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Women and Technological Development in Nigeria

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Abstract: A remarkable feature of the history of technological development, at least as it has been written until comparatively recently, is the non-mention of women participation in the process. Even in industrialized societies, recent research has provided evidence of women's previously unacknowledged contributions to technological developments. Yet women have been growers, gatherers and processors and storers of food from and even before, the beginning of recorded history and recently have become prominent in many modern technological fields. In the circumstance, this study seeks to examine the extent of the role of women in the technological development of Nigeria. The role of women in five major professions was considered around each of the six geo-political zones of the country. Though variation of women's contribution occurs from zone to zone, it was found that women were rarely passive recipients of technology, but, as its users, could interact in ways which fed back into and influenced the design of artefacts and systems. That the differences, vis-à-vis the role of men, are found to be more the product of socially determined roles than innate propensities. Strategies were then proffer to involve more women in contributing to the technological development, which it is emphasized will lead to a wider definition of what counts as technological in Nigeria and to possibly different solutions to what are deemed technological problems, coupled with the fact that it can raise the status of women.

Key words: Woman, technological development, major professions, Nigerian

INTRODUCTION

Technology is a purposeful human activity, which involves designing and making products as diverse as clothing, foods, artefacts, machines, structures, electronic devices and computer systems, collectively often referred to as "the made world", Microsoft Encarta (2004) and when this is done to improve people's quality of life or satisfy their needs, whether physical, material, metal, emotional or spiritual, it is called technological development. A remarkable feature of the history of technological development of Nigeria, at least as it has been written until comparatively recently, is the invisibility of women. The view that there have been few women technologists is deeply rooted and has been periodically reinforced by heroic accounts of, for example, the great road-makers, fen-drainers, canal and bridge builders and lighthouse constructors (Samuel, 1884).

Yet in the technological development of Nigeria, women contributions have been ubiquitous and varied according to the structure, needs, customs and attitudes of this country. In prehistoric times, women and men participated almost equally in hunting and gathering activities to obtain food. With the development of agricultural communities, women's work revolved more around the home. They prepared food, made clothing and utensils and nurtured children, while also helping to plough fields, harvest crops and tend animals. As urban centres developed and education became universal, women sold or traded goods in the marketplace and spread into all educational fields, including those, which have technology as focus.

Problems formulation: As Nigeria began to industrialize or develop, recent research has provided evidence of women's previously unacknowledged contributions to technological developments. This has been found not to be encouraging to the women (McCormick and Sanders, 1992). Thus, the purpose of this study is to address the following questions:

- What has been the extent of the role of women in the technological development of Nigeria?
- What strategies can be evolved in improving this role?
- Are there any ways this role can enhance the status of women?

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MATERIALS AND METHODS

This study is a descriptive survey, which considers a sample of five major chosen professions from a larger population of the available professions where women are making their contributions to the technological development of Nigeria. The main instrument used to gather data for the study was questionnaire, which was administered to semi-literate and literate persons to know the percentage of women's contributions in each profession and in each of the zones. The questionnaire was formulated after exhaustive review of related literature and other scales that have been used in similar situations. Contact was made with correspondents with electronic mail (E-mail) addresses in some state capitals, with each correspondent helping to administer the questionnaire to selected areas in the state while the researchers themselves visited at least five areas in each zone of the 6 geo-political zones of the country. The questionnaire had 4 sections. Section A sought information on the background of the respondents. Section B had 30 items addressing the role of women in the technological development of Nigeria. Items 1-6 sought information regarding personal characteristics of women; items 7-12 sought information on the home; items 13-20 solicited for information relating to finance, items 21-25 sought information relating to vocational/Technical education of women and items 26-30 were meant to obtain information regarding the percentage of women's contribution in specific areas of technology. Section C had 10 items, which were to provide information on the strategies for improving the role of women in the technological development of Nigeria. Section D had 5 items on how women contributions in this regard can enhance their status. All the items in sections B, C and D were placed on a Likert-type scale, with responses ranging from strongly agree, agree, undecided, disagree and strongly disagree. Four professors on educational research methodology validated the questionnaire. Based on their recommendations, the questionnaire was reviewed and used for the study. Thirty respondents were equally contacted at random from the 20 local government headquarters of Edo and Delta States. The essence was to compare a small area results with that obtained from the larger Nigeria as country and to test the hypothesis, which is that there is no significant difference between the means of the opinion held in these two states, commonly referred to as mini-Nigeria and Nigeria as a whole.

Analysis of results: In view of the hypothesis, the data were analyzed by t-test and regression methods. The t-test method was preferable in this study in that it is indicative of existence of real difference in sample mean. The approach does eliminate factors other than the true difference in effects of the two methods of test and therefore is more sensitive. Besides, its use does not involve the application of F-test to first validate the result. However, the t-test of the hypothesis only indicates acceptance or rejection. Therefore, it was required to obtain a level of confidence interval, which apart from giving a measure of reliability, also provides index of reliability, r. and this was provided by variance approach to regression.

On a pair sample t-test, there results a set of differences and the null hypothesis will be that the mean of such differences is zero. With the aid of SPSS computer compiler, 20 separate sample results, one from the two states and the other for the whole Nigeria are compared. On paired sample t-test, this gives 19 degrees of freedom and from tables at the á-risk of 5%, the acceptance region is found to be $|t| \leq 2.42$. The rejection region is, therefore $t > \pm 2.42$. With a two-tailed test, t is calculated to be equal to -2.18. Hence, the mean difference is not significant at the 5% level and as such there is no variation in the opinion held in these two states and Nigeria as a whole. Further analysis was carried out to obtain a level of confidence interval (the regression), which apart from giving a measure of reliability does provide index of reliability (r). With the aid of SPSS computer complier, the value of r or the percentile overall fit is found to be 0.84. This further proved that there is no variation in the opinion held in these two states and Nigeria as a whole.

The results obtained, which were in specific areas of technology were further analyzed and the percentages of the contribution in each of the different geo-political regions are as tabulated as. Presented in Fig. 1 is a bar chart obtained with Excel compiler, which represents these results.

RESULTS AND DISCUSSION

Thus, in discussing the findings, from ancient to modern times, 5 generalizations can be made about women's contributions in the technological development of Nigeria, which is confirmed from the results obtained from respondents as:

- The Table 1 shows that there is no zone in the country where women are contributing less than 31.4%. In agriculture, the contribution is put at 43% and in the medical field is as low as 17%. However, in home economics women are contributing as much as 82.8%. Though in business and manufacturing, the percentage is less than 30, this to a great extent is as

Table 1: Percentage of women contribution in some selected areas of technology in the 6 geo-political regions of the country

Zone/ Profession	South-South (%)	South west (%)	South east (%)	Middle belt (%)	North west (%)	North east (%)	Total (%)
Agriculture	35	40	65	45	38	35	43.0
Business	44	40	30	12	8	10	26.7
Manufacturing	30	33	25	30	25	23	27.7
Medicine	15	42	21	10	8	6	17.0
Home Economics	89	82	81	82	80	83	82.8
Total %	42.6	47.4	44.4	35.8	31.8	31.4	

Note: All data are in percentage

result of the purdah system in the north, which makes these areas predominantly occupied by men.

- Women have provided the basic needs of the home, such as maintaining the home and food processing; because of economic necessity; poor women in particular worked outside the home whether they were unmarried or married and especially if their husbands were unable to sustain the family solely through their own work. This includes fishing, farming and running restaurants, sellers of goods such as salt, figs, bread, or working laundresses; cobblers; and potters, with or without husbands. In most ancient Nigeria, however, upper-class women usually were limited to their homes and workingwomen were used for unskilled work. Working women crushed stones used to make roads and worked long hours weaving clothe.
- Women's indentured work or apprenticeship has often been similar to their work at home When goods that had been produced by hand in the home were manufactured by machine under the factory system, women competed more with men for some jobs, but were concentrated primarily in textile mills and clothing factories. Manufacturers often favoured women employees because of relevant skills and lower wages and also because early trade union organization tended to occur first among men. Employees in packaging shops were also preponderantly women. The result was to institutionalize systems of low pay, poor working conditions, long hours and other abuses, which along with child labour presented some of the worst examples of women worker exploitation in early industrial capitalism. Women workers in business and the professions, the so-called white-collar occupations, suffered less from poor conditions of work and exploitative labour, but were denied equality of pay and opportunity. The growing use of the typewriter and the telephone created two new employment niches for women, as typists and telephonists, but in both fields the result was again to institutionalize a permanent category of low-paid, low-status women's work. Teaching, especially at the lower echelons, remained a career customarily open to women and medicine also became one important field where women enjoyed some early success. Nursing was traditionally a female preserve. Women are now frequently accepted equally with men as tailors, hair dressers or barbers, carpenters, etc.
- Women have maintained the primary responsibility for raising children, regardless of their work. In Nigeria, women responsibilities in this respect remain unchanged today. Similarly, the activities of infant and child care or nursing babies have been and often still are, seen as women's work
- Women have historically been paid less than men for their contributions and have been allocated lower-status work. Some major changes are now occurring as Nigeria is industrializing including the steadily increasing proportion of women in the labour force; decreasing family responsibilities (due to both smaller family size and technological innovation in the home); higher levels of education for women; and more middle- and upper-income women working for pay or for job satisfaction. Statistically, they have not yet achieved parity of pay or senior appointments in the workplace, especially in governance, in Nigeria.

The study of the technological capabilities of women in Nigeria has demonstrated the extent of women ingenuity in matters of food preparation, often in the face of great adversity. Whenever it became difficult to grow enough food, the women have innovated and adapted food production and processing techniques to supplement family diets (Ogbigwe, 1996). New sources of food are being identified from indigenous plants and trees and new processes are developed by women for preparing food and rendering it fit for storage.

As noted by Ukpore and Edijala (2002) and found in this research, there is evidence of women's previously unacknowledged contributions to technological developments. Also, it is clear that women were rarely passive recipients of technology, but, as its users, could interact in ways which fed back into and influenced the design of artefacts and systems. The work experiences of women in weaving cloth and management of the home were contributory to the development of the textile industry and environmental sanitation in Nigeria.

There are no simple explanations for the invisibility of women in the history of technology. Possibly men, who wrote the histories, simply did not know what women did (Agee, 1996; Samuel, 1884). In Nigeria, the roles were very precisely laid down: "Men's work is to hunt and fish and then sit down; women's work is all else". For many years the inability of a woman to do things in her own name was clearly an obstacle to recognition. The paucity of women in not pursuing some type of educational studies and even attaining higher degrees in them, especially in the technical courses is responsible for this as noted by many respondents and this was emphasized by Mamman (1996).

The need for capital to support a period of trial and development of a novel artefact was another barrier (Angela and Alison, 1996). It was only recently the Married Women's Property Act was passed, that Nigerian women acquired legal possession and control of personal property independently of their husbands, though many husbands still insist that this must be done with their permission. The dominant role of warfare and military concerns in the development of technology, where men play prominent role, has also been suggested as contributory to women's absence from the pages of its history (McCormick and Sanders, 1992).

Garner (1991) emphasized, as was also found to be true in this study, that the ways in which women value things and people and communicate with others are different from those of men. As a generalization, women are reputed to be less adversarial, more given to networking and generally less formal and hierarchical relationships and concerned to minimize disaster and confrontation, as opposed to the authoritarian, rule-bound, competitive and hierarchical structures of the world of men, intent on maximizing gain.

Even if these differences are more the product of socially determined roles than innate propensities, it would seem that the greater involvement of women in technology could lead to a wider definition of what counts as technological and to possibly different solutions to what are deemed technological problems (World Bank, 1995; Ukpore and Edijala, 2002; Emile, 1977; Angela and Alison, 1996; Ogbigwe, 1996). It was observed in this study in line with the opinion held by Ukpore and Edijala (2002) that the status or the position of women, which is the amount of control they have exercise over economic, social, political, domestic and the personal autonomy they enjoy and the esteem accorded them, in different cultural settings is one of the factors limiting women contribution in the technological development of Nigeria.

Ogbigwe (1996) observed that in Nigeria, as labour shortage developed when thousands of men were called to serve in the military during the civil war years, to fill the gap, many women began doing industrial work that previously had been done only by men. Some women were even allowed to serve in the military and the police force. In Nigeria, as in other developing countries, improvement is expected throughout. So, any gap to be closed elsewhere, especially women role in the technological development relates to improvements that are seen to be possible in a single generation. The educational opportunities open to women in Nigeria and the literacy levels achieved, although generally improving, remain markedly worse than those of men. The absolute number of illiterate adults appears to be increasing, with women in substantial majority.

This study reveals that career opportunities, especially in the higher echelons of business and government, have yet to improve to the levels seen in some Western countries. However, most respondents pointed out that the practice relating to contraception, the premature termination of pregnancies and the uneasiness of childbirth, menstrual experiences and to some women, widow hold predispose women from maximizing their contribution in this respect.

Improving women role in the technological development of Nigeria: Despite the fact that women constitute more than half of Nigeria population, producing up to 70% of food requirement by some estimates, in general they remain concentrated in a limited number of traditional occupations, many of which do not require highly technical qualifications and most of which are low paid. However, according Mamman (1996), as Nigeria becomes industrialized, more women are obtaining jobs in more occupations. Nevertheless, some strategies are proffered here, which not only enhance their input in this area, but also their status or position.

The professions, whose statutes were one of the first targets of equal opportunity legislation, formed something of a vanguard for female workers in the 20th century, but equal pay and opportunity in these fields has yet to be matched by comparable developments in the business sector. World Bank (1995) reported that equal pay for equal work will raise the status of women, but almost no women achieved high office. Therefore, there must be encouragement in form of equal employment and minimum wage legislation, with regular upward review particularly on the alleviation of these abuses on the working women. Collective bargaining must be used more widely

as a means to improve women's working conditions. Equal opportunities legislation is to be introduced to guarantee and facilitate employment outside the domain of the "office lady" (women in low-paid secretarial work, often performing menial office tasks).

Women in Nigeria are still concentrated in some traditional occupations and industries and almost always at lower levels of responsibility than men. World Bank (1995) has defined a "basic learning package" needed for both men and women in developing nations. This package includes functional literacy, some choice of relevant vocational skills, family planning and health, child care, nutrition, sanitation and knowledge for civic participation. Illiteracy is higher among women than among men. Even where some equality has been achieved, problems such as high unemployment rates affect women adversely. In the last two decades, from this study, it was found that women's average hourly earnings have risen from 66-87% of men's earnings. At the same time, the Nigeria government should undertake major reforms of textbooks and curricula, parent education, training programmes, financial grants or loans, childcare and tax policies and marriage and divorce laws, all geared to accord women equal opportunities in the labour market while also recognizing their special needs if they are mothers. Counseling and support programmes are to be designed for women re-entering the work force to increase their input.

Traditional paternalist attitudes, the importance of the family in Christianity and the presence of Islam in some areas, have all tended to depress the working status and opportunities of women (Martin, 1995). That said, economic growth has allowed women to aspire to careers and wages never open to them before and Nigeria should be seen to be ever less willing to let such traditional constraints keep potential wealth creators out of their economies.

Discrimination is a major impediment to educating women, but the rewards of overcoming this bias are far-reaching. Educated women were found to contribute more to the technological development of Nigeria and have fewer and healthier children than uneducated women. Their children were also more likely to be educated themselves. Basic education could be achieved with substantial amount going into it, especially in encouraging women education in vocationally orientated skills.

In developed countries such as Nigeria, the nature of functional literacy is to be re-thought: familiarity with computer-generated, information-based technologies is increasingly necessary for successful economic performance (Emile, 1977). So, it has become a major aim of educational policy in this country, from the first years of school to higher education, to ensure that an ever-increasing proportion of the women population should be at par in acquiring and applying these requisite skills. This is with the view that no one will find the excuse to look down on the women.

CONCLUSION

It is found that women were rarely passive recipients of technology, but, as its users, could interact in ways, which fed back into and influenced the design of artefacts and systems. Even where the differences are found vis-à-vis the role of men, these are more the product of socially determined roles than innate propensities; it was found that the greater involvement of women in technology could lead to a wider definition of what counts as technological and to possibly different solutions to what are deemed technological problems, coupled with the fact that it raises the status of women. Historically, Nigerian women have wielded only behind-the-scenes power in the household. Today, however, women's roles in Nigerian society are changing; western influences are gaining visibility and traditional values are being scrutinized. Women in Nigerian have long suffered economic discrimination and gender bias. But as Nigerian's women's movements gain strength, the future looks brighter for many of the country's women to contribute to the technological development of Nigeria.

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