

GENDER ISSUES IN SCIENCE AND TECHNOLOGICAL DEVELOPMENT

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ABSTRACT

As Nigeria is getting developed day by day, and more women are entering into the economy, as scientist, technologist, politicians and other professionals, their economic contributions to the nation is becoming publicly acknowledged. The belief that certain occupations are presumed for the men is fast breaking down. Globalisation has in a way encouraged Nigerian women to aspire to greater heights than ever before. Most women have been challenged by women such as the late female Astronaut, mission commanders Kalpan Chawla, an Indian and Laurel B. Clark. The commander of the recent NASA space mission spaceship Discovery by the united states of America. Mission commander Eilken Collins is an inspiration to the African women. The current debate on gender issues is therefore, an attempt to criticize, and reconceptualize the epistemological basis of traditionally accepted dichotomy of male-female roles, which has for the past decades failed to help the nations in their developmental efforts. This paper, therefore, has highlighted the obstacles faced by women in their science and technological venture in development, and solutions have also been proffered.

Keywords: Gender Issues, Science and Technological Development.

INTRODUCTION

Women's subordination the conservatives argue is a natural phenomenon while the liberalists contend that it is the work of males in the male – dominated societies. The explanation is far fetched when it relates to Nigeria. Before colonialism, cultural practices portray women as relating very well with the males. In some societies in Nigeria before colonialism, women were allowed to rule. Oral traditions recall female obas in several areas of Yoruba land. It was not necessarily that a male who was chosen as a ruler, for it could also be a female. This is evident in the traditions of Oyo, Sabo, Ondo and Ijesha, Calabar, recording reigns of female obas and obongawan respectively. Colonialism in Nigeria returned women to the kitchen and the traditional roles of farming, fishing, weaving and trading. Although the origin of women's subordination is a controversial issue, which does not lend itself to an easy answer, there are wide varieties of explanations. Some of the explanations are discussed in this work clearly highlighting reasons for perpetual domination of women in a male – dominated society. In Nigeria, men have advantage over the women because the males inherit property from the family. Also men are considered stronger and more serious individuals where it involves jobs requiring physical energy. Because women have less numerical strength and insignificant economic contributions, they are denied appropriate power and status. In spite of women contributions to informal sector of the national economy, through fishing, trading, and farming, these contributions are not given adequate recognition.

WHAT IS SCIENCE AND TECHNOLOGY?

We have renowned female scientist already mentioned in the abstract of this work. Other scientist both foreign and Africans have discussed and their contributions clearly highlighted. It is often believed that when we talk about the word 'science' it can be viewed as a body of knowledge and as a set of assumptions and principles, which prescribes how the knowledge can be obtained and tested. Lawrence Meyer (1972) is of the view that "the basic purpose underlying any scientific endeavor is to explain. Put simply, the key word is "explanation. The explanation usually involves generalization and causation. Abraham Kaplan (1964) explains the situation further by saying that "an important aspect of explanation is the construction of empirically verified generalization with explanatory and predictive power. Technology as defined by oxford Lerner's dictionary is given as the study, mastery and utilization and manufacturing methods and industrial arts; systematic application of knowledge to practical tasks in industry. This paper, therefore, discusses women in industrial arts, manufacturing areas and practical tasks in industries, and other scientific endeavours.

THEORETICAL FRAME WORK

This work adopts the view of the critical feminists. The central and immediate concern of critical feminism is reformation of concept and attack on epistemological assumptions that affect the concept of the position of women in society. As reported by (Ityavayar, 1989), critical feminism as a theory of change holds that the long established myths and even jokes that misrepresent or down grade women should be abolished to allow room for a new and a better socialization process in society which will not deny women their rightful position in society. It is the attitude of the critical feminists to look critically at the language, style, and general attitudes of men towards women (Ogundipe-Lesile 1987). Critical feminists are optimistic that the future is bright for women in policy-making (Umoh, 2001). Even some of the male-conservatives do agree that women should be given the opportunity to excel in previous male dominated areas. It, therefore, remains a big task for this category of men to convince their counterparts to tap the great resources of one half of the population of Nigeria who are ready to contribute significantly to National Development.

A GENDER PERSPECTIVE

The socio-biological and the conservative camps hold that the biological differences between men and women are necessary and effective causes of division of labour by sex in all societies (Ityaryar and Obiajunwa, 1992). As would be expected, this inferiority, according to them is inherited from our primate ancestors. Adam was superior to eve, according to the Bible, because Adam was the first creation. Eve, the Bible says, was created with one of the left ribs of Adam. Although they argue specific task are streamlined for the different sexes in different societies, the world is fast changing and their view is almost not correct in all aspects. They argue that men are always warriors, protecting the group while the women work in the home or near the home rearing children and performing domestic duties. This assertion is almost proved not to be correct in its entirety. Redefining “women” in the context of the African environment and experience, (Africa leadership Forum, 1993:4) provides four major characteristics of “the African woman”, the first is the perception of women as rather “ a counterpart of the men in all socio-economic and political endeavor, and in short enshrined in “dual-gender succession which gives rise to matrimor-chiacal system. Women are empowered to exercise their professional gifts “without inferiority or hangover and without apologies”. The women who distinguished themselves in traditional history rose to great historic height through the succession structures within this area of their reality (African leadership forum, 1993:4). Secondly, as a daughter and counterpart of a son she is assigned a power role in the general societal institution and have remained till today in the Nigerian environment. An example was made of the role of “Daughters of Edo in Benin” during the tense political climate of the day. Thirdly, as a mother perceived as occupying the seat of life , and nurturing life not only in the family but in the entire community, thus the basis for interest of all. This view also seems to hold in most third world countries and also has a major part of the forum’s conceptual definitions. Saying of trust “mother is supreme”. In southwest Nigeria, mothers listen to the song” mother is an invaluable gold and the day she dies your gold has gotten lost in the ocean”, emphasis mine. Fourthly, a woman is seen as a wife meaning a spouse, woman and an associate in all endeavours of life in the family and the community. The forum’s conception seems to be in order with the traditional conception of gender. But when one looks up to what has happened to them during colonial and contemporary times, one finds neither answer nor help. However, the forum clearly disassociates itself from the international view of gender. A member of the forum categorically disassociates herself from Anglo-American conception; saying that men and women have distinct sex but were created to complement one another and that man is natural head of the family (Ezekwezil; 1970). One notes here that this is a conservative view, which only has a minor part of the Forum’s conceptual definitions. Examining gender under the contemporary Ibibio experience (Essien, 1986), the word “Eka” (mother, in all the dialects spoken in Ibibio land, means “large” or (extensive),”motherhood” or womanhood and is often, if not always, used in expressions of adoration and awe. Eka also connotes greatness, importance, respect and reverence as in Eka Abasi, Eka Ekong, Eka Eyen (the mother of the Supreme God, the mother of the war, and the mother of the child). A saying that is very popular in Nigeria “sweet mother” connotes a mother having an invaluable role in the home and outside the home activities, (Umoh, 2001).

THEORETICAL LITERATURE

The Paradigm of Mass Production and Industrialization in Africa - Offspring Of Indegenious Technology

The African society has since been distinguished by two distinct sectors, namely; ‘capitalist’ sector and the ‘subsistence’ sector. The capitalist sector portrayed a situation in which productivity was high and profitability was high. A situation where ownership was in the hands of either the State or private firms

and production was based on modern industry or estate agriculture. 'Subsistence' sector was regarded as being stagnant, had a low level of technology and severed primarily as a labour service (Lewis, 1945, 1955). Hagen talked about these two distinct societies as "modern" and "traditional" (Hagen, 1962). Adam Smith tried to liken China of those days to the present society as he tried to contrast China with the developed European countries (Arendt, 1972:14). Today it is safe to apply Karl Marx description of non-European forms of society, which he said had "Asiatic mode of production" unchanging and, to a large extent, undialectical (Arendt, 1972:16). Maurice Dobb extended his description of technological stagnation to the pre-capitalist (Dobb, 1963:33-82). Current trend of events have portrayed that traditional societies are able to undergo the process of internal transformation. India, Pakistan, Korea have lived to the expectation of "traditional" societies to the surprise of "modern" societies. These significant changes in the industrial sector have been as a result of using appropriate technology. Female gender has also contributed immensely in indigenous technology in China and Japan. At one time in history China, and Korea have been communist countries and have had the benefit of benefiting from the State – wide sponsored research. As seen by Bacha, empirical misconceptions, ideological biases and class interests mingle together to explain the "antinatural bias implicit in the subsistence mode of production (Bacha, 1980:265). Since the early 1960's replacing "labour intensive" with "capital intensive" mode of production has not significantly lifted Africa in terms of increased productivity. The Africans have failed to realize that "labour intensive" would solve the problem of manpower and at the same time allow Africans to grow gradually in what Rostow terms, stages in Economic growth. Women are fast realizing that embarking in indigenous technology is fast enhancing the cottage industries such industries as pottery, bag making (both raffia, leather, and beading) are products that come out of indigenous technological development in Nigeria.

WOMEN IN SCIENCE AND TECHNOLOGY - A GLOBAL PERSPECTIVE

a. Foreign Women in Technological Development

BULDERS AND TITANS

Carly Florina: Florina turns the wheel at one of the icons of the technology era. She is a marketer and one of the only eight (8) women leading a fortune of 500-companies. She engineered the \$19 billion merger with Compaq- and fought off a shareholder challenge. **Meg Whitman** – Is an American. ebay, would not have the status it has today, that is, one of the fastest companies in the world, collecting more than \$2 billion in annual revenue. They are the ones who are trading \$900 worth of goods and services a second on her website. **Belinda Stronach** – A Canadian is the president and CEO of magna international, north America's fifth largest auto –parts company. **Abigail Johnson** is the president of Fidelity Management and Research and is in charge of operations.

ARTIST AND ENTERTAINERS

Nicole Kidman An Australian is an artist and entertainer who has explored new territories, new standards and has made the world an immeasurable richer place. **Nora Jones**, in the serenity of Jones song delivery, this bold proclamation is issued: technology, publicity, has their place in music. **J.K. Rowling**, is a popular writer linked to Harry Potter, 254 million books sold in 61 languages in 200 countries earning her estimated \$211 million last year 2004. **Aishwarya Rai** an Indian has the biggest Indian industry in film production (the world largest). **Katie Couric** An American has cancer screening center which have risen 20% nation wide and many lives have been saved in what people refer to as Couric effect.

SCIENTIST AND THINKERS

Julie Gerberding An American is the first female director of the center for disease control and prevention (CDC) and has shaped how we see the world and ourselves. **Sandra Day O' Connor** – An American has remained popular since the 1992 landmark abortion ruling, coupled with partial occurrences that state interest should include protecting "the life of fetus that may become a child". **Samantha Power**, is a former Freeland reporter who has been noted for her voice against genocide.

THE AFRICAN EXPERIENCE

On the African scene can be remembered the popular Myriam Makeba, a woman who has changed South Africa through her songs. Mrs Koforo, an African woman who, conducted research and found out that Bitter kola (Effiat) can be used in the cure of Glycoma. Ms Afi Ekong, a former popular artist who changed arts industry in Nigeria. NAFDAC boss in Nigeria is an expert in her field. The present Finance Minister, Okonjo Iwela has been an expert in her field initiating programmes that will help our women to be successful industrialist and commercial experts. Several African women have excelled in their various fields of endeavours. Most to be acknowledged are females who have industrialized Africa using the resources-demand model. Given the encouragement they require, African women technologist can prove Mytylka wrong in her "unfulfilled promise of African industrialization".

WOMEN IN LOCAL TECHNOLOGY

In Africa, there has been emphasis on the development of a new developmental paradigm for African industrialization, which is, starting from the base by developing appropriate local technology that suits their culture. Most of their raw materials are the local materials, the clay, the raffia, the cane products, the palm fruits and palm fronts and other rich raw materials given to them by God. Improvements carried out on the traditional products have been as a result of the activities of women and technologist and scientist. This popular saying goes "we are women with different needs, interest, experiences and concerns. We are women within our unique social, economic and political context. We are part of a worldwide movement of women. And within our diversity lies our strength" (IWTC, 1984:5).

THE FAMILY SUPPORT PROGRAM- FAMILY ECONOMIC ADVANCED PROGRAM (FEAP)

An aspect of the family support program, Family Economic Advancement Program (FEAP) was established to advance loan to duly registered families. In the area of agriculture, women were encouraged to embark on large scale farming which produced various items such as Soya beans, cassava, palm produce, rice, melon etc. in the area of industries, through co-operative societies; families were encouraged to set up agro-based industries. Loans were advanced to women without collaterals. Ways and means were devised to help women benefit from property distributed from both the matrilineal and patrilineal linkages. Women are encouraged to rear fish and goats in large quantities, rearing and smoking, pottery, weaving. Women scientist and technologist in Nigeria are also benefiting from Biotechnology. Goats from the Eastern part of the country are crossbred with goats from the North.

THE GREEN BELT MOVEMENT IN KENYA

"Form'85" which was held between 10 and 19 July in Nairobi, in conjunction with UN world conference on women brought various development strategies to women in Nairobi. Dr. EddatGachukia said: Women have planted a seed in Nairobi that will germinate and grow with the years into a forest. The achievements of Forum '85 will become apparent and grow increasingly strong as the years go by (Forum '85, 1985) As observed by many women, a decade had ended, but for many women, a new decade had begun in Nairobi. Each woman would return from carrying that collective energy back to her community (Forum'85, 1985). In Kenya some local women prefer using firewood as a source of fuel. The green belt movement in Kenya embarks in planting thousands of improved specie trees for both protection of environment and as a source of fuel. The green belt movement also embarks on other economic ventures. Soil conservation helps the movement to plan for better yield of crops. The green belt movement has initiated many economic programs that have led to the improved conditions of women in Kenya. The federation des associations Feminines du Senegal (FAFS are supporting local initiatives of women to establish village forest (Dankelman and Davidson, 1997: 115)

PROBLEMS AFFECTING WOMEN IN TECHNOLOGICAL DEVELOPMENT **FEW WOMEN IN POLICY-MAKING STRUCTURES**

In Nigeria and the developing world generally, very few women could be seen in decision-making processes of their societies, including those issues specifically affecting them. They seldom have inputs into decisions and programmes, which fundamentally affect them. The ratio of employment among women folk's and their male counterparts is conservatively estimated at 24:1 in Nigeria, even though women constitute over 50 percent of the total population. Although some observers point to some countries such as India, Israel, Argentina, Indonesia, Britain, Sri Lanka, Philippine as having produced women as government leaders, one can only accept this observation meaningfully in terms of frequency. In each of these countries, only one woman had been given the top leadership in governance in conservatively over one thousand years. Mathematically then, one can observe this to be a chance rather than a sustainable pattern.

FEW OPPORTUNITIES FOR TECHNOLOGICAL EDUCATION

Women have few opportunities for technology education. Given while they are in secondary schools, parents prefer the male children to attend technical schools while females pursue vocational courses, government who is acting as a research partner with leading universities still get titled towards favour of male researchers.

TECHNOLOGY AND RELIGION

Technological revolution has been affected by religion. As already discussed, religion is one of the factors that champion the inequality between male and females. If religion has affected negatively the progress of science and technology where males are concerned, then females are terribly scared when technology tends to contradict religion. A group of students of the Natural and Physical Sciences had this to say:

We believe that it is the duty of every scientific student to investigate nature simply for the purpose of elucidating truth and that if he finds that some of his results appear to be in contradiction to the written word, or rather to his own interpretation of it, which, may be erroneous, he should not presumptuously affirm that his own conclusions must be right, and the statement of the scripture wrong; rather, leave the two side by side till it shall please God to allow us to see the manner in which they may be reconciled and, instead of insisting upon seeming differences between science and scriptures, it would be well to rest in faith upon points in which they agree (Umoh, E. D, unpublished conference paper).

TECHNOLOGY AND BUSINESS-LACK OF RESOURCES BY WOMEN

Possession of efficient machinery contributes to competitive advantage. women lack resources to compete in male-dominated societies. Men have stronger network for negotiating resources to man their businesses but women have no such opportunity. Technology is capable of producing a vast variety of material goods services, but will the dream of such goods and services eliminate inequalities and injustices harbored by our male-counterparts. Think about that.

TECHNOLOGY AND POLITICS

Culture and other social ills have continued to prevent female gender from excelling in technological advancement. The present mode of playing politics can be refined if women are allowed in great numbers into politics. Germany's current Chancellor during her political campaigns said "this election is about our destiny" (Newsweek September, 19, 2005) African politics and technology is all about our destiny and African women, like Merkel we can do it.

CONCLUSION

Women are important in their area of operation. They are equally very good in the men usurped domain. Women are vital in all tasks. This is particularly true in Africa, where women grow most of the food. "Women are the backbone of Africa", says Harrison and here and elsewhere they are traditionally responsible for a great deal of conservation activity- they are prepared to work whole heartedly to prove that they are much more concerned about family and the entire continent as a whole (Umoh, 2001). Women have successfully started the African industrialization in the right direction, that is, the resources Demand model instead of import duplication. They found it necessary and useful to tap the local resources. Women organization have successfully improved and perfected their products and it is hoped that a few years to come, the locally produced goods will compete favorably with the imported ones as a result of the use of appropriate technology.

STRONG CALL FOR CHANGE IN GENDER BIAS

This is coming to all of us, is Nigeria better today than in the past years? Is the future brighter for all of us? The current Chancellor, Merkel during her political campaign, put a similar question forward to Germany. As observed by Katinka Barsch of The Center for European Return, if Germany reforms, France and Italy will be pressed to follow. This paper is giving a similar message that if Nigeria reforms in the area of utilizing female potentials effectively, Ghana Sierra Leone, Gambia and others will be pressed to follow. This step will make Africa stronger and effective in technological advancement, be it local or foreign. The on 2005 state of the world report, "promise of equality: gender equality, reproductive health and the millennium Development goals", shows that accepting women equal opportunities in science and technology field will enhance the country's development pace for the next generations.

RECOMMENDATIONS

1. **Women should be encouraged to go into areas such as biotechnology:** Women produce 80% of consumable items in Nigeria. It is imperative that they enter, in large numbers into the area of biotechnology. It is worthy to remark that the workshop organized by the National Biotechnology Development Agency (Abuja), Tuskegee University, U.S.A, international Institute for tropical agriculture (Ibadan, Nigeria) sponsored by USAID in the year 2004 was not attended by women in remarkable numbers.
2. **Women should be recognized as having equal potential for technological development:** Just as the men, after all, women have excelled in high technological areas such as space mission. For example the American Astronaut disaster of 2004 included two females, mission commander Kalpan Chawla, an Indian and Lawel B. Clerk, an American. The space mission of August 4, 2005, was led by a female, commander, Eileen Collins.
3. **Female gender should empower themselves:** By determining to enter the previous male domain of science and engineering fields women will move a step further. It is only through self-determination that the effort of government or external groups will be meaningful.
4. **Government should encourage female researchers:** The government of this country should realize that the non-utilization of female potentials in the area of science and technology is crippling the nation. Some African countries are using extensively their local technology for both home use and exports.

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