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Corporate Social Responsibility as Contextual Responsiveness for Engineering Education in Africa

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Abstract: ***Context is the interrelated condition in which something exists or occurs. It can also be seen as the parts of a discourse that surrounds a word or passage and can help shed light on its meaning. So, in carefully understanding context in engineering education, it will be prudent to examine all the dimensions that surrounds it and these spans environmental, political, cultural, disciplinary, social and economic dimension. This study provided considerable insight on what contextual responsiveness is and understand the impetus for it, while making the case for corporate social responsibility as a tool for contextual responsiveness in engineering education in Africa. Findings from the study revealed that that contextual responsiveness in engineering education seeks to consider how overall changes influences the discipline and how the discipline responds to it. Corporate social responsibility was seen as a management strategy that seeks to consider social and environmental perspectives in business processes and it has immense benefits for stakeholders, society and the organization itself. The study conceptualized corporate social responsibility as contextual responsiveness for engineering education in Africa and the elements within it were considered. The study recommended that there should be an overhaul to the practice of corporate social responsibility so as to have guidelines and standards to follow when engaged in it.***

Keywords: ***Corporate social responsibility, contextual responsiveness, context, engineering education, engineering, Africa***

I. INTRODUCTION

The Merriam Webster Dictionary (2020) defines context as the interrelated conditions in which something exists or occurs. It can also be seen as the parts of a discourse that surrounds a word or passage and can help shed light on its meaning. Though, theoretically, there has been a lack of consensus on what context really is and this is because it has many dimensions. From the definitions above, context is broad and multifaceted and it includes all the conditions in which something exists or occur. So, in carefully understanding context in engineering education, it will be prudent to examine all the dimensions that surrounds it and these spans environmental, political, cultural, disciplinary, social and economic as captured in the works of Fomumyam (2020).This implies that the conduct and practice of engineering education in Africa takes place in a context and these contexts are the conditions in which the discipline exists or occur.

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Contextual responsiveness has been defined by various authors and some will be considered in this study. Contextual responsiveness according to Amalia G. Sabiescu (2020) was defined as the character of a system, artefact or agent of dynamic feedback or adaptation in response to contextual conditions as they evolve in an interactional environment. This definition emphasizes fluidity and dynamism in response to change. It is a pattern of looking at change in interconnected systems. Thus, contextual responsiveness in engineering education seeks to consider how overall changes influences the discipline and how the discipline responds to it. It is imperative to note that there are massive changes occurring globally along economic, technical, environmental, socio-cultural frontiers which are able to influence the conduct and practice of engineering education in Africa.

According to UNIDO (2020), corporate social responsibility is a management concept whereby companies factor in social and environmental concerns in their business operations and interactions with their stakeholders. It seeks to achieve a balance along economic, environmental, and social imperative while not undermining the expectations of shareholder and stakeholders. Thus, this study will conceptualize corporate social responsibility as a panacea for contextual responsiveness for engineering education in Africa. This study will provide considerable insight on what contextual responsiveness is and understand the impetus for it, while making the case for corporate social responsibility as a tool for contextual responsiveness in engineering education in Africa.

II. METHODOLOGY

This research is an inquiry into corporate social responsibility as contextual responsiveness for engineering education in Africa. To address the topic under consideration, a theoretical approach was used in synthesizing literature from established sources on corporate social responsibility and contextual responsiveness for engineering education in Africa. To achieve this, relevant keywords from the topic were used in searching for literature which was collated to critically lend credence to the topic under consideration.

III. RESEARCH GAP

The conditions in which something or an event occur has been revealed to be context above.

The conditions in which the conduct and practice of engineering education takes place include social, cultural, technical, environmental, ecological, economic etc.

It is therefore crucial to note that these conditions have assumed a massive change as time progresses. We are in a time of massive, profound and rapid change which has influenced all aspect of human life and this has influence on the conduct and practice of engineering education. As there are changes, there is a deficit in knowledge which requires new area of learning to deal with these changes.

But what is ofessence, is the knowing that there is a need for engineering to be responsive contextually. The many challenges that befalls Africa are along these lines which requires contextual responsiveness to deal with them. There is a need for contextual responsiveness in engineering education in Africa to respond to the changes taking place. Thus, the imperative of corporate social responsibility as contextual responsiveness for engineering education in Africa.

A. An insight into the dynamics of engineering education in Africa

Evidences from history revealed that the 20th century had major engineering masterpieces that attests to the applicability of the discipline globally. These amazing technologies have caused an overhaul in the way people live while also making their lives better (Constable G *et al*, 2003). This captures one of the key benefits of engineering captured in the definition by the Royal Academy of Engineering. According to the Royal Academy of Engineering, the discipline was defined as the creative application of scientific principles to make things better. The 21st century offers significant changes to the engineering education scenario in Africa and the explosion of new knowledge, overhaul in old knowledge, demographic changes, economic changes, environmental changes, social and political changes etc. have the impetus to influence the discipline of engineering education in Africa. This and the ability to respond to these changes has been a major standpoint to differentiate between nations of the world and this has been used by the World Bank and many other organizations. The North-South divide has become popular in the 21st century as a socio-economic and political division of the earth. The Global North represents the countries of the world that are economically developed such as counties in Europe, North America, Australia, Israel etc. amongst others. The countries of the Global North are characterized by developed economies, presence of infrastructures, low poverty rate, dependence on other sectors of the economy apart from the primary sector while the Global South are the countries that are backwards economically such as India, some countries in Africa, Brazil, Mexico and others. The countries of the Global South are characterized by poor infrastructure, widespread poverty, dependent on primary production, poor economies, insecurity, corruption, poor development etc. As a result of this divide, countries from the Global South often depend on the Global North. As a result of the various investments made in engineering education over the years, it has contributed to the advances seen in countries of the Global North while placing them on a pedestal of superiority. For deficits in countries of the Global South, the Global North depends on them for international trade and politics, technology transfer, educational opportunities and to maintain global and regional peace. With engineering education being a vital discipline that seeks to make processes better, it has the impetus to contribute to social and economic prosperity in Africa as revealed in the works of Matthews *et al*, (2012). Hence, the need to leverage on the massive opportunities lurking in the discipline. It has been noted that Sub-Saharan Africa is home to 13% of the worlds working age group and this statistic has been studied to increase to 17% by 2030, the region will have the second largest population after Asia globally. According to GE (2015) there are various projections that Sub-Saharan Africa as a region will expand in size of workforce more than the rest of the world in total. This wide demographic opportunity has the impetus to contribute to new economic breakthroughs that will be made by investing in future industries and labour market which will be facilitated by engineering education. This will culminate into increasing labour productivity and per capita income, dependence on various sources for economic growth, more talented graduate and highly diversified job opportunities in the years ahead. It has been opined by the World Bank (2014) that to have massive economic growth and global competition, it is important that Africa develops its human capital along science, engineering and technological lines. In Africa, South Africa is the center of engineering education in Africa because it has well-developed infrastructures. As a result of the dismantling of the apartheid regime in the region, South Africa has played a major role as the United States of Africa and the country has universities that have developed significantly in interdisciplinary educational activities. With the presence of vast deposits of minerals, South Africa has played key roles on mineral research with other regional universities and they also have strong industrial links. The curriculum also in Africa has not reflected much of the learning contents that are peculiar to our clime. As a result of British colonialism in Africa and their influence on the education of the region, they brought with them elements of westernization which has been incorporate into the curriculum in Africa. With the need to discourage that, there are some steps that have been taken such as the clamour for decolonization and the need to uphold locally relevant content in the curriculum. Another dimension of this is the anglicization of our teaching process. Since, English language is our Lingua Franca, most educational processes are carried out in English language.

There is also a clear knowledge gap required by industries and in Sub-Saharan Africa, it has been reported that there is an un-ending need for home-grown capabilities in engineering.

There is a high rate of unemployment among graduates of engineering and this was attributed to poorly paid positions as a result of foreigners employing firms who prefer their foreign counterparts as labour (Matthews *et al*, 2012). This gap was also attributed to engineering graduates not employable as a result of poor skills (EARC, 2014).

Africa is a region with great potentials that ought to be the cynosure of all eyes among the comity of nations but that has not been the case with Africa due to so many factors.
It is therefore important to intensify effort and build capacity in engineering education in Africa to encourage many developments in the region. With a focus on better infrastructure to align with the growth trajectory of the region, it is important to encourage development of skills in engineering that will help to champion this cause. It is noteworthy to bear in mind that as a result of poor technological development in Africa, major engineering projects are carried out by foreigners such as the Chinese and this can be curbed by building local capacity for such engineering projects. Some of the development that should be focused on in Africa include roads, bridges, buildings, airspaces, harbours etc. With Africa having massive potential for primary production, it has the impetus to contribute to industrial development in the region especially manufacturing. This in the long run will make the region a net exporter and also prevent importation of manufactured goods. Much more than ever, there is a huge demand for power in Africa and this also has the potential to contribute to development in the region. But the region is characterized by acute power shortages which has negatively impacted all sectors of the economy. This necessitates the need to build skills in engineering education so as to be able to enjoy the dividends that will come with engineering education.

B. Ensuring contextual responsiveness in engineering education in Africa

The context that surrounds engineering include cultural, environmental, social, economic, technical, political. Each will be opined on to understand contextual responsiveness in engineering education in Africa. Cultural responsiveness addresses issues that deal with values, heritage, ethnicity and origin in engineering education. It is important to note that engineering education must be culturally responsive so that it factors in elements of culture into it which include values, heritage, ethnicity and origin. Going forward, it is essential to note what culture is. One of the notable definitions of culture was given by Hofstede (2007) where he opined that culture is the collective programming of the mind that separates one group or category from another. Culture is essentially a tool for differentiation as it separates one group from the other. The elements of culture influences what is done in various areas where humans inhabit and this influences their daily activities. Culture is revealed in clothing, music, housing, arts etc. But in engineering parlance, the type of constructions made, buildings, bridges and other facilities reflect the culture of people and engineering must be responsive to it. For instance, the housing patterns and other forms of infrastructures provided in temperate and tropical countries is different. As a result of different geographical location, each area has happenings peculiar to it such as natural disasters. This must be considered so as to ensure cultural responsiveness in such areas. Socio-cultural and environmental factors influence the type of engineering intervention that will be made in various locations and engineering education must also consider the factors to ensure responsiveness. Responding to the demands of culture is key in addressing cultural responsiveness. Environment is key to human survival and sustenance. The word environment is derived from the French word “environ” and it means surrounding. It is therefore vital to note that the surrounding is a composite of biotic and abiotic factors that affect humans. The biotic factors are living conditions and elements that influences man while the abiotic factors are the nonliving elements within the environment. It includes physical, social, cultural and biological factors within the environment. The environment has experienced massive change over time and the effect is becoming more noticeable with time. This is manifested in climate change and its effect. Human societies around the world are constrained with various challenges in dealing with the environment and maintenance and improvement of the environment is vital in securing the future of humans (Lambin, 2005: Costanza *et al*, 2000). To ensure environmental responsiveness, these changes must be considered and addressed. Though engineering education contributes to changes in the environment, it can also be applicable to address environmental changes. Some engineering activities like mining, explosion, burning and combustion, etc. contributes to environmental imbalances and must be adequately addressed. We are in times of great environmental challenges that portends grievous consequence on survival and sustenance of humans. The environmental challenges must be addressed so that the its effect can be reduced hence its responsiveness. The society is a structure that showcases intricate connection between one another and the proper management of these connection ensures a stable society. The social sphere in simplicity refer to the human society, interaction of individuals or groups and welfare of members of the society. it also includes forming bonds, relationship and synergy with others. As humans, we are basically social and we engage in one form of interaction with others in the social system. The need for such interaction can be for love, to meet basic needs, to exchange ideas and information et. The social sphere is crucial to human existence, sustenance and survival and there is a need for social responsiveness. Social environment seeks to encourage quality of life and environment by individuals in their community or nation. With various needs by individuals and community at large, efforts must be geared towards solving them and social responsiveness emphasizes the way individual or society responds to social needs. Human needs are varied and ii have opined on some above which they through interaction and engagement with others aim to solve. Hence, the import of social responsiveness for humans and the society. Individuals and groups at large must contribute to the betterment and welfare of others in the society and the society itself. Politics is also one of the factors that surrounds the conduct and practice of engineering education. Political factors in every clime influences all disciplines and engineering education is not left out. Power, governance, regime, democratization, policies, legislation and laws, tax and tariffs, political stability/instability, bureaucracy, corruption, freedom, trade control etc.

the interplay of all these factors is crucial in influencing the practice and conduct of engineering education.

It is vital to note that engineering education cannot be practiced in a vacuum, it takes place in a geographical location where there is governance or an act of leadership. By the power of the political forces at play in a territory, it influences the conduct and practice of engineering education. The appointment of a presidential commission on the fourth industrial revolution by the president of South Africa Cyril Ramaphosa which will help make policies that will guide the country to be a major broker in technology in Africa. this led to the appointment of a professor TshilidziMarwala as the deputy chair of the commission. This is a dimension through politics influences engineering education.

Politics is a major factor in human relationship and it is seen wherever humans exist. Political responsiveness deals with the ability to satisfy the needs of the governed by advancing policies and decisions that influences them positively. The teeming populace in a political environment have their own needs and concerns which the decision by the political class can influence. Hence, promoting actions that can help in meeting the needs of people within a political territory can help in ensuring political responsiveness. In a democratic society as it obtains in most country in Africa. government must respond to the needs, concerns and agitations of citizens (Dahl, 1971).

The forces of economy which are basically captured in the demand-supply dimension are key for understanding economic responsiveness. Economic factors play a vital role in influencing the practice and conduct of engineering education in Africa. This is also predicated on political actions and decisions made in a territory. Other economic factors such as inflation, exchange rate, labour, government activity influences the conduct of engineering education in Africa. With this dimension to engineering education, various economic factors must be made to respond to the economic needs in engineering education.

C. Conceptualizing corporate social responsibility as contextual responsiveness for engineering education in Africa

Corporate social responsibility has varying definition and various authors over the years have opined on what it is. Corporate social responsibility has become common place recently with the dawn of digital technologies and people try to engage in corporate social responsibility to project their brands to the world while negating the major import of corporate social responsibility. This is due to the fact that people don't really understand what it entails and there is a need to consider some definitions to understand more what corporate social responsibility is all about. Key amongst the definition include UNIDO (2020) which defined corporate social responsibility as a management concept whereby companies factor in social and environmental concerns in their business operations and interactions with their stakeholders. This definition seeks to create a balance between the company, stakeholders and the society. It is vital to note that production in any clime takes place in a context and there are various elements in the context which include the environment, the social and other factors.

Thus, the conduct of any business must be that it contributes directly or indirectly to the betterment of the company, stakeholders and the society. To contribute to the betterment of the company, there must be sustainability over number of years while contribution to stakeholders might be in form of profit or dividends while to the society, the production process must not affect the society negatively. To achieve this, various companies and organization engage in corporate social responsibility.

Furthermore, the European Union Commission (2001) revealed that corporate social responsibility is a concept through which companies integrate social and environmental concerns in their business activity and in their interaction with their stakeholders on a voluntary basis. This definition also captures the essence of social and environmental concerns in business activity.

The social concerns involve the interaction and human dimension to the business process and in any business endeavor, humans are important and they must be factored in at all time while the environment is also all factors that surrounds humans which must not be jeopardized in any business process. So, in the conduct of any business, there must be consideration for various various conditions which is not only limited to the social and environmental sphere. This is in line with the findings of Carroll (1979) which states that business include the economic, legal, ethical and discretionary expectations that the society has of organization at a specified point in time. Corporate social responsibility is also voluntary and not compulsory (Türker and Altuntaş (2012).

Thus, this study will conceptualize corporate social responsibility as contextual responsiveness in engineering education in Africa having established and addressed what corporate social responsibility and contextual responsiveness. It has been established that responsiveness is the impetus to respond to needs in a system and engineering education as a discipline takes place in a context and the contexts addressed in this study include social, economic, cultural, environmental and political. As a result of the changing times and condition, there must be contextual responsiveness for engineering education. The activities that takes place in a system which includes production has consequence on the environment. when an organization ventures into its various activity, it has effect on the external environment and this can be in positive or negative direction. Take for in instance in engineering education practice like landscaping, the aim might be to maintain the aesthetics of the environment which can contribute to achieving environmental balance but in doing that also, there will be a disruption to the structures in the environment. For example, disturbance of the relative position of the soil, creation of heaps of waste etc. so also mining activity has various consequence on the environment which must be addressed. The burning of fossil fuel in business premises, production processes, logistics and transportation, and all exchange along the value chain has consequence on the environment and to address this,

there must be environmental responsiveness brought about by consideration for the environment and this can be achieved by corporate social responsibility.

With the focus to address environmental concerns as one of the standpoints of corporate social responsibility, it culminates in contextual responsiveness for engineering education in Africa.

Activities of corporate social responsibility that might help in environmental consideration include awareness and seminar on the fragility of the environment, climate change and the need for proper environmental practices such as the use of bio-degradable materials, recycling of wastes, less reliance on fossil fuel, encouraging green environment by tree planting, legislation and legal action against erring organizations etc. This will ensure in the long run that the various environmental challenges are addressed thereby culminating in contextual responsiveness for engineering education in Africa. along environmental lines, corporate social responsibility seeks to ensure conservation of resources and utilization of natural resources, maintenance of the landscape, climate change etc. This excerpt from Tony Blair, UK Prime minister (May, 2000) captures the essence of environmental responsiveness

"we are now, more than ever, aware of the potentially negative impact of business on the environment, whatever the nature or size of the business. There can only be positive results from developing sustainability- from benefitting your own bottom line to benefitting tomorrow`s industry to benefitting the environment in which we all live"

This showcases the importance of corporate social responsibility achievable by consideration for the environment. engineering education is a business activity that takes place in a territory and it influences environmental processes. In corporate social responsibility, the onus is to ensure that the negative impact of the business on the environment is reduced.

More so, humans are part of the society so also are companies and organization. This implies that by value of our social fabric, we engage in interaction with each other. The company or organization is a part of a social enterprise and they must serve social purpose. Also, in social systems, there are various needs that must be met such as infrastructure, need for peace and tranquility, progress and development. Addressing these needs is vital to ensure social responsiveness as a part of contextual responsiveness for engineering education in Africa.This can be demonstrated in terms of philanthropy. Like I said before, humans are vital in the conduct of any business and they must be considered. Philanthropy as an element of corporate social responsibility ensures that businesses gives back to the society and this might be in various forms. Philanthropic feats such as provision of infrastructures in certain geographical areas, sensitization on key social issues can contribute to contextual responsiveness for engineering education in Africa. We have over the years seen how companies and organizations fix infrastructure, empower people, provide scholarships, provide grants for businesses, encourage development of areas etc. This is a dimension of corporate social responsibility and it has the impetus to culminate into contextual responsiveness for engineering education in Africa. To ensure contextual responsiveness, there must be consideration for ethical, legal and economic condition in engineering education. The matter of ethics pervades all discipline and it ensures that things are done in the right way they ought to be done. This will therefore ensure that systems, structures and processes in engineering education are not done outside the right standards. With this, there will be contextual responsiveness for engineering education in Africa. Also, in a social system, there are political structures that influences all interaction and the conduct of politics is one where policies, legislation and laws are made to influence businesses. Adhering to the legal provisions made will ensure that things are done under the ambit of the law and done aright. A contrivance of the law in well established society has consequences on the erring business or organization. While economic conditions such as demand/supply, tax, inflation, legislation etc. influences the conduct of engineering education. Understanding the interplay of these conditions and factoring them in in business processes can result in contextual responsiveness for engineering education in Africa.

IV. FINDINGS AND DISCUSSION

Before the crux of the topic was addressed, it was first important to understand the concepts in the topic under consideration and from the study context was seen as the interrelated conditions in which something exists or occurs. It can also be seen as the parts of a discourse that surrounds a word or passage and can help shed light on its meaning. It is therefore crucial to note that engineering education does not take place in a vacuum. It is surrounded by a lot of conditions which influences it and also helps in making meaning out of it. In the works of Fomumyam (2020), they include social, cultural, disciplinary, environmental, political dimension which were captured in this study. Findings from this study also revealed that contextual responsiveness in engineering education seeks to consider how overall changes influences the discipline and how the discipline responds to it. It is imperative to note that there are massive changes occurring globally along economic, technical, environmental, socio-cultural frontiers which are able to influence the conduct and practice of engineering education in Africa. Thus, the need to ensure that these changes are considered while also proffering adequate solution to them using the apparatus of corporate social responsibility. Corporate social responsibility was seen as a management strategy that seeks to consider social and environmental perspectives in business processes and it has immense benefits for stakeholders, society and the organization itself. The study conceptualized corporate social responsibility as contextual responsiveness for engineering education in Africa and the elements within it were considered.

V. IMPLICATIONS

This paper attempts a review of relevant literature to address the topic under consideration and evidence in support of the discourse were captured in the discussion.

The paper conceptualized how corporate social responsibility can be applicable as contextual responsiveness in engineering education for Africa.

This is important now than ever before because of the times we are in which is one of sudden pervasive changes that has not been witnessed before and which has damning consequence on humans and the environment. Hence, the need to have such a critical outlook into the dynamics of corporate social responsibility and contextual relevance in engineering education in Africa. the dynamics of engineering education in Africa is one characterized by poor investment in the discipline which is revealed in the World Bank metric of developed-developing nations tagged Global North and Global South. This necessitates the need for intensification of efforts on developing engineering capacity in students so as to have graduates that will have the knowledge crucial to solving the many challenges of the region. Key evidence from the study also has vital points that are important for policy makers and stakeholders in social-environmental concerns to take into consideration. When this is done, efforts into conserving the environment while also maintaining the natural resource base will be appreciated. Some perspectives considered in this study which corporate social responsibility captures for instance social and environmental concerns has immense import on the effort at achieving some of the sustainable development goals (SDGs). The 2030 Agenda for Sustainable Development, adopted by all United Nations Member States in 2015, present a template for peace and prosperity for inhabitants and the planet presently and in the years to come. At the heart of the 2030 Agenda for Sustainable Development are 17 sustainable development goals (SGDs) which is an urgent call for various countries of the world (developed and developing) to form global partnership in ending poverty, promoting good health, improving education, reduce inequality, encourage economic growth, tackle climate change and preserve forests land and oceans (UN, 2020). Some of the evidence from the social and environmental element of corporate social responsibility is key in achieving some of the Sustainable Development Goals such as clean water and sanitation, good health and wellbeing, quality education, gender equality, climate action etc. The onus is now on stakeholders and policy makers to leverage more on the ideals of corporate social responsibility so as to culminate in actions that will help achieve some of the Sustainable Development Goals.

VI. CONTRIBUTION OF NEW KNOWLEDGE

Context is vital in any discourse and it must be considered but much more than this, understanding the context that surrounds each discipline is key in order to ensure responsiveness.

This paper has shown the context in which engineering education exists and elements that surrounds it while also shedding light on how to ensure contextual responsiveness.

The contribution of this paper to new knowledge is captured by various attempts to exemplify the need for contextual responsiveness and also how to ensure contextual responsiveness.

The paper also brought in the nexus between corporate social responsibility and contextual responsiveness while also factoring in the sustainable development goals. There are elements in the corporate social responsibility that can ensure that the sustainable development goals are achieved and its therefore important to intensify and leverage on the ideals of corporate social responsibility.

VII. CONCLUSION AND RECOMMENDATION

Engineering education makes processes, systems and structures better and it has the potential for proffering solution to various challenges that befalls man and the environment. Though, it has various benefits, it has not been able to adequately address the challenges of Africa as a region which necessitates the need for ensuring contextual responsiveness in the discipline. Much more than ever before, there are changes now which spans the socio-cultural, environmental, political, technical, ecological space which requires solutions tailored made to address them. Corporate social responsibility also seeks to ensure that social and environmental concerns are considered in business processes. Hence, the essence of corporate social responsibility as contextual responsiveness for engineering education in Africa. The study recommended that there should be an overhaul to the practice of corporate social responsibility so as to have guidelines and standards to follow when engaged in it. This will ensure that the scheme deliver on its ideals. There should be an intensification of effort to leverage on corporate social responsibility so as to ensure social and environmental balance.

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