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UNIVERSITY - INDUSTRIAL RESEARCH ORGANIZATION - INDUSTRY CO-OPERATION

THE CASE OF NIGERIA WITH EMPHASIS ON THE UNIVERSITY OF LAGOS 1/

by

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1/ The views and opinions expressed in this paper are those of the author and do not necessarily reflect the views of the Secretariat of UNIDO. This paper has been reproduced without formal editing.

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GENERAL:

Universities, colleges of technology, polytechnics and industrial research organisations are the main avenues for industrial development in developing countries. This is more so than in developed countries where there are some firms that are large enough to have their own Research and Development Sections. Sometimes, however, it is not only size but also the awareness of the importance of research that determines the existence of such sections in industries.

In some developed countries groups of industries combine to establish industrial research organisations to cater for their peculiar problems. In developing countries such organisations are set up by the government and their range of research is normally very wide. It is a fact of life in such countries that the indigenous industries are, very often, short-sighted and profit motivated to a fault. Perhaps this is a necessary and passing phase. One hopes that they will quickly grow big enough and be able to slow down and take stock and realise the need for research into production methods, handling methods, new products and so on.

In a developing country, universities are usually new and Faculties of Engineering are often the last to be established, mainly because of the high cost of equipping laboratories and the lack of properly trained staff. The problems associated with equipping laboratories are many:

foreign exchange formalities are usually long and tedious;
port facilities are sometimes inadequate hence equipment may have to be air-freighted if they are required urgently;

there are few or non-existent service or repair facilities; often no spare parts are readily available hence machines have to be replaced where they could otherwise easily have been repaired.

THE NIGERIAN UNIVERSITIES:

Out of the twelve universities in Nigeria, there are six with Faculties of Engineering or Technology.

The University of Ife has a well-developed Electronics and Light Current laboratory which was the result of the work they did for their State Government over a period of years. There is also a Production Centre whose main purpose is to provide factory-type training for students on site.

The Ahmadu Bello University in Zaria has the oldest Faculty of Engineering in Nigeria and is also planning a production unit.

Lagos is, at the same time, the federal capital, commercial capital, main seaport, main airport and the centre of industry in Nigeria. The Faculty of Engineering at the University of Lagos is, therefore, in a unique position to be deeply involved in the technological development of Nigeria. However, the Faculty is much younger than the University itself and is still developing.

In developed countries, some universities are famous for their competence in some particular branch or other of engineering; in our case, we usually have to cater for a wide range and also try to achieve a high standard of competence in each one.

One of the institutions of industrial research, the Federal Institute of Industrial Research, is situated in a Lagos suburb

and we often have occasion to seek co-operation from each other. I am, for example, on the Industrial Research Council of Nigeria which is the Management Board of the Institute and I am, therefore, in a position to see the areas in which co-operation is most readily possible.

The departments in the Faculty of Engineering at my university are free to organise courses and seminars for, or act as consultants to industry.

The Chemical Engineering Department staff have a joint consultancy to check various designs for some oil firms and have received a large grant from the Federal Government to carry out research in a particular area.

The Civil Engineering Department frequently carries out tests on reinforced concrete columns and beams for construction companies. The department contains a Hydraulics Research Laboratory which can carry out investigations on wharves, docks, ports and coastline problems. It has already done some work in this line for an oil firm and one of the problems that is looming large is the erosion of the beach in Lagos.

The Electrical Engineering Department has a High Voltage Laboratory which is the only one of its type in the country. It was donated to the University by the West German Government. It runs seminars yearly for about thirty people mostly drawn from the Federal Posts and Telegraphs Department and the National Electricity Power Authority. It is currently negotiating with the Posts and

Telegraphs Department to run courses for its staff and, in some cases, to supervise them for higher degrees. A further request is to investigate and map out the insulating properties of the earth all over Nigeria.

The Mechanical Engineering Department is, perhaps, the one most directly concerned with Industry. The Faculty of Engineering was started by UNESCO who helped to support it for a few years before passing it on to the University. It was some time after the Civil War ended that money became available for more equipment and we are now beginning to equip some laboratories for the first time.

For example, in the Stress Analysis Laboratory, we are now to have a Strain Gauge Section and a Photoelasticity Section. We are also setting up an Industrial Engineering Laboratory and a Metrology Laboratory.

The Photoelasticity Laboratory may appear rather sophisticated for a developing country, but it must be appreciated that we are more subject to structural and machine failures than in developed countries, where design and construction are carried out within standardised limits and inspection is more rigorous. Materials used for most of our structural work is imported and tested usually under temperate climate conditions. A laboratory where trouble-shooting and optimum design can be more quickly and easily carried out is, therefore, a very useful addition to our facilities.

The Industrial Engineering Laboratory is meant for undergraduate and post-graduate projects and staff research and is available for research into industrial problems from industry.

The Metrology Laboratory, apart from being used to educate students in the importance of the science of measurement will, it is hoped, become a main avenue of co-operation between the University on the one hand and the public and private sectors of industry on the other.

When all the equipment has been installed and the laboratories are fully functioning, we propose to publicise the fact by means of newspaper advertisements, radio and television announcements and an Open Day. This will make the general public, and industry in particular aware of the facilities available and encourage them to take advantage of their existence.

THE INDUSTRIAL CENTRE:

Nigeria is in the fortunate position, compared with other developing countries, of having mineral resources of such a nature that it can afford projects that some other developing countries cannot, at the moment, afford. But no nation, however wealthy, can keep draining its natural resources without preparing for the possibility that the price of its commodity may fall, its customers may discover an alternative or its mineral resources may dry up. The best way to do this, we feel, is by industrialisation.

The present state of our industry is that it is mainly an assembly and a servicing industry. This situation has to be corrected so that we do not, for much longer, keep exporting all our raw materials and receiving them back later, at monumentally increased prices, as manufactured goods.

The Universities in Nigeria feel that the best way we can serve Industry, is to provide them with a steady supply of highly qualified engineers. This means engineers who have undergone adequate theoretical and practical training to a high degree of competence.

Having previously explained that our industry is at its initial stages of development, it would be obvious that it is not really in a position, even if it were so inclined, to give our students the type of training that they would need for the future. Accordingly, the Faculty of Engineering at the University of Lagos, some time last year, made a proposal to build an Industrial Centre. This will be a manufacturing unit which, to all intents and purposes, will be a factory complex. However, it will also provide facilities for practical training for undergraduate engineers, technicians and artisans. It is proposed that each student will spend one solid period of six months of their four-year undergraduate course at the Centre; it will be of such a size that the periodical infusion into it of these students will not adversely disrupt production.

One of the largest sections in the Centre will be the Research and Development Section and, it is hoped, this will be used quite considerably by both the public and private sectors of industry.

One of the duties of the Centre will be to run short courses in the use of equipment and machinery for industry. Various sections of the Centre will serve as a standard for Industry on machine arrangement on shop floors and materials handling from raw material collection points to the departure points of the finished products to customers. The Centre will also be an example, much needed in Nigeria, of proper attention to factory safety, health and hygiene regulations, recreation and cafetaria facilities.

My Faculty of Engineering launched an Appeal Fund for the Centre about six months ago but hopes the main supporter of the project will be the Federal Government. We have also been corresponding with UNIDO for about a year, mainly for assistance in preparing a feasibility report and also to serve as a base from which to approach world bodies for financial assistance when the time comes.

We have found that there is an erroneous belief that Nigeria is now such a wealthy country that it no longer needs any financial aid for any of its projects. This is, in fact, not true. With its population of some 70 million people and with so much construction to carry out, a vast, predominantly illiterate people to educate, provision of water, electricity, sanitation and other amenities to cater for, there is not that much money to go around. The air fare, per mile, from Lagos to London is, for example, said to be one of the highest, if not the very highest in the world. Those of us who deal with agents of the suppliers of equipment and machinery in Nigeria know that many firms, using various untenable excuses, inflate the prices of their goods because they are selling to Nigeria; this is obvious when one compares prices from one agent to the other.

We feel it is vital for us in the universities to assist and force the pace of the transfer of technology in our country. This we can best do by providing adequate manpower of high quality to industry.

We have been in contact with firms in Vienna and various cities in Britain to negotiate terms for providing equipment, expertise at the initial stage and, in some cases, partnership on a small scale, in some sections of the Centre.

CO-OPERATION WITH INSTITUTIONS IN OTHER COUNTRIES:

On the question of co-operation with universities in other countries, the Chemical Engineering Department at the University of Lagos has an agreement with the University of Waterloo in Canada. Every summer, one of our senior members of staff goes there for three months and, starting from March, 1977, one of their professors will come to us for periods ranging from four months to one year. It is hoped that their Chief Technician will also be able to come out to us later.

The Hydraulics Research Project in the Civil Engineering Department was set up with the help of the Government of the Netherlands who provided about half the cost. Links have been forged with the Delft Hydraulic Research Laboratory who supplied the staff that designed and supervised the construction of the laboratory. The Delft Laboratory has trained, and is still training, some of our staff; we have expressed a willingness to accept some of their young graduates if they should wish to work at our Research Project in order to gain experience.

The Production Engineering Department at the University of Nottingham in England is sending us somebody to give a seminar at our university on Mechanised Assembly early in March next year; it is also providing us with some pick-and-place equipment. The two-day seminar will be open to the public and will be followed by a one-day practical workshop where the people who attended the lectures will practise some of the concepts they learnt from the seminar. Another member of staff from Nottingham will come out to us around May to help with technical staff training in the Metrology Laboratory.

The Electrical Engineering Department at my university has a scheme whereby a member of staff will go to the University of Stuttgart in West Germany for a course on Electrical Machines for about six weeks next summer.

We receive requests every now and then from institutions, ministries, industries and universities in Southern Africa to inform them of the training available for some of their staff or students. Sometimes, it is unfortunately not the type of training a university can provide and we have referred such cases to the Colleges of Technology or the Polytechnics.

CO-OPERATION WITH INDUSTRY:

In Nigeria, the Federal Government set up the Industrial Training Fund (ITF) whose purpose is to reimburse firms and organisations for what they pay students who are receiving practical training with them during the long vacations.

These students may be from Commerce, Banking, Medicine or Engineering and may come from any type of institution of tertiary education. The ITF is, therefore, a sort of co-ordinating body in the interaction between institutions of learning and industry. One finds, however, that even though the means of recovering payments made to students is available, some firms will not take in students or, where they do, there are no proper training facilities or training officers. Universities are, therefore, not always at fault when there is no co-operation between them and industry. There are cases where institutions have gone out to firms or sent out questionnaires informing firms that they would like to have problems from industry for their final-year students to take on as projects. The reply, if any, has generally been in the negative.

Most of the largest firms in Nigeria are foreign and as such they tend to send their industrial problems of a technical nature to the headquarters of the parent firms in their home countries. The reason often given is that such multi-national organisations find it more economical to set up one large research centre at their headquarters. This may often mean that a problem sent from one branch may find a ready solution because a similar problem had previously been referred to the centre by another branch. Another advantage is that the organisation can afford to equip one research centre properly with high quality equipment and staff which, otherwise, would be spread rather thinly all over the world. This is doubtless good economic planning but it means that the universities in Nigeria are deprived of this opportunity of co-operating with industry to their mutual benefit.

It is true that universities in developing countries are in a better position than their counterparts in developed countries to lead opinion and to try to direct the course of industrial development because they have, proportionally, a greater concentration of equipment for research and highly trained technological personnel. However, the universities cannot force themselves onto industry but have to try methods of gentle persuasion to make industry realise the need for mutual co-operation.

We have, for example, written circular letters to Industry, informing them that in the University of Lagos, we are planning to start a course on Industrial Engineering, listing the functions of an industrial engineer, and the contents of the undergraduate course he would take. We asked industry if it was likely to need the services of such engineers in the near future and to suggest any additions they might think would improve the course. The main purpose was to find out what number of industrial engineers might be needed so that we could tailor our course to such needs and not flood the market with a sudden infusion of too many industrial engineers. Response was very poor though the replies received were about 85% positive.

We have also arranged to meet the members of the Nigerian Employers Consultative Association at one of their monthly meetings to address them on the need for mutual co-operation and, incidentally, to appeal to them for support for our proposed Industrial Centre.

We have employed an Industrial Relations Officer in the Faculty of Engineering. His main functions are to place students in Industry during the long vacations, to monitor such training and also to serve as a link between the academics in the Faculty and Industry.

THE ROLE OF UNIDO:

One may now consider what function UNIDO can play in fostering this co-operation. The first point to make in this connection is that Universities, Industrial Research Associations and Industry in general, often have no knowledge of the facilities available elsewhere. Industry, of course, guards its own secrets for obvious reasons though one tends to think, sometimes, that it does not properly distinguish between what should be kept as a trade secret and what should not. Universities and Industrial Research Organisations, on the other hand, should have no such reasons for secrecy.

UNIDO, therefore, is in a good position to compile a list of such facilities at various institutions and circulate them. They may find such lists have to be up-dated from time to time, particularly in the case of developing countries where the rate of expansion of such facilities is comparatively high.

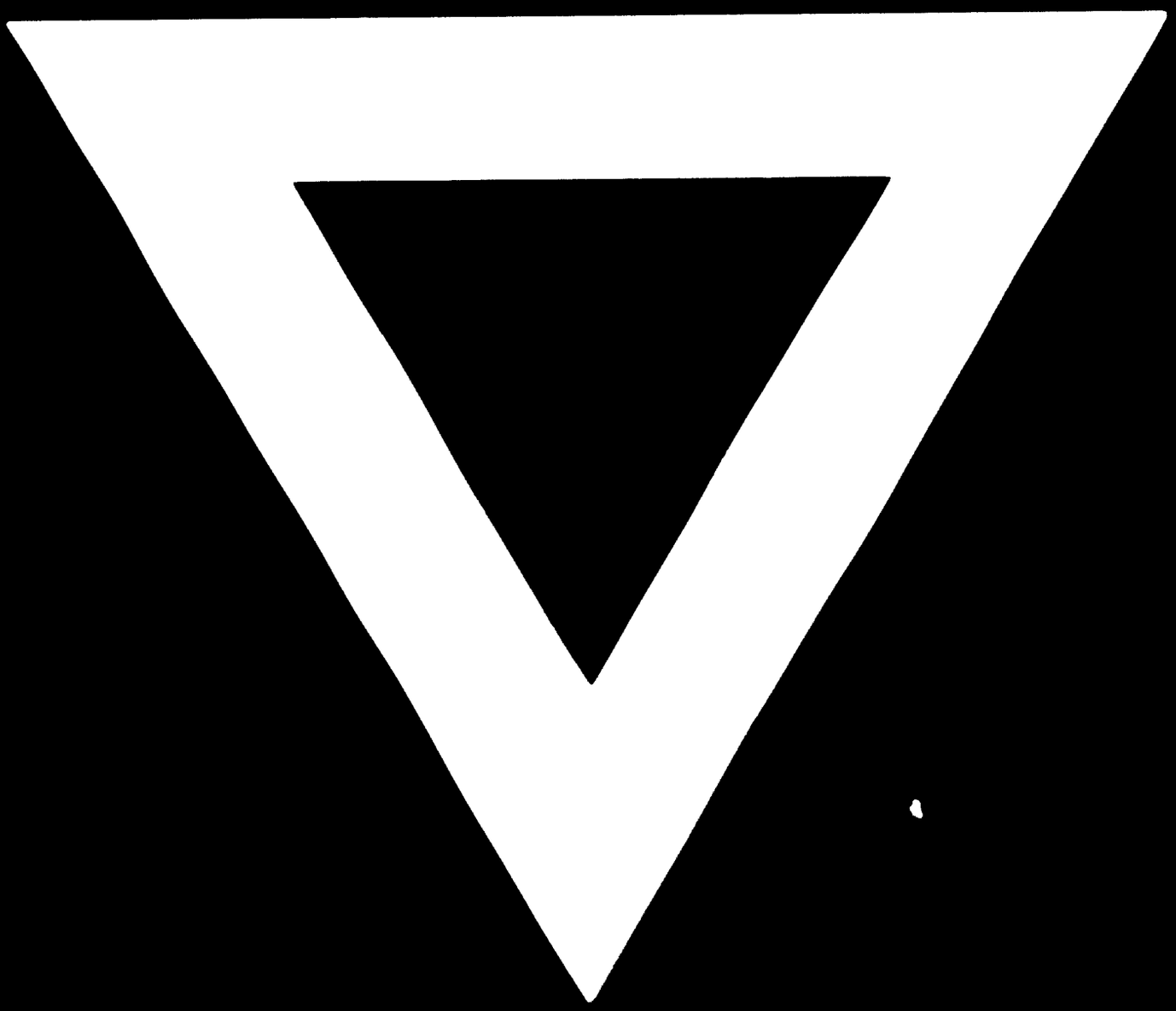
UNIDO should try to educate institutions and, perhaps, governments, of the need to share such facilities by making them available to similar institutions in other countries.

There may be areas of great need peculiar to certain parts of the world which UNIDO may be able to help, either directly with aid from UNDP or by offering advice as to the best funding organisation to approach in order to satisfy such needs.

UNIDO should try to organise conferences or meetings to bring together the officials of such institutions because verbal discussions are often a better and quicker way to effect co-operation than by correspondence.

I must not close without expressing my thanks to UNIDO for inviting me and, thereby, making it possible for me to put these views before such a world-wide audience.

G-332



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