretary-General's Special Adviser on the Prevention of Genocide, the UN failed to stop the genocide in Darfur (Nick, 2006). It is evident that if the international community is not ready and willing to intervene in African conflicts, it could be argued that Africa must be ready to devise a self and inward-looking approach, otherwise called "African solution to African problems".

The foremost international actor in Darfur has been the African Union (AU). Darfur remained a testing ground for the fledging organization in history. When the degree and levels of the catastrophe became too unbearable to ignore, in 2004, the AU created a monitoring mission in Darfur, comprising 60 monitors and 300 troops to protect Darfurians (Nick, 2006) from the ravaging deadly conflicts orchestrated by the rebels. The AU became actively involved within the scope of a Cease-Fire negotiation between the two parties in Chad and later assumed a key role in monitoring the Cease-Fire agreement thereby facilitating political dialogue between the government of Sudan and Darfur. In April 2004, the AU created a Cease-Fire Commission in Darfur to bring an end to the conflicts in the region. The Commission's roles were based on "planning, verifying, and ensuring the parties adhere to the Cease-Fire agreement entered into in March 2004". The AU Peace and Security Department (PSD) was charged under the leadership of Ambassador Sam Ibok, Director of the AU Peace and Security Department, to monitor the peace talks in Chad (Nick, 2006).

Accordingly, the African mission in Darfur (AMID) had failed to achieve a meaningful peace mission, although with a measure and little degree of success. For example, the AU was the first international organization to respond and intervene militarily in the conflicts. It failed to protect civilians despite the estimated 1,400 troops dispatched from Rwanda, Nigeria, and Gabon (Ted, 2005: 8). The inability of the African Union's Mission in Darfur (AMID) to bring a lasting peace in the region has also been credited to the AU financial constraints and the size of the AU force. The deployment of the AU force, albeit, small, was delayed for about four months after the Cease-Fire agreement has been signed by the two parties. Also, the Commission's mandate lacked the capacity and mechanisms, except reporting the violations of Cease-Fire agreement to the Joint Commission, which comprises the two parties and the international community (Ted, 2005: 8) in the conflicts. After an unsuccessful intervention by the AU in Darfur, in 2006, the government of Sudan and Darfur rebel groups negotiated the Darfur Peace Agreement (DPA), to limitless outcome.

The inability of the AU to bring lasting peace to the people of Sudan, had led to continuous deteriorating and excruciating human situation in Darfur, which later resulted in the intervention of the UN. In July 2007, however, the Sudanese government accepted to allow a Hybrid United Nations-African Union Mission in Darfur (UNAMIND), as authorized (Great Lakes Invitational Conference Association, 2007) by the UN Security Council resolution 1769 (Birikorang, 2009: 2) and accorded Chapter VIII mandate towards strengthening the AU-led Pease Mission in Darfur. An estimated 20,000 soldiers and 6,000 civilian police officers were deployed to Darfur region. Following the agreement by the Sudanese government and Darfur rebel groups in 2007, UNAMIND has worked effectively to fulfill its mandate and responsibility: protecting civilians, ensuring of availability of humanitarian aid, also working to ensure realizing the objectives of the DPA (UN, 2007). However, the UN peace mission Darfur faced a number of challenges. These include hostility within Sudanese inner circles; hostility of armed groups in Darfur and a fragmented political and social environment (Pierre-Antoine, 2006).

## VIII. CONCLUSION

This paper has examined the AU security architecture and implications for the Responsibility to Protect (R2P). An important note from the analysis in this paper is underscored by the AU security architecture in safeguarding the lives and properties of vulnerable population during and after conflicts through the principle of the Responsibility to Protect. The paper argued that as a continental body, the AU still lacks the power to enforce binding decisions on any warring party. For any International Organization to effectively arbitrate in conflict resolutions between the member states, such a common organization has been to be infested with powers so binding on the Union. The conflicts in Burundi were beyond the AU responsibility. AU is an emerging organization that still requires the efforts of the international community, to tackle security challenges in Africa. Having said that, the AU remains the first continental organization that carried out the Principle of Responsibility to protect in the face of the deadline conflicts that nearly tore apart both Burundi and Sudan. One cannot underrate the challenges faced by the in the cause of carrying out its peacekeeping missions. In Africa These include the small size of the AU force, the financial constraints of the AU to mobilize its military personnel and equipment to the fields of operations, the power politics between Nigeria and South Africa in reaching common ground on the AU strategic objectives, lack of adequate and technical expertise to oversee and service broken down military equipment on the fields of operations, etc. However, these challenges could be overcome if the AU and all its member States agree on common ground, or modalities and steps set aside in its Constitutive Act towards ensuring proper implementation of its strategic goals and objectives. Moreover, strategic partnerships between international organizations, such as the EU and NATO, and AU cannot be over emphasized in the realization of its mandate in relations to African regional security architecture. The AU must be ready to partner with these bodies in the areas of intelligence gathering, training and retraining of its military personnel, and if possible, financial aids to the AU from these bodies, to enable the AU to overcome its financial challenges. Also, the AU members must be ready to remit their dues regularly to enable the Union carry out its mandate efficiently.

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# Hypercentrality of English Language in the World of Globalization

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## ABSTRACT

Globalization is increasing rapidly in the contemporary world; this increase in globalization has affected language. This impact in turn affects the culture of the language. One way through which globalization has affected language is by spreading one language globally, where that language is considered as the dominant language, it tend to over shadow other native languages. English language has emerged as the dominant language due to the onslaught of globalization which has connected every part of the world into a global village. As a result, this dominant language has penetrated into the indigenous cultures of the various societies thus threatening the very existence of native languages of indigenous people and by implication their social fabric because language is an important component of any social system. In the era of globalization, English language is used globally in almost all domains of national life like business, media and internet.

*Keywords:* globalization, english language, indigenous languages, social fabric, extinction.

*Classification:* DDC Code: 423.1 LCC Code: PE1591

*Language:* English

London Journals Press

LJP Copyright ID: 573333
Print ISSN: 2515-5784
Online ISSN: 2515-5792

London Journal of Research in Humanities and Social Sciences

Volume 22 | Issue 15 | Compilation 1.0

# Hypercentrality of English Language in the World of Globalization

Suheel Rasool Mir

## ABSTRACT

*Globalization is increasing rapidly in the contemporary world; this increase in globalization has affected language. This impact in turn affects the culture of the language. One way through which globalization has affected language is by spreading one language globally, where that language is considered as the dominant language, it tend to over shadow other native languages. English language has emerged as the dominant language due to the onslaught of globalization which has connected every part of the world into a global village. As a result, this dominant language has penetrated into the indigenous cultures of the various societies thus threatening the very existence of native languages of indigenous people and by implication their social fabric because language is an important component of any social system. In the era of globalization, English language is used globally in almost all domains of national life like business, media and internet. This language has assumed the character of an international language with dominant factors. As this dominant language is being rapidly spread over the globe, the dominant culture that it represents is also gaining currency. Thus the world's native languages are fast disappearing and the dominant one is rampant across the globe. On global scale it has led to extinction of other languages and culture, thus endangering them. Endangered languages are no longer spoken by children. Only few elders speak it and extinction occurs when the language is no more spoken as a result of globalization. It is evident from the secondary sources that almost 5000-6000 languages have been endangered due to globalization. In today's globalized world English is perceived as an advantaged language and many parents push their children to learn English language over their native language in order to bring them at par with global developments.*

*In the above mentioned context the present paper entitled Hypercentrality of English language in the world of Globalization: A socio-linguistic study will try to explore the impact of globalization on culture of languages. Secondly the present paper will critically analyze how English language has emerged as the dominant language due to the onslaught of globalization*

*Keywords:* globalization, english language, indigenous languages, social fabric, extinction.

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## I. INTRODUCTION

The Enlightenment and its avatars like modernity, postmodernity and globalization have 'invaded' all arenas of the world known to man. It has affected all arenas of society differently. Like everyone else, languages which are considered to be one of the components that constitute the identity too have been caught up in the effects of what we call globalization. In this borderless world, indigenous languages have been confronted by many post-enlightenment challenges (Crystal, 2001). Even indigenous languages are no more immune to globalization. The processes of globalization thereby erode the social foundations of socio-linguistic fabric. (David, 1998).It poses threats in the wake of a strong emphasis on economic values inherent in globalization processes, and through the dominance of certain languages and cultural practices, implying an accelerated trend towards a loss of languages (especially among indigenous communities), and the extinction of certain practices. All these trends favour the emergence of a uniformity of expressions (but not necessarily of identities) and

approaches, impinging on (especially the more intangible aspects of) cultural diversity. Does globalization heighten or diminish "our aesthetic awareness or are we drowning in a tidal wave of superficial, global pop culture easily sold and instantly digestible everywhere"? (Richard Tomkins, Financial Times, 23 April 2004) Globalization is increasing rapidly in the contemporary world; this increase in globalization has affected language. This impact in turn affects the culture of the language. One way through which globalization has affected language is by spreading one language globally, where that language is considered as the dominant language, it tend to over shadow other native languages. English language has emerged as the dominant language due to the onslaught of globalization which has connected every part of the world into a global village. As a result, this dominant language has penetrated into the indigenous cultures of the various societies thus threatening the very existence of native languages of indigenous people and by implication their social fabric because language is an important component of any social system (Meredith, 2010). With the rapid advancement of science and technology, the world is gradually losing its diversity. It is getting globalized. People's attitudes, the way they dress, their foods the way they eat, the way they do their daily chores, the way they travel, the way they enjoy and get entertained and etc are getting globalized (Edward, 1978). The diversity, the traditions, rituals, customs are getting drifted away. Does not this impact on language and communication? Of course it does, language too is getting globalized gradually (Donna, 2005). Language is changing into a simpler, faster communication mode that fits with the electronic communication methods and dissemination of information. Facebook English, SMS English are getting popularized among the new generation, especially because it is free of many complicated grammar rules and spelling rules, thereby people can easily grasp it and they will like it absolutely (Erik 2001).

In the era of globalization, English language is used globally in almost all domains of national life like business, media and internet. This language has assumed the character of an international language with dominant factors. As this dominant language is being rapidly spread over the globe, the dominant culture that it represents is also gaining currency. Thus the world's native languages are fast disappearing and the dominant one is rampant across the globe (Aitchison, 2000). English language can be rightly regarded as the key to the store house of production and productivity. We can make use of this language to promote our world view and spiritual heritage and promote cultural and traditional aspects across the globe (Deborah 1992). Globalization has brought English language into limelight. The scenario of the usage of the language has changed drastically. The Queen's language has become a common man's curriculum. The language has become a silver bowl to earn one's bread and butter. Globalization leaves no stone unturned. As current globalization seems to demand comprehensive transformation of a society, its impact on language and culture can be detected in every facet of life (Cooke, 1988).

On global scale it has led to extinction of other languages and culture, thus endangering them. Endangered languages are no longer spoken by children. Only few elders speak it and extinction occurs when the language is no more spoken as a result of globalization. It is evident from the secondary sources that almost 5000-6000 languages have been endangered due to globalization (Kachru& Nelson, 1996). In today's globalized world English is perceived as an advantaged language and many parents push their children to learn English language over their native language in order to bring them at par with global developments (Lowenberg, 2000)

## II. GLOBALIZATION

Globalization is a buzzword of the moment, within universities, government and society. The power of the word itself, and all that it brings with it, is immense (e.g. Bourdieu 1999). Some tell us that globalization is inevitable, that it entails specific events and others that it is something that should be defeated. In academic circles, there are many definitions of and approaches to globalization simply because it is not a field of study that is restricted to any one discipline (Xavier ,2002).

Globalization scholars belong to fields as diverse as cultural studies, sociology, economics, international relations, political theory, art and linguistics. This cross-disciplinary nature of globalization is perhaps one of its defining features. Hence, it is a field that borrows a significant number of terms and concepts from existing lexicons. The result is that what globalization means is always in dispute. In the end, globalization concerns a field of inquiry defined more by the questions it asks and its object of study: the world as a whole and parts of it in relation to this whole.

## III. GLOBAL ENGLISH

Global English refers to both a collection of varieties of English (often called Global Englishes or International Englishes) and a phenomenon (the global spread of English). While the term "global English" may suggest a new variety of English which is used globally, such a variety does not yet exist. The growing widespread usage of the English language creates a variety of debates, most importantly those about language rights (e.g. Minority language maintenance, official languages, language education) and cultural loss. Because of the growing number of speakers of English as a first or additional language, many perceive the status of English as hegemonic (or the language of linguistic imperialism) because, as the argument goes, as more people learn/speak English, the less other languages are learned/ spoken. Debates about the hegemony of English often take place as though English itself were the enemy. It is important to remember that the current status of the English language arises from the politics, economic status, and etc.of those who use English rather than the language itself. Language policy, education and attitudes have to be monitored to stop other languages being marginalized, but, more importantly, to stop speakers of languages other than English from being marginalized. Whether there is a variety that has emerged as "standard global English" is a complex issue without a clear answer because it relies on the perceived status of a particular variety and the purpose for which it issued. While it is safe to say that certain varieties of English are preferred for certain purposes (see Evans 2005), though not due to their inherent superiority but to the value assigned to them by people. Because there are so many varieties of English spoken in the world (see Crystal 1997) it is impossible to say that only one of those is the "standard" global variety.

### *3.1 Impact of globalization on Indeginieous languages*

Language reflects culture, and in this case the power of English reflects the power of certain countries. Until relatively recently, the United Kingdom held the reins to the world's largest empire, with colonies scattered across the globe (Domke & Darla, 2001). Their superior industrial capacity meant that they were able to conquer new territories and impose their own cultural norms, laws, religion and language. As a result, English found its way into nearly every corner of the earth (Matthew, 2004).Although some are arguing that globalization is positive for language and people, there are some that are arguing it will have negative effects on language. The biggest argument is that globalization and the dominance of a few languages will force some languages into extinction (Malloy &Thomas, 2006). The Endangered Languages Project reports that 40% of world's languages will disappear, directly related to globalization and its effects. To elaborate more, Ethnologies suggests that 25 percent of the world's languages are in danger of permanently disappearing in the near future, Indigenous people's today stand at the crossroads of globalization (Richard, 2006). In many ways, indigenous peoples challenge the fundamental assumptions of globalization. They do not accept the assumption that humanity will benefit from the construction of a world culture of consumerism. Indigenous peoples are acutely aware, from their own tragic experience over the past 500 years, that consumer societies grow and prosper at the expense of other peoples and the environment (Meredith, 2010). Today, with the rapid advance of globalization, the loss of intangible cultural heritage once seen in Japan can now be observed throughout the world. The threat of extinction to intangible cultural heritage is particularly noticeable in developing countries in Asia, Africa and the Middle East, today.

Therefore, while modernization and industrialization remain urgent issues, it is at the same time essential to preserve and transmit these traditional cultures. The various ways in which intangible cultural heritage is being preserved and transmitted require special attention. The disappearance of languages as a result of the impact of globalization is bound to have negative effects, both direct and indirect, on identities and intangible cultural heritage – especially as these languages are vectors of traditional manifestations and celebrations of community life. The term globalization of languages is also defined by Steger (2003) as "the process of the spread of some languages that are used as international languages, and the disappearance of other languages that lack speakers".

Man has been using language as a medium of communication for the ages, today due to Globalization English language has become the most prized possession of communication. In this Global village, English language acts as a repository of wisdom and wit. English language is a propeller for advancement of career and a machine to mint money. And it is a telescope to view the vision of future (Aliester, 1994). In this Global world, communication in English is now recognized as an inseparable part rather the life blood of every activity which occurs in our day to day life. Now a day's every organization functions through a communication process, wherein mutually independent persons create and exchange messages to articulate and achieve commonly held objectives and goals. Frankly speaking, globalization is nothing but another form of colonization. I state this fact because it is true as far as indigenous peoples are concerned (Wallerstein, 1989). In general, the relationship of indigenous peoples to their ancestral lands forms the basis for culture, social institutions, and the daily work practices in indigenous economies. It goes almost without saying that the notion of globalization is neither value-free nor clinical, as we witness the shrinking of ancestral lands and territories worldwide (Peter, 1996).

World languages through colonization, more powerful, industrialized countries were able to force their languages on weaker populations (Alastair, 1994). Since these countries were dictating the terms of any potential economic exchange, it was necessary for traders in other less-powerful regions to learn more widely-spoken languages like English or French in order to communicate and participate in this exchange. While this inevitably led to the loss of much smaller, regional dialects, colonization kicked off the start of the globalization process (Malcom, 1993).

### *3.2 English: The official language of Globalization*

English is the official language of globalization. In the global market of linguistic goods English becomes the language of global modernity. The users of vernacular and national language are continuing to decrease (Vellenga, 2004). The various ways in which intangible cultural heritage is being preserved and transmitted require special attention. The disappearance of languages as a result of the impact of globalization is bound to have negative effects, both direct and indirect, on identities and intangible cultural heritage – especially as these languages are vectors of traditional manifestations and celebrations of community life. English competence is a powerful tool to survive the age of the globalization (Yamada, 2005). English has become the second language of everybody. Globalization and English language are said to work as pull factors for one another. English language plays a major role in the progress of Globalization. Globalization of trade and commerce, increasing diversities of work force with different setup values have increased the importance of English language usage. In other words, English has power: financial power, political power, and cultural power (Pennycook, 1995). Across the world, people who speak it often enjoy greater opportunities and options than those who do not. Companies who utilize it are able to expand internationally to an extent that might not otherwise be possible. We could spend hours discussing the advantages and disadvantages of this reality. But the fact is that right now English is arguably the most powerful language in the world (Phillipson, 1995). Nettle and Romaine (2000) claim that nearly half of the existing 5,000-6,000 languages will be extinct in the next

100 years. They argued that languages become endangered as a response to different pressures acting on a community, including social, cultural, economic, and military demands. The extinction occurs when the endangered language is replaced by another language and takes over its functions in the community (Nettle & Romaine, 2000). Similarly, Crystal believes that global lingua francas put pressures on minority languages, resulting in language death or extinction (Crystal, 2000). Clearly, one consequence of the globalization of the English language is an increased amount of endangered languages throughout the world.

English rules" is an old phrase, "English language rules" is the new phrase emerged out of Globalization. Knowledge of English is very essential because countries are becoming globally integrated and coupled with each other in all aspects in terms of culture, economy, trade and commerce

### *3.3 Linguistic Globalization and Linguistic Imperialism*

Communicating ideas is not the only function of a language. Rather, language can be considered a powerful source of setting up and preserving social relationships in speech communities. Power can be established by the use of language. Accordingly, language highlights the truth of the superior, and deemphasizes the truth of the inferior to a large extent (Thomas & Wareing, 1999).Generally, English users' ideas are not the same and direct. Some believe to mix tradition and modernity. However, some pay attention to negative effects of English. Some believe that English can give them power. Actually, this perspective does not belong to all learners of English who are in different countries. In fact, as we are thinking about the importance of English as a universal language, we understand that English native speakers tend to protect their language. English is recognized as the international language for communication all over the world because of its position and uses in the world today. It can be used among the people of the same country, e.g. India and thus, it can be considered an international language locally and globally (McKay, 2002). In fact, only English has contained the military and economic power needed for making the international language among other colonial languages (McArthur, 1998). In particular, the domination of countries that speak English in several areas provides English with an upper rank, and contributes to making English a principal language among other languages. Among different types of globalization, cultural globalization is being argued among intellectuals of a variety of disciplines. However, it is difficult to satisfy applied linguists completely. Based on the critical analysis of the present literature in the fields of sociology and culture, there are three corresponding schools of thought. The first group members are signified by authors like Ritzer (1993) who believed that some sort of cultural homogenization, which is holding the American culture at the center is apparent. These authors believe in an easy and clear equation: "Globalization" means "Westernization" means "Americanization" and "McDonaldization". According to this equation, globalization is mainly considered a process of Westernization which to a large extent is the same as Americanization which can be considered McDonaldization. Secondly, globalization affects political activities, which has an important effect on the world. E.g., financial activities, technological industry and global economy can lead basically to interaction and media. Thus, globalization can transform circumstances and conditions in ELT (Block & Cameron, 2002). As the final point, ELT settings have different contexts in several countries all over the world Block and Cameron (2002) observed some of these changes based on economy and technology. There is a question here to see if globalization contains good or bad effects on ELT with regard to the profession, teachers, activities, learners, methodologies, and course books, etc.

## IV. CONCLUSION

When a culture dies along with a language, the connection between perception and action is forever changed. Using our native language is a very important way to protect it from extermination. But usage of the language is not only about speaking it. There is no doubt that

Globalization has changed the life style of human beings altogether, the English language has given a new life to the modern man. Because of Globalization Communication in English is the major requirement in the day-to-day selection process. "English" is a language before Globalization and "English" is the language after globalization .English and Globalization are inseparable, living one on another in the present day world like body and soul of a human being. To make the richness of the language survive, it must be used in literature as poetry, dramas, films and so on. In Greenlandic society, as well as in many other indigenous societies, many words in the language are related to the way people lived traditionally, and therefore, the language is in danger of diminishing in modern society. Globalization phenomena will continue to stride into the future; it is our urgent task to examine the checks and balances of the globalization process, and find a way to promote both regional cultures and global values. Today, globalization has had and will continue to have effects on many aspects of society, including language .As globalization has increased the spread of world languages like English, and another consequence is that many other languages are becoming endangered and ultimately extinct.

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# The Impact of Exchange Rate on Inflation and Economic Growth in Liberia

*Nathan Saah Harris, JR*

## ABSTRACT

This paper seeks to measure the impact of the Exchange rates on Inflation and Economic Growth in Liberia. The study uses (13) years of cross-exchange rate regime analysis in Liberia (2007-2019). The study used STATA 14 software program to run the time series data and used Ordinary Linear Square regression (OLS). The researcher also runs a VAR model to find the impulse response of the shock on Exchange rates to Inflation and Real GDP growth. The paper also introduces the Liberia Black market rate; the black market rate is usually higher than the official exchange rate on the markets. The study results show that our time series values for most of the variables are non-stationary in their level but became stationary at their percentage change, and the first difference, which is incorporated from the first degree in the regressions from 2007-2019. The researcher runs a separate regression on the Percentage change in the Real Exchange Rate and also percentage change in the Black market rate using Inflation and RGDP as our Dependent variables.

*Keywords:* exchange rate (ER), liberia black market rate (BMR), inflation, economic growth, central bank of liberia (CBL).

*Classification:* DDC Code: 823.914 LCC Code: PR6052.R246

*Language:* English

London
Journals Press

LJP Copyright ID: 573333
Print ISSN: 2515-5784
Online ISSN: 2515-5792

London Journal of Research in Humanities and Social Sciences

Volume 22 | Issue 15 | Compilation 1.0

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*Keywords:* exchange rate (ER), liberia black market rate (BMR), inflation, economic growth, central bank of liberia (CBL).

*Author:* BBA, MSc, Pd.D. Student.

## CHAPTER ONE: INTRODUCTION

### *1.1 Introduction*

This research paper captured the high Exchange Rate (ER) and the Black market rate from 2007-2019 within the Liberian economy and its impacts on Inflation and economic growth. Considering that, the Liberian economy is import-based; the percentage change in exchange rates is very important to this study. The researcher identifies some broadening implications, on the Liberian economy, with political instability that lasted for the past 14 years. The unconstitutional acts which have led to the overthrowing of President William R. Tolbert by President Samuel K. Doe started with the Liberia civil war that lasted for over fourteen years and also led to the killing of former President Samuel K Doe. The political instability of Liberia in the past has windswept much of its economy and infrastructures, and the Ebola virus outbreak in Liberia in 2014, which lasted for two years and that took almost over four thousand lives; the civil unrest has made Liberia reach an unacceptable stage of development. The paper considers these instabilities as one reason Liberia currently lacks a progressive monetary policy, structured financial market, and even more realistic structural National Development Plan (NDP). The evidence is that every president elected has his or her development plan. It is essential that the study looks at both the official exchange rate changes and the changes within the black market exchange rates in Liberia because these rates have caused both negative and positive impacts on economic growth and increased prices of goods

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and services (Inflation) in Liberia. The paper considered both rates vital because Liberia's exchange rates have affected businesses, depreciating the country's currency, and increasing the prices of goods and services expensive due to the high exchange rate. The high level of exchange rate fluctuation in the Liberian economy has affected investments and economic activities, especially among business owners and even poor citizens. The high exchange rates have raised serious concern among stakeholders and economists within the Country.

The exchange rate is when one country's local currency is in exchange for another country's money. It's also considered the value of one nation's currency concerning another currency. The study established two different exchange rates in Liberia, the official rate, which is controlled by the Central Bank, and The Black market rate (unofficial) controlled by the business people or street sellers. The high exchange rates tern to affect the Liberian dollars on the Liberian market; this has encouraged import and discouraged export and over-dependence on imported goods. The paper also recognized the problems causing the high exchange rate: firstly, The Liberian economy is driven by United States dollars, and Prices are determined by the exchange rate on the Liberian markets. Inflation over time has continued to increase due to the high exchange rate within the Liberian economy. The abandonment of older denominations (money) within the economy and the printing of excess money by CBL have caused depreciation in domestic currency. Secondly, the Decrease in US dollar supply within the economy due to low investments and the Withdrawer of UNMIL also cause a decrease in the flow of US dollars in the Liberian economy. Thirdly, the lack of a manufacturing company to produce local goods and services consumed daily by Liberians makes the Country import more than its export. Most of the Country's consuming goods are mostly imported into the country. Goods and serves are bought and sold in US dollars, thus creating more demand for US dollars; which is encouraging more business people and citizens to hold dollars than local currency. Fourthly, due to the fluctuating nature of the exchange rates, people tend to keep money at home than at the bank, questioning the Financial sector's Safety and Soundness.

Liberia floating and high exchange rate started during the Ebola crisis; this crisis saw many investors leaving the Country because of fear. Since then, things have consistently continued to be difficult, and the exchange rate continues to increase on-a-daily-basis on the Liberian markets. The rate that is determined by the street money exchangers is referred to in this paper as the Black Market Exchange Rate. Their locations also determine their exchange rates.

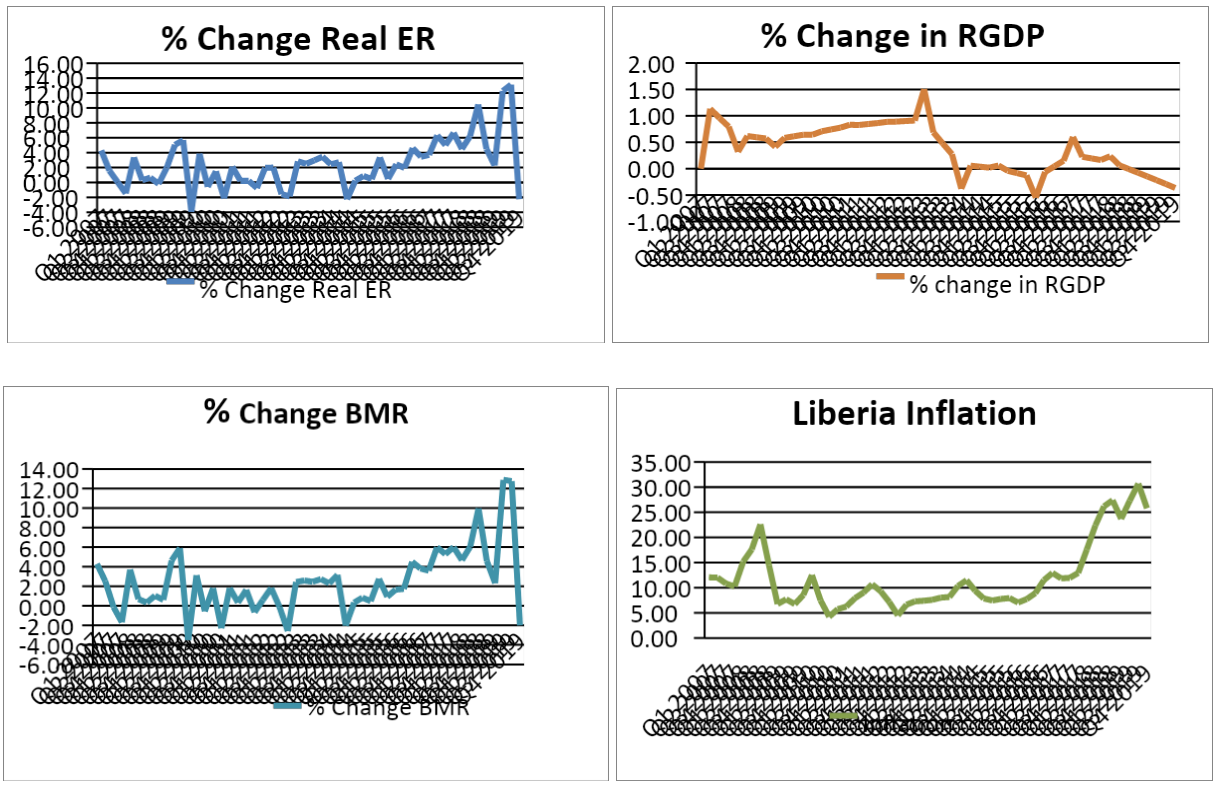
The high exchange rate has continued to depreciate the domestic currency to the foreign currency; therefore, according to Ramakrishnan and Gupta-Kpoor (1999), currency depreciation leads to trade balance enhancement in the future, which is now happening. Bahmani-Oskooee et al. (1994) view said that the devaluation of exchange rates harms the trade balance. Samuelson et al. (2001) express that exchange rates are primarily unbalanced because they are very responsive to central banks' intervention, and monetary policy, which changes expectations in the future. Exchange rates also affected relative prices. With other scholars' views on this topic, it's imperative to note that it is complicated to understand the behaviors and how different exchange rate regimes affect economic activities with the lack of financial markets and structural foreign exchange markets. Commodity prices have been determined by the exchange rate on the Liberian markets; investors are afraid to invest more because the exchange rates rise and fall. According to the Central Bank of Liberia 2019 report about currency outside banking institutions, it accounted for 97.9%, up from 94.0% reported in December 2018. It has been proven that the rise in currency circulation was due to macroeconomic uncertainty that induced rapid drawdown on deposits also gives rise to Inflation and undermined economic growth. The Black market rates are operated mainly by legal and illegal business operators, and also play a significant role in the economy. The Black market exchange rate operators are all over the Country, in all Counties,

communities, Towns, and major streets, providing services for lockers citizens. They occupied over 45% to 60% of the economy, providing foreign exchange services for all citizens. They determine their rate daily, and their rates are usually 2 – 4 digits higher than the Central Bank's official rate. At the same time, the official rate provided by the Central Bank is mostly used by government vendors and government employees.

Due to the black market rates, the business owner also tends to increase all their goods' prices, leading to a continuous increase in inflation and depreciation of the home currency. The study envisions measuring the black market rate determined by the market factors instead of government control with the official rate and examining if the market determent rate plays an essential role in our macroeconomic variables (Inflation and RGDP growth). And find out if the impact is more significant than the official rate.

This study focuses on measuring the impact of changes in rates on Inflation and Economic Growth in Liberia. The paper considers the effects of the percentage change from the Black market exchange rate on the Inflation and Economic Growth in the Country from 2007-2019. The results from the study show that most of the time series values for the variables are non-stationary in their level form but stationary at the percentage change and first differences, which are incorporated from the first degree from 2007-2019. The paper strives to bring Liberia's macroeconomic needs to the table and offers useful suggestions for Liberia's economic policies, monetary policies, and political frameworks. The results entail the official and the Black exchange rate positively impacting Inflation and a negative impact or influence on Liberia's economic growth. Notwithstanding, the researcher also realizes that if the agendas of government must focus on improving the lives of the poor by providing them with skills and opportunities; the government must first develop an inclusive financial approach of Reliable Fiscal Policy (RFP), Monetary Policy (MP) and establish a most rebuts Foreign exchange Rate policy (FERP) and focus on investing in Agriculture.Table: 1 indicates the percentage change in the real exchange rate changes reached an all-time highest in the Country's history of 13.13% in Q3 2019 and the lowest of -3.93% in Q4 2009. This means that depreciation in the local currency faces its worst decline in 2019 and leads to inflation. The graph shows that Liberia's black market rate accounted for -3.51% in Q4 2009 as the lowest, while 12.89% has been accounted for as of Q2 2019 have the highest percentage change in the exchange rate on the black market in Liberia. In Liberia, inflation also reached an all-time highest in August of 30.70% percent and lowest in Q3 2010 of 4.23% percent. The percentage change in Real Goss Domestic Production (RGDP) has had its best performance in 2013 of Q2, recording 0.15 as the highest in RGDP and a decline of -0.005 in 2016 of Q1.

Graph 1 % change in Rates, RGDP, and value of Inflation (2007-2019)




### 1.2 The Objectives of the Paper

The purpose of this paper is to measure or examine the relationships or impact of exchange rate changes on inflation and economic growth within Liberia. To examine the impact on exchange rates, the paper uses two types of rates in Liberia, the official exchange rate and the Black market exchange rate.

### 1.3 Hypothesis

*Ho*. That there is a positive impact or influence on the Exchange Rates on Inflation in Liberia.

*Ho*. That there is a negative impact or influence on Exchange Rates on economic growth in Liberia.

$H_1$. That there is a negative impact or influence on Exchange Rates on Inflation in Liberian.

$H_1$. That there is a positive impact or influence on Exchange Rates on economic growth in Liberia.

### 1.4 Significance

The Significance of this work is to measure and examine the relationship between exchange rate changes, inflation, and economic growth in Liberia for the past Thirteen (13) years (2007-2019). In so doing, it looks at the following factors:

- Firstly, it intends to examine the impact of the foreign exchange rate changes in correlation with inflations in Liberia and sort policy options towards achieving better fiscal and monetary policy stands, and contribute to the existing literature in finding solutions.
- Secondly, check the reality of the relationships that exist between exchange rate changes and Economic growth in Liberia. Check the existence of autocorrelation invalidating the stability of economic indicators.
- Lastly, to find a clear picture or reasons behind exchange rate changes in Liberia and examine the hypothetical and Empirical Relationship between Exchange Rate changes in Liberia on Inflation and Economic growth.

### *1.5 Contributions to the knowledge*

This research on the Exchange Rates (ER) on Inflation and Economic Growth is very much important to many sectors in Liberia and will contribute to the following areas:

Firstly, The Central Bank of Liberia - The recommendation in this work is anticipated to be of excellent use to the Central Bank of Liberia, helping the authorities of the bank to make a gainful contribution in their present and future monetary policy decision-making. The paper will also help in making future regulations on foreign exchange rates, inflation, and economic growth in the Country. It will also give suggestions on how to tackle and solves some of the inflation of goods and services problems and how to get an unofficial street money exchanger (the black market exchange rate) off the street. The Central Bank has always faced serious issues with these street money exchangers; they have tried to get them off the street, but it has been difficult. Recommendations in this paper will path the way for new policy implementation to handle the Liberia black market exchange rate.

Secondly, Investors - This study will help investors get more information on the exchange rate, inflation, and economic growth, making it easy for them to make their best investment decisions in the future.

Thirdly, Commercial Banks and other non-banking institutions in Liberia - The paper would also immensely contribute to the financial institutions because it will give them ideas of the kinds of monetary and fiscal policies that the CBL and the Government of Liberia (GoL) will use in their interventions for the stability of the sectors. Liberia's banking sectors account for 80.0 percent of the financial system's total assets, and the largest subsector currently has nine commercial banks with 93 branches in 11 of its 15 counties. According to CBL reports, the non-banking financial sector is one of the sectors that has been relatively stable over the past few years and has a group of formal and informal financial services providers. The insurance sector in the non-banking financial sector is ranked second in size to its banking sectors.

Lastly, Researchers and Scholars - This study will also contribute or add knowledge to many students choosing this topic to develop on it. Also, Researchers will want to find out more about Liberia's exchange rate volatility, inflation, and economic growth in the near future. The researcher also believes that it will serve as a pathway for better research by many scholars. The research has also introduced a new variable in this field, "The Liberia black market rate." This variable will encourage more scholars to discuss it more since it is a practice in most African countries. The black market rate is the rate that is always determined by people in the black market and not by the Central Bank in the Country. The research also provides other Scholars or researchers with opportunities to further research the black market exchange rate in Africa and how it impacts the continent.

The structure of this paper is as follows: Chapter One (1) Introduction and Significance, Chapter Two (2) Literature Review, Chapter Three (3) Research approach, and Methodology, Chapter Four (4) Empirical Analysis/ Results, Chapter Five (5) Provide Concluding Remarks and Recommendations.

## CHAPTER TWO: THE LITERATURE REVIEW

### *2.1 The Literature Review*

This study's review contains various researchers' kinds of literature and the basis of their analysis on this topic "The impact of Exchange rates Changes on Inflation and Economic growth. It was difficult to find a comprehensive report on Liberia and other poor African nations facing Exchange Rate Volatility, Inflation, and Economic Growth problems. Notwithstanding, in writing this paper, the researcher review several other papers that directly connect to my research, like "Causal Effects and Dynamic Relationship between Exchange Rate Volatility and the Economics Development in Liberia" Gbatu et al., (2017). It has been argued that since the introduction of financial liberalization, most developing nations have been uncovered to sharp exchange rate fluctuation. The condition has made many economists do lots of research to find

out the impact of the exchange rate volatilities on trade flows Cho et al. (2002); Karemara et al. (2005); Soleymani et al. (2014; Wong (2017). Liberia's exchange rate volatility is associated with macroeconomic volatilities, especially within international trade, which leads to a decline in economic growth. Earlier research has shown that the relationship between exchange rate and economic growth, depends on additional control variables like financial development see Aghion et al. (2009), Ndambendia et al. (2011), also see (Jha 2003), and the exchange rate regime.

Liberia currently uses dual system currencies, which are: the Liberian dollar and the United States dollar. The Liberian markets are also a dollarized market Economy; this means that any one of the two currencies can directly trade. The disadvantage of this dual currency is that the USD is an international currency used in every Country worldwide. The paper established that more people are holding the dollars, and the holding of the dollar is raising the overall level of prices, stirring up the Inflation or exchange rate within the Liberia economy. In contrast, the Liberian dollar is only used in Liberia. In recent years, the exchange rate regime in Liberia has been mainly controlled by the black market rate. The Black market rate is a rate that is not controlled by the Central Bank of the country but determined by the street sellers (money exchangers) where most of them are illegal currency exchangers.

According to the Mundell – Fleming model and theories, a rise in the Country's interest rate could, in the general point of view, lead to an increase in demand for the national assets and therefore cause its exchange rate to appreciate, which could reduce exports and increase imports for the nation (Romer 2012). Indeed, this paper has seemed a decrease in export and an increase in imports in Liberia. Liberia is an import-based country; it imports more and exports less.

The connection between the monetary policy, the interest rate, and the decision to keep the exchange rate floating or fixed are all factors of the low volatile rates of a nation against other countries. Mundell and Fleming's point was about how inflation might lead to a more fixed exchange rate.

Research has shown an appreciation in the exchange rate can have a similar effect on a rise in the interest rate for economic activities and reducing it, notwithstanding an appreciation of the exchange rate, lowers the interest rate needed to generate the aggregate demand and can sometimes be used as a tool to increase demand without general movements in the interest rate Romer, (2012).

### *2.2 The Exchange Rates Volatility*

The Exchange rates are also national currency quotations to foreign currency. It is considered a multiplier or a ratio. The instability of exchange rates describes uncertainty in international business, both in financial assets and non-financial. Volatilities are considered instability, and uncertainty, which measures risk, financial assets or non-financial assets, portfolio, and risk management on option pricing. The Exchange rate in Liberia is a major concern for the government, policymakers, investors, managers, shareholders, and economists. According to (Grier and Mark, 2010), many external factors have influenced the regular changes in supply and demand. According to Dufour (2010), "Foreign exchange volatility is the sensitivity of changes in the real domestic currency value of assets, liabilities, or operating income to unexpected changes in exchange rates." The exchange rate is a critical microeconomic factor that affects the real economy and international trade; notwithstanding, any increase in exchange rate volatility discourages firms from creating jobs Belke et al. (2003). According to (Tavlas 2003), a currency peg helps stabilize the exchange rate between two countries and provides long-term business planning that positively affects new predictability of exchange rates between countries. The researcher noted that, since Liberia has a dual currency system, which is also one of the Country's main problems, Liberia will be more necessary to implement a currency peg with the United States since its currency is linked with the United States dollars. The exchange rate can either be fixed or floating. When exchange rates

are floating, their value rises up and down in larger swings than if it was fixed; and it tends to be challenging to predict the value of the rate (Calven & Renhart 2002). Studies have shown that there is much uncertainty associated with floating exchange rates; notwithstanding, many nations usually choose to peg their exchange rate and adopt a fixed exchange rate regime. The one currency system by the European countries is an excellent example of the adaptation of fixed currency.

### *2.3 The Exchange rates and Inflation*

Mishken (2008) describes Inflation as indicates of the general level of all prices in goods and services rising and subsequently pushing power is reducing. The Central Bank of Liberia has attempted for the past period under review to stop inflation and keep the economy and prices at a minimum level. Still, it has been difficult for the period under consideration. The continuous increase in inflation rations and depreciation of the Liberian dollars has caused significant concerns both domestically and internationally, which even cause the IMF and World Bank interventions.

Inflation has caused the adaption of new monetary policy frameworks to help reduce inflation at a minimum level, and over the past seven months, the rates have been at LD197/US$1.00. According to (Akofio-Sowah 2009), said: “inflation is the percentage change in the local currency import prices resulting from a one percent change in the exchange rates between the importing and exporting country.” Inflation in Liberia can be categorized into two factors: the demand for foreign currency and the supply of foreign currency to the economy by the regulatory authorities. The impact of high inflation on the Liberian economy as a whole is very dangerous. Moreover, there is a huge demand for foreign currency as the main import base. Foreign currency is needed by business owners to satisfy and meet their business's survivability.

In recent years, international finance and economics have been troubled by the impact and changes in exchange rates and cash flows, and Corporations' returns (Bergen 2010). Black and Tarassova (2000) disclose that the Bretton Woods system's fall in the mid-1970s saw corporations’ worldwide view the exchange rate as a vital risk indicator. They consider the impact on domestic and international corporations and trade as an exposure. The exposure to foreign exchange rate fluctuation impacts the value of fixed payoffs, net assets, and the firm's real assets (Bergen 2010).

The exchange rate regime has played a virtual role in Liberia's slow or decline in its economic growth for the past years. The exchange rate volatility of Liberia is from two angles: the external dimension which is determined by global or international prices like oil, gas, etc., which are predominately imported into the Country, and the internal dimension, which is the demand for foreign currency to meet the country import demand. Inflation is usually the main monetary policy that policymakers use to combat exchange rate fluctuation and also as a means to stabilize the exchange rate Calven Reinheart (2002).

### *2.4 Exchange rate and Economic growth*

Many economists have argued in time past that a flexible exchange rate increases trade uncertainty and, at some point, reduces trade volumes as it exposes importers to higher risks from fluctuation. See Rornell et al. (2000) opine that flexible exchange rates encourage fiscal discipline by allowing the effects of unsound fiscal policies to instantly manifest the movements within the exchange rates and price levels. The hard exchange-rate pegs promote trade openness and economic integrations Rose (, 2000); Frankel et al. (, 2002). While in 1994 (Hank and Schuler) also argue that a hard exchange-rate peg improves financial institutions and sounder budgetary management as the government loses power to print money to finance expenditure. Volatility is the persistent fluctuations in exchange rates, and the study has shown that it has a massive effect on developing economies. Covering past years, most research has demonstrated the impact of exchange rate fluctuation, especially on imports (Assery and Peel, 1991; Wang and Barrett, 2007; Arize et al., 2004). According to these researchers, there is a negative or positive impact of exchange

rate fluctuations on employment and growth Belke et al. (2003), Kaas et al. (2004); on inflation, Danjuma et al. (2013); on growth Mundell (, 1995); Levy-Yeyati et al. (2002); Danne (2006); Holland et al. (2011) and Economics activities (Adewuyi and Akpokodje (2006); Kandil (2004).

The impact of exchange rate volatility may show a discrepancy within sectors because there are different degrees of international trade openness, various industry, and different use of long-term contracts (Maskus 1986). The theory of exchange rates implies that it is more volatile in the short run than fundamentals, and the second theory states that the rate of volatility is based on speculation within the market. See Schnabl's (2009) study negatively affects many Asian and European nations' economic growth. Domestic currency in Liberia has been traditionally subjected to the negative impact of exogenous currency shocks. Exchange rates are highly volatile in the short run, and it is mainly due to political activities, variations in the demand monetary strategy, and changes in prospects. However, in the long run, it is determined by the relative price of the good in the nation (Samuelson and Nordhaus 2001). Early studies that have given a theory on economic growth and how the currency would affect the exchange rate are the "international monetary system the missing factor" (Mundell 1998). Mundell explains about the missing in that period where the international monetary arrangement also helps to find an answer which is a single currency. Mundell believes that a single currency would be a great help, especially to smaller nations that would greatly benefit from having a more exchange rate against other countries and increasing their economic growth in their nations.

In conclusion, the Exchange rate changes in many types of research have always negatively and positively impacted inflation and economic growth, most especially in developing nations which Liberia is no exception off. Exchange rates in Liberia are used to compare the prices of goods in all country locations. Fluctuations affect economic activities, growth, employment, investments, trade, and inflation. Liberia's case has always caused a negative impact on the economy by increasing unemployment, low investments, and hardship, especially for the poor, increasing prices of all goods and services, and devaluing the domestic or local currency, which has made many hold the United States dollars. The paper has found out that many researchers do not include the black market rate in their paper; forgetting to know that many African nations deal with both rates (the Black Market rate and the Official rate). The paper introduced a new variable on previous works' limitations, which is the black market rate. The study measures the black market rate determined by the market factors instead of government control with the official rate and examines if the market-determined rate plays an essential role in our macroeconomic variables (Inflation and GDP growth). And also find out if the impact is greater than the official rate.

## CHAPTER THREE: RESEARCH APPROACH AND METHODOLOGY

### *3.1 Research Design*

The Empirical findings or analyses in this study are based on data collected from the Central Bank of Liberia, World Bank, IMF database, and from business people in Liberia by using the Survey approach. The exchange figure was gathered from 2007-2019, and the research design used Secondary and Primary Types of Data. The type of data is considered secondary data because it is existing data that creditable institutions have provided.

### *3.2 Source*

The source of this paper's data is from the Central Bank of Liberia (CBL), the International Monetary Fund (IMF), and the World Bank and Street money exchangers in Liberia. The Black Market Rates data were collected by conducting a survey and analysis on several Bureaus, Street exchangers, and some permanent business people who have good historical records and experiences on the black market rates in Liberia.

### 3.3 Data analysis

This research analysis is based on the Stata 14 software and uses a time-series regression approach for analyzing this paper for the 13 years of data.

### 3.4 Methodology or model

The methodologies in this paper are the following:

Inflation in model one is the dependent variable, whereas Real Exchange Rates changes, changes in Real GDP, Lending rate, Import to GDP ratio, US Inflation, and US Industrial Productions Index are independent variables. Model one is as follows:

*Model One (1) can be stated explicitly as*

$$Inf_t = \beta_o + \beta_1 lnER_t + \beta_2 lRGDP_t + \beta_3 LR_t + \beta_4 IM\text{-}GDPR_t + \beta_5 USINF_t + \beta_6 USIPI_t + \mathcal{E} \quad \text{------ 1a}$$

$$Inf_t = \beta_o + \beta_1\, lnBMER_t + \beta_2 lnRGDP_t + \beta_3 LR_t + \beta_4 IM\text{-}GDPR_t + \beta_5 USINF_t + \beta_6 USIPI_t + \mathcal{E} \quad \text{------ 1b}$$

*Where,*

Inf = inflation
LnER = Percentage Change in real exchange rates
LnlRGDP = Percentage Change in Log of Real GDP
LR = Lending rates
IM-GDPR = Import to GDP ratio
USINF = US Inflation
USIPI = US Industrial Production Index
LnBMER = Percentage change within the black market exchange rate
T=time, $\beta_o$ = Parameter intercept or constant, $\mathcal{E}$= stochastic error terms and
$\beta_1$ $\beta_2$ $\beta_3\beta_4\beta_5\beta_6$ = Parameter estimates

In model one (1b), we replace the real exchange rate changes with the black market exchange rate changes to find their separate impact on Inflation in Liberia.

*Model Two (2)*

In model Two (2), Y (lnReal GDP) is the dependent variable, whereas real exchange rate changes, Inflation, Lending rate, Import to GDP ratio, US inflation, and US Industrial Productions Index are independent variables.

*Model 2 can be stated explicitly as*

$$Y_t = \beta_o + \beta_1 lnER_t + \beta_2 INF_t + \beta_3 LR_t + \beta_4 IM\text{-}GDPR_t + \beta_5 USINF_t + \beta_6 USIPI_t + \mathcal{E} \quad \text{---------- 2a}$$

$$Y_t = \beta_o + \beta_1\, lnBMER_t + \beta_2 INF_t + \beta_3 LR_t + \beta_4 IM\text{-}GDPR_t + \beta_5 USINF_t + \beta_6 USIPI_t + \mathcal{E} \quad \text{---------- 2b}$$

*Where,*

Y = (LnRGDP) Real GDP growth
LnER = Percentage change in real exchange rates
LR = Lending rates
IM-GDPR = Import to GDP ratio
USINF = US Inflation







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USIPI = US Industrial Production Index

LnBMER = Percentage change in the black market exchange rate

T=time, $\beta_o$ = Parameter intercept or constant, $\mathcal{E}$= stochastic error terms and

$\beta_1$ $\beta_2$ $\beta_3\beta_4\beta_5\beta_6$ = Parameter estimates.

Again, in model 2b, we replace the real exchange rate changes with the black market exchange rate changes to find their separate impact on Liberia's real GDP growth.

The black market rate is that rate in the Country that is controlled and determined by the street seller or currency exchangers. Their rate is usually greater than the Central bank rates; they are always two to four points greater than the CBL rate. Because we have two dependent variables: Inflation and Real GDP growth, we tend to run separate regressions to obtain separate analyses. T indicates that we are using time series for the study.

We seek an Ordinary Linear Square regression (OLS) method to identify how the exchange rate changes (Official Exchange rate) and the black market exchange rate impact Inflation and Economic Growth in Liberia. Additionally, we also run the VAR model to determine the Impulse responses to Real GDP growth and inflation.

### 3.5 VAR model

The researcher also runs a Vector Auto regression Model. The researcher aims to investigate or establish the causal relationship among the variables and simulate shocks to our variables or the system and trace out the impact of the shocks that cause on the endogenous variables. In running the VAR model, we establish two empirical models:

*VAR model 1*

In model one; we analyze the separate shocks on inflation from the real exchange rate changes with the black market exchange rate changes to find their separate impact or influence on Inflation in Liberia.

*Model 1 stated as specified.....*

$$\inf = \beta_o + \sum_{i=1}^{k} \beta_1 \inf_{-1} + \sum_{i=1}^{k} \beta_2 \Delta lner_{-1} + \sum_{i=1}^{k} \beta_3 \Delta lnblkmkt\_rate_{-1} + \mathcal{E}$$

*VAR model 2*

In model two, we also analyzed the separate shocks on RGDP growth from the real exchange rate changes with the black market exchange rate changes to find their separate impact or influence on Liberia's RGDP growth.

*Model 2 stated as specified .....*

$$\Delta lnRgdp = \beta_o + \sum_{i=1}^{k} \beta_1 \Delta lnRgdp_{-1} + \sum_{i=1}^{k} \beta_2 \Delta lner_{-1} + \sum_{i=1}^{k} \beta_3 \Delta lnblkmkt\_rate_{-1} + \mathcal{E}$$

*Notes:*

K = length of the lag

$\mathcal{E}$ = the error terms also called the impulses or the shocks

T= time, $\beta_o$ = Parameter intercept or constant, and

$\beta_1$ $\beta_2$ $\beta_3$ = Parameter estimates

## CHAPTER FOUR: THE EMPIRICAL ANALYSIS/ RESULTS

### *4.1 The Empirical Analysis/ Results*

This part of our paper presents the results from our time series data regressions; this paper runs four separate time-series regressions from 2007-2019. To assess inflation's impact, we use inflation as our dependent variable in Table 3 and use all other variables as regressors, excluding the black market. In equation four, we replace the official exchange rate (ER) with the black market rate to estimate its impact on inflation. Table 5 used RGDP as our dependent variable, used the other variables as our regressor, and excluded the black market rate used in table 6 to replace ER.

### *4.2 Regressions*

The researcher took into consideration, to runs some preliminary tests in order to have valid data. The tests conducted in this paper are the test for unit root, Autocorrelation test, and Heteroskedasticity test.

#### *4.2.1 Unit Root Test*

The researcher runs a test for unit root, which is essential for the time-series data to reduce structural beaks' risk (Frerreira, 2009). The Researcher runs the root test to find out if there is non-stationary, which would lead to spurious regression, and it does not show main reversion, and the data generation process of this series is not around zero. The Augmented Dickey-Fuller (Maddala & Wu, 1999) test indicates that if the data are non-stationary, they cannot be used for Hypothesis testing, prediction, or forecasting in our dataset. The researcher, therefore, run a spurious regression in this test and compare the result with the Dwaston estimate results and find out that our data was non-stationary because our $R^2$ was greater than the Dwaston result. And find the percentage change and first difference of the variables and finally found out that it was stationary, which we used to run the regressions. The Augmented Dickey-Fuller test results show that the unit-roots test was significant, and should reject the null hypothesis because there is a unit root in the model.

*Table 1:* A Test for Unit Root

| Augmented Dickey-Fuller (ADF) Test | | | | | | | |
|---|---|---|---|---|---|---|---|
| | | With Trend at level | | | Without trend at 1st Difference | | |
| Variables | Observations | Test Statistic | Prob. | 5% Critical | Test Statistic | Prob. | 5% Critical |
| Liberia ER | 50 | -4.987 | 0.0002 | -3.504 | -3.790 | 0.0030 | -2.933 |
| Liberia Inflation | 50 | -2.087 | 0.5534 | -3.500 | -5.814 | 0.0000 | -2.933 |
| Liberia LGDP | 49 | -2.324 | 0.4205 | -3.504 | -1.472 | 0.5476 | -2.933 |
| Lending Rate | 50 | -3.023 | 0.1258 | -3.500 | -7.195 | 0.0000 | -2.933 |
| IM/GDP Ratio | 50 | -2.974 | 0.1396 | -3.500 | -3.274 | 0.0161 | -2.933 |
| US Inflation | 50 | -3.812 | 0.0160 | -3.500 | -6.474 | 0.0000 | -2.933 |
| US Indus Prod index | 50 | -4.304 | 0.0026 | -3.500 | -3.144 | 0.0234 | -2.933 |
| Liberia Black Market Rate | 50 | -5.031 | 0.0002 | -3.504 | -3.867 | 0.0023 | -2.933 |

### 4.2.2 Autocorrelation Test

Test for Serial Correlation (Breusch-Godfrey LM test for autocorrelation)

| Breusch-Godfrey LM test for autocorrelation | | | |
|---|---|---|---|
| lags(p) | chi2 | df | Prob>Chi2 |
| 4 | 1 4.225 | 4 | 0.0066 |

*Ho: no serial correlation*

The diagnostic test for Serial Correlation of the residuals using the Breusch-Godfrey LM test for autocorrelation is shown in the above table to follow the decision-making rule as slated below whether the model is good or in line with economic criteria.

Null Hypothesis Ho: Residual no serial correlation (autocorrelated)

Alternative Hypothesis H1: Residuals are correlated (autocorrelated)

Our Breusch-Godfrey LM autocorrelation test shows that we accept the null hypothesis and conclude that we do not have a serial correlation in the residuals. And our result also indicates that the model is in line with economic criteria.

### 4.2.3 Heteroskedasticity Tests

We conduct a heteroskedasticity test using Breusch-Pagan/Cook-Weisberg (LM) test to compute for heteroskedasticity. Since we are using OLS (Ordinary Least Square) and one of the assumptions of the OLS is that the model must be homoscedasticity; we use the Breusch-Pagan (B-P) LM test, we conclude that if the P-value <0.05, we Reject the null and say that there is significant evidence of heteroskedasticity.

*Model 1*

Breusch-Pagan / Cook-Weisberg test for heteroskedasticity

```
Breusch-Pagan/ Cook-Weisberg test for hetroskedasticity
        Ho: Constant variance
        Variables: fitted values of Inflation
        Chi2(1)  =      1.18
        Prob > chi2 =  0.2775
```

Our diagnostic check for heteroskedasticity test in model one for residuals using the Breusch-Pagan / Cook-Weisberg test shown above and follows the decision-making rule stated below to determine whether the model is good and in line with economic criteria.

Null Hypothesis Ho: Residual are homoscedastic (constant variance)

Alternative Hypothesis H1: Residuals are heteroscedastic

Our results from the test obtain a probability of 0.2775 or 27.75%; it is more than 5%. Therefore we accept the null hypothesis because residuals are homoscedastic (constant variance), and the model is in line with economic criteria.




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*Model 2*

Breusch-Pagan / Cook-Weisberg test for heteroskedasticity

Breusch-Pagan/ Cook-Weisberg test for hetroskedasticity
Ho: Constant variance
Variables: fitted values of ChangeRGDP
Chi2(1) = 1.78
Prob > chi2 = 0.1824

Our diagnostic check for heteroskedasticity test in model one for residuals using the Breusch-Pagan / Cook-Weisberg test shown above and follows the decision-making rule stated below to determine whether the model is good and in line with economic criteria.

Null Hypothesis Ho: Residual are homoscedastic (constant variance)

Alternative Hypothesis H1: Residuals are heteroscedastic

Our results from the test obtain a probability of 0.1824 or 18.24%; it is more than 5%. Therefore we cannot reject the null hypothesis because our residuals are homoscedastic (constant variance), and the model is in line with economic criteria.

*Table 1:* Definition of variables

| Variables | Definition | Expected sign in the regression |
|---|---|---|
| Liberia Inflation | Liberia's inflation is the overall increase in the price level of goods and services in the Liberian market for a period of time. Inflation in this paper is one of the Dependent variables | |
| Liberia ER | Exchange rates changes are the percentage change in current unit per the United States dollars taken from the Central Bank of Liberia and the International Monetary Fund (2019) | -/+ |
| Liberia RGDP | The Real GDP is the measure of the country's GDP from one fiscal year to another, and it is also the value of the current year divided by last year's value of GDP per capita. The real GDP is one of the dependent variables in this paper. | |
| Lending Rate | The Lending rate is the interest charged on money by a financial institution to another. | -/+ |
| IM/GDP Ratio | The Import-to-GDP ratio is the indicator of the relative importance of international imports in the economy. | -/+ |
| US Inflation | US Inflation is the increase in all the prices level in the US market over a period of time. | -/+ |
| US Indus Prod index | The US (IPI) is an economic indicator that the Federal Reserve Board of the United States of America publishes and measures the nation's real production output. | +/- |
| Liberia Black Market Rate | Liberia's Black Market Rate is the rate that is not controlled by the Central Bank but by street money exchangers, most of which are unofficial (illegal) operators. | -/+ |

### 4.3 Regression Results

#### 4.3.1 The explanatory returns

Table 2 the time-series regression approach to the Exchange rate changes tests. The average risk for the rates is just our average value of the explanatory variables in this study. The average value of Inflation in Liberia is 11.977% per quarter. This is very large from economic growth and investment perspective, but it has a marginal 12.9603 standard errors. The average percentage change in the real exchange rate is 0.023% per quarter, and the Standard errors are 4.977 (tmn). The average percentage change in RGDP of 0.002% per quarter (t = 7.141). The average change in the Black Market rate in Liberia is 0.023%, with a standard error of 5.132.

The Maximum official exchange rate change in Liberia in 2019 was 0.123, while the Maximum Black Market rate in the same year was 0.121, which is the main determinant of prices in the Country. The Maximum Inflation in 2019 was 30.696, while the percentage change in the Real GDP Maximum was 0.007 in 2013.

The Minimum changes in Liberia's official exchange rate in 2009 were -0.04, while the Minimum Black Market rate was -0.036 in 2009. The Minimum Inflation was 2010 at 4.321 while the Real GDP Minimum was -0.003 in 2016.

*Table 2:* Summary Statistics

*Summary statistics for the Quarterly dependent and all explanatory variables (in percent) from Q1 2007-Q4 2019 of The Impact of Exchange Rates Changes on Inflation and Economic Growth in Liberia, paper with 52 observations.*

| | inf | Ch_ er | Ch_ lgdp | lending_ rate | import_g dp_ratio | us_inf | us_ipi | Ch_blkmkt_ rate |
|---|---|---|---|---|---|---|---|---|
| Mean | 11.977 | 0.023 | 0.002 | 13.678 | 0.135 | 1.979 | 101.659 | 0.023 |
| Std. Dev | 6.664 | 0.033 | 0.002 | 0.677 | 0.025 | 0.372 | 5.607 | 0.032 |
| t(mn) Std Error | 12.9603 | 4.977 | 7.141 | 145.692 | 38.94 | 38.3623 | 130.789 | 5.132 |
| Minimum | 4.231 | -0.04 | -0.00 3 | 12.444 | 0.91 | 0.65 | 87.598 | -0.036 |
| Maximum | 30.696 | 0.123 | 0.007 | 15.243 | 0.197 | 2.54 | 110.325 | 0.121 |
| Observations | 52 | 51 | 51 | 52 | 52 | 52 | 52 | 51 |

*Notes:* inf = Inflation, Ch_er = % change in real exchange rate; Ch_lgdp = % change in real GDP; lending_rate =lending rate; import_gdp_ratio = import to gdp ratio; us_inf= US inflation; us_ipi=US industrial production index, Ch_blkmakt_rate = % change in black market rate.

In Table: 3, we report our results on the dependent variable (Inflation). This result implies that the percentage change within the official exchange rate coefficient is 0.337. The result shows that there'll be a 0.337% increase in Inflation in Liberia for any increase in Exchange Rate changes, holding all other variables constant. (However, it does not subject to what value you hold the other variables constant because we are using a linear model). This is significantly different from 0. It means that anytime the Liberia dollar weakens against the major currencies (US dollar), it reduces the value of the Liberia dollar which increased the general prices of goods and services in the Country. This is how a weak Liberian dollar or depreciation leads to Inflation in the Country. While the Real Gross Domestic Product change has a coefficient of -0.227, meaning every percentage decrease in Real GDP will approximately lead to a 0.227

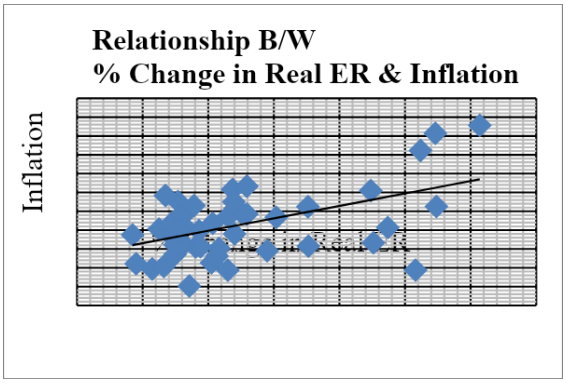
reduction in the Liberia Inflation rate holding other variables constant. Notwithstanding, it is not significant at 5%.

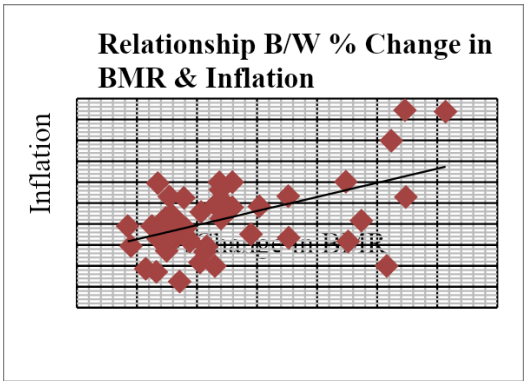
We replace changes within the official exchange rate with the black market rate changes. It indicates that the percentage change in Liberia's black market rate coefficient is 0.347. Hence, for every increase in the Black market rate, there'll be an additional 0.347% increase in inflation within the economy. It is statistically significant to inflation. The Magnitude of the impact of the Black market exchange rate on inflation is very high because it is not under the regulations of the Central Bank of Liberia. It means that whenever the Liberia dollar is weaken against the US dollar, it reduces the value of the Liberia dollar, and this lead to an increase in the inflationary rate in the Country. The percentage change in the RGDP coefficient is -0.270. For each percentage decrease in the real gross domestic product, we have a tendency to expect a 0.270 decrease in inflation. However, it is not statistically significant to inflation. (*See table 3 below*).

*Table 3:* Regression on Dependent variable (Inflation) and its regressor's Real exchange rate and Black market exchange rate and other explanatory variables from Q1 2007- Q4 2019

| | Real Exchange rate | | Black Market Exchange rate | |
|---|---|---|---|---|
| dinf | Coef. | St.Err. | Coef. | St.Err. |
| Change_er | 0.337<br>(3.33)*** | 0.101 | | |
| Chblkmkt_rate | | | 0.347<br>(3.39)*** | 0.102 |
| changeRGDP | -0.227<br>(-0.16) | 1.458 | -0.270<br>(-0.19) | 1.444 |
| dlending_rate | 0.011<br>(0.70) | 0.015 | 0.009<br>(0.59) | 0.015 |
| dimport_gdp_ratio | -1.787<br>(-4.21)*** | 0.424 | -1.740<br>(-4.13)*** | 0.421 |
| dus_inf | 0.040<br>(3.77)*** | 0.011 | 0.042<br>(4.01)*** | 0.011 |
| dlus_ipi | -0.822<br>(-1.27) | 0.649 | -0.814<br>(-1.26) | 0.646 |
| Constant | 0.004<br>(-0.76) | 0.005 | 0.004<br>(0.79) | 0.005 |
| R-squared | 0.523 | | 0.527 | |
| F-test | 8.048 | | 8.167 | |
| Akaike crit. (AIC) | -242.129 | | -242.585 | |
| SD dependent var | 0.029 | | 0.029 | |
| Number of obs | 51.000 | | 51.000 | |
| Prob > F | 0.000 | | 0.000 | |
| Bayesian crit. (BIC) | -228.669 | | -229.062 | |
| | | | | |

*Notes:* dinf = Inflation, Change_er = % change in real exchange rate; ChangeRGDP = % change in real GDP; dlending_rate =lending rate; dimport_gdp_ratio = import to gdp ratio; dus_inf= US inflation; dlus_lipi=US industrial production index. The figures in the parenthesis ( ) represent the T-statistics and Significant at 1% = ***; significant at 5% = **; significant at 10% level = *.




Our results from table three imply a positive impact from each change in percentage within the official exchange rate and changes within the black market rate on inflation. The purchasing power of citizens might drop if the trends of those indicators remain the same. Because inflation is that rate that indicates the overall prices of goods and services and rises subsequently, purchasing power starts to reduce Mishken (2008). The rates that are considered an unexpected movement within the economy need to be maintained at a lower level. The study implies that official exchange rate fluctuations can also lead to inflation in prices.

In Table 4, the researcher used RGDP as the dependent variable and used all other variables as explanatory variables. The results show that the Liberia exchange rate is statistically significant at all levels, and it exerts a negative impact on real GDP growth. The result in table four implies that a percentage increase in Liberia's exchange rate change is associated with a -0.025 decrease in Real GDP growth. It means that as the Liberia dollar depreciates against the major currencies it spurs inflation in the Country and an increase in Inflation as the result of weak currency results in an increase in interest rates (the cost of borrowing) and this makes it difficult for business and individuals, to obtain capital in expanding their business and in the long run affect the real GDP growth negatively. This explained how the mechanism of exchange rate changes impacts the real GDP growth in Liberia. While Inflation in Liberia has a coefficient of 0.015, meaning for every unit of increase in inflation, approximately 0.015% increase in the Real GDP growth in Liberia considering other variables constant. However, the result implies that it is not significant at a 5% level.

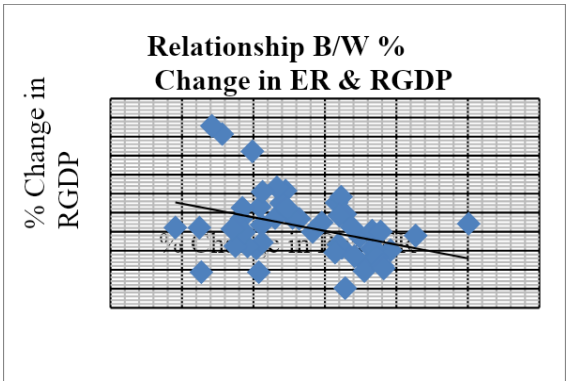
The researcher is concerned to find out the separate impact with exchanges from both the Official and the Black markets, the researcher replaces the percentage change in real exchange rate changes with the black market rate changes, and it indicates that, if the black market exchange rate changes (increase or depreciate) by 1 percent, then GDP growth is predicted to decrease by 0.025. This means that as the Liberian dollar depreciates against the US currencies it spurs inflation and finally leads to an increase in the cost of borrowing in the country. These mechanisms affect GDP growth negatively. And it is significant to RGDP at 1%. The inflation coefficient is 0.016. Thus, indicating a 0.016 positive impact on real GDP, and it is not significant at all levels. (*See table 4 below*).

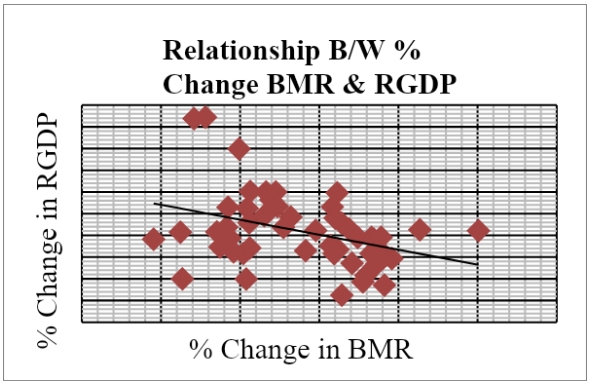
*Table 4:* Regression on Dependent variable (ChangeRGDP) and its regressor's real exchange rate and Black market exchange rate and other explanatory variables from Q1 2007- Q4 2019

| | Real Exchange rate | | Black Market Exchange rate | |
|---|---|---|---|---|
| changeRGDP | Coef. | St.Err. | Coef. | St.Err. |
| change_er | -0.025<br>(-3.51)*** | 0.007 | | |
| chblkmkt_rate | | | -0.025<br>(-3.56)*** | 0.007 |

| | | | | |
|---|---|---|---|---|
| dinf | 0.015<br>(1.16) | 0.013 | 0.016<br>(1.19) | 0.013 |
| dlending_rate | -0.002<br>(-1.83)* | 0.001 | -0.002<br>(-1.67) | 0.001 |
| import_gdp_ratio | 0.037<br>(3.01)*** | 0.012 | 0.037<br>(3.06)*** | 0.012 |
| dus_inf | -0.001<br>(-1.04) | 0.001 | -0.001<br>(-1.26) | 0.001 |
| dlus_ipi | 0.007<br>(0.17) | 0.038 | 0.009<br>(0.23) | 0.037 |
| Constant | -0.003<br>(-1.38) | 0.002 | -0.003<br>(-1.42) | 0.002 |
| R-squared | 0.302 | | 0.293 | |
| F-test | 8.417 | | 8.649 | |
| Akaike crit. (AIC) | -480.971 | | -480.315 | |
| Number of obs | 51.000 | | 51.000 | |
| Prob > F | 0.000 | | 0.000 | |
| Bayesian crit. (BIC) | -467.449 | | -466.793 | |
| | | | | |

*Notes:* changeRGDP = % change in real GDP; change_er = % change in real exchange rate; dinf = Inflation, dlending_rate =lending rate; import_gdp_ratio = import to gdp ratio; dus_inf= US inflation; dlus_ipi=US industrial production index. The figures in the parenthesis ( ) shows the T-statistics and Significant at 1% = ***; significant at 5% = **; significant at 10% = *.




The regression results from table 4 in this study imply that there is a negative impact from both the changes in the Black market rate and the changes within the official exchange rate to RGDP. Dollar (1992) analyzed 95 developing countries from 1976-1985, showing a negative relationship between the variables. Bosworth et al. (1995) also use 88 developed and industrial nations for 1960-1992. Results show negative effects on output growth by slowing the factors of production on growth or economic growth. Schanabl's (2009) result shows a negative influence on volatilities on many Asian and European nations' economic growth. Therefore, the impacts of exchange rate volatilities may vary across countries. A higher exchange rate may lead to lower growth in nations with smaller or no financial markets (Aghion et al.).

*VAR Model results*

Our VAR Model result implies that the response of a one standard deviation shock to a percentage change within the official exchange rate leads to an increase in inflation. The response of the shock to Inflation starts to increase from period 0-period 4 in the short run and guardedly starts to decline from period 4 to period 8 in the long run.

The response of the shock to percentage change within the black market exchange rate has a positive shock to inflation in both the short-run and long-run. The shock to inflation from the







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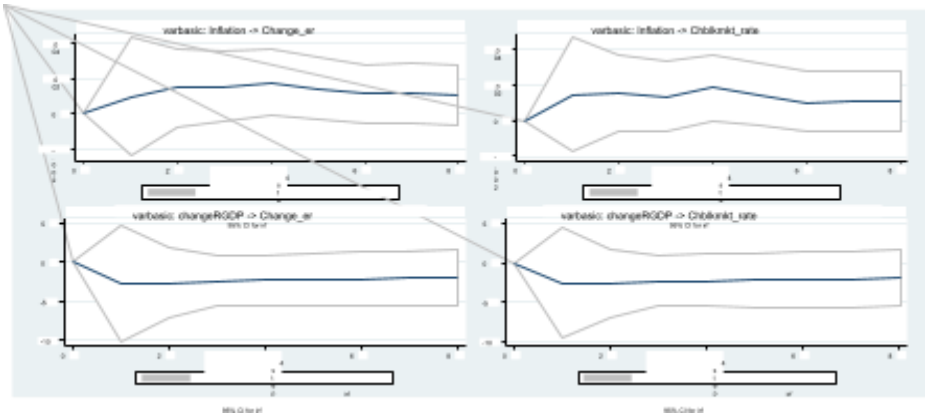
black market rate changes from period 0 to period 1 experienced an upward movement and started to drop at period 2 and again at 6 begin an upward movement to period 4 and finally begin declining at Period 4 to Period 8 in the long run.

Hence, if this increase continues to extend within the percentage change within the black market rate, and with no intervention from the Central Bank of Liberia to correct this imbalance, the financial institution (Central Bank) will lose management of the rate thereby making the home currency depreciate due to the unofficial activities from the black market exchange rate and persistently lead to higher inflation on the Liberian economy.

An increase in both the percentage change within the office and the black market exchange rate in the country means that Liberia's goods are getting more expensive than its relative competitors. Therefore, people in the Country can get more foreign goods (imports) for an equivalent amount of domestic goods. This is an indication of an increase in the general prices as a result of a rise in the percentage change in both exchange rates.

The response of standard deviation shock exchange changes has created a decline in RGDP growth in the Country between periods 0 to period 1 and begin a bit stable from period 1 to period 2 and started experiencing an upward movement from period 2 to period 8 in both exchange rate changes. Notwithstanding, Real GDP growth in the short-run and long-run will experience a negative response to shock to percentage changes to exchange rates. This black market rate usually arises when foreign currency exchanges take place at an unofficial (or illegal) exchange rate. An increase in the black market rate will cause Liberia's Central Bank to lose control of the exchange rate (Depreciation). The Central Bank of Liberia needs to correct the imbalance of excess demand or supply of dollars to local currency. Furthermore, these unofficial activities taking place in the black market direct the nation's resources in erroneous directions and bring about a decrease in real GDP growth.



*Graph:* VAR and Impulse Response Function (IRFs)

## CHAPTER FIVE: CONCLUSION & RECOMMENDATION

### *5.1 Conclusions*

Liberia should consider making some policies about the exchange rate fluctuation by implementing a single currency in the Country. The paper has also investigated the many reasons that have led the Country to reach this level, which it took into consideration the civil crisis that lasted for over 14 years, the Ebola virus in 2014, which lead to approximately 4,000 people losing their lives to the virus in Liberia and the most recent COVID-19 which is taking the world making bigger economy collapse. It is about time that economists in the country and stakeholders, including the World Bank, the International Monetary Fund, the National Legislature, and

other meaningful citizens, start emerging to find a suitable solution to the many economic problems. The lack of a manufacturing company to produce local goods and services consumed on a daily basis by Liberians makes the Country import more than its export. Most consumer goods are mostly imported into the country, and these goods and services are bought and sold in US dollars, thus devaluing the Liberian dollars. The Safety and Soundness of the financial sectors will continually question if people continue to keep money at home. The dual currency situation has devalued the local currency where individuals and businesses have non-confidence in using the Liberian dollars. The study concludes that the Country's economy and financial sectors can prosper when more importance is placed on controlling the Country's exchange rate system and adding value to the use of the local currency.

Finally, this study revealed a positive relationship or impact between the Exchange rate and Inflation in both the short-run and the long run. Simultaneously, there is also a negative relationship or effects of the exchange rate changes on economic growth in the short-run and long run. And the impact of both the real exchange rate changes and the black market exchanges are almost the same.

### *5.2 Recommendations*

- The paper also recommends that the Country should implement a currency peg with the United States of America since it links its currency to the United States dollars. The pegging of the Liberian dollar to the United States dollars will help stabilize the country's exchange rates and help eliminate the black market rate in the Country.
- And the Central Bank of Liberia should put in place the infusing of the local currency's liquidity to maintain a low inflation volatility rate, which will help protect the purchasing power of the ordinary poor citizens of the Country.
- The paper advises that it is about time that the Country moves to a cashless economy, and the national government should take the lead to introduce an app system that will be used for transactions.
- Through the Central bank of Liberia, the leadership establishes a currency swap with its trading partners worldwide to address the need and demand for the importation of goods and services to foreign currency.
- The Central Bank of Liberia (CBL) should take into consideration targeting inflation. The targeting of inflation should be a monetary policy used by the authority to control the inflation rate and guide the real inflation rate level toward the targeted inflation rates.
- That the Central Bank of Liberia should reintroduce the US dollar optional to legal business houses to curtail the difficulties faced by business people in obtaining US dollars.
- And suppose the government must improve the lives of the poor by giving them skills and opportunities. In that case, they should consider developing an inclusive financial approach of reliable Fiscal Policy, Monetary Policy and establish a most rebuts Foreign Exchange Rate Policy (FERP), and focus on investing in Agriculture.

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