Setting up an Industrial Enterprise in Nigeria

OD
DT 515
AZ8
T76-033
S45



Published for the
FEDERAL MINISTRY OF TRADE
by the
FEDERAL MINISTRY OF INFORMATION, LAGOS
1967

Price 1/-

QD
DT515
AZ8
T76·033
545

Setting up an industrial enterprise requires initiative and technical 'know-how'. These four articles, which were originally published in the Nigeria Trade Journal, *deal with the various problems that have to be solved before the undertaking can be successfully operated—the initial planning, financial and commercial control, engineering and, finally, factory management.*

FIRST PUBLISHED 1955
REPRINTED 1959
REPRINTED 1966

SETTING UP AN INDUSTRIAL ENTERPRISE IN NIGERIA

1. Initial Planning

MANY NIGERIANS TO-DAY have a desire to establish some form of industrial enterprise and a number have already acquired considerable technical knowledge and skill in some particular activity and would like to make full use of that skill for the advancement of the country. Some have money which they think might be sufficient to start with. They are, however, doubtful as to whether they would be wise to invest in the particular enterprise they are considering because they are uncertain whether the enterprise will be successful, whether the money they have will be sufficient, or whether the project would provide them with a good living.

First considerations

There are numerous problems which must be considered before one can decide to set up a new enterprise and many more which have to be faced when production is achieved.

The essential elements in any industrial undertaking can be listed :—

Technical knowledge of the processes to be used.

Capital adequate to establish and operate the industry on a scale large enough to be profitable.

Craftsmen and labour competent to operate and maintain the factory.

Raw materials of the right quality, either local or imported.

Services—power, fuel, water, transport.

Markets for the product at prices which will enable a profit to be made.

Management skill to ensure continued success.

A deficiency in any one of these can cause the undertaking to fail. Each, therefore, merits a more detailed examination.

Technical knowledge

Often the entrepreneur himself already has sufficient technical knowledge of the industry which he intends to start; if not he will have to make sure that he can hire a suitable man. He will also be well advised to be sure that if the first man he appoints should later decide to leave, he can easily replace him.

Capital

Two types of capital will be needed; fixed capital and working capital. Fixed capital goes to buy land, buildings, machinery, vehicles and housing. It may also have to be used to provide roads, water mains and electric power lines. Once this capital is invested in this way it will be almost impossible to convert it back into money unless the factory can be sold as a profit-making concern. It is therefore essential to be quite certain in the first place that fixed capital is used only for things which are really necessary to ensure smooth working of the factory. Working capital will be needed to buy raw materials, power, water and fuel and to pay for management, labour, transport, advertising, distribution, packaging and office expenses during the period from when manufacture starts until the product begins to sell. This form of capital may be recoverable in the form of money as it represents ' stocks of raw materials and finished products ' and ' materials in process ' which can usually be sold again if the enterprise collapses.

There are two basic forms in which capital can be sought : ' Risk capital ' and ' Loan capital.' Care must be taken to weigh the advantages and disadvantages of each, and indeed an unwise policy at this stage may doom an enterprise to failure before it is started.

Risk capital is the money which the entrepreneur and his partners put into the undertaking and any shares in the company which they sell to their friends or to the public. It is so called because the subscribers take the risk of losing some or all of their money if the business fails; it usually carries the right for the subscriber to have a voice in the management of the business.

Loan capital is money which is borrowed in the form of an interest-bearing loan from a bank or from a Loans Board and has to be secured on some fixed assets, either the property of the company or of the entrepreneur or his partners. In the event of the business failing, these assets are forfeited as far as is necessary to repay the outstanding loan. In the case of loans from a Loans Board, repayment of the whole sum is normally required over the first ten years operation of the industry. If this loan capital is too large a proportion of the total capital, its repayment may necessitate charging so high a price for the manufactured article that, if competition is keen, the factory will not be able to sell its output. Hence it is desirable to keep the proportion of loan capital as low as possible; usually it should be less than one-third of the total capital.

Craftsmen and labour

Most factories need a proportion of key workers with suitable skill to operate the machines, as well as a supply of general unskilled labour. The would-be industrialist must make sure that the required number of skilled workers are available or can be trained by the time the factory is ready to go into production. He must also check that the labour force will be available all the year round and will not want to leave to work on their farms, for instance, at certain times of the year.

Raw materials

If raw materials cannot be bought as needed all the year round, it may be necessary to invest considerable capital in holding stocks. If the quality is not constant, adjustments may have to be made in the manufacturing processes and continual care will be required to keep the machines running efficiently.

Services

The location of the factory must be such that the required amounts of power, fuel and water can be obtained all the year round without undue expense. Transport facilities—road, rail or water—must be adequate to carry goods into and out of the factory and to the markets.

Markets

The whole object of the enterprise is to produce goods which can be sold at a profit. Before the factory is built the entrepreneur must find out just how much it will cost him to produce, pack and market his goods. In order to discover this he must accurately assess the costs of raw materials; fuel, water and power; labour and management; and maintenance and depreciation of equipment and buildings. He must know the rate and efficiency of production, and he must carefully calculate his overhead cost (distribution, warehousing, insurance, rates and taxes, directors' fees, office expenses, interest and repayment of loans, etc.). He must know where he will sell his goods, whether the demand for them will be steady or seasonal; whether his price and quality will be suitable for the market.

He must also have a reasonable idea of whether costs and price levels and market demands are likely to remain steady over a number of years and whether he is likely to meet intensive competition either from other local manufacturers or from imported goods.

Management skill

Finally, when the enterprise has gone into production and the product starts to sell, skill in management will be needed to keep it solvent and to make the maximum profit. Here many points have to be watched carefully; they can be grouped under the headings Financial, Commercial, Technical and Labour.

Financial Management.—The first requirement for good financial management is an adequate accounting and costing system to ensure that a true picture of the financial position of the undertaking is readily available; that sums due are claimed promptly; that capital is not locked up unnecessarily in stocks and half-finished goods; that processing costs are kept to a minimum; and that adequate reserves are available to meet all commitments.

Commercial Management.—Having established channels for selling the product, it will be necessary to ensure that a continuous and steady flow of orders is obtained; that goods are despatched and invoiced promptly; that the most favourable trading terms are obtained; that wholesalers' and middlemen's commissions are not excessive; that changes in quality, design and packaging required by the markets are made in good time; and that goods are delivered in first-class condition.

Technical Management.—The job of technical management is to ensure that production continues at the required rate; that quality does not deteriorate; that waste is kept to a minimum; that the efficiency of the machinery is kept up; and that all improvements, which will lead to reduced processing costs and higher output, are introduced promptly.

Labour Management.—Once the factory is working it is necessary to see that the right type of skilled and unskilled labour is always available; that the turnover of work-people is not excessive; that working conditions are good; that wages are adequate to attract competent workers; and that everyone in the factory understands his job and is kept fully occupied.

Conclusion

It can be seen that the establishment of an industry is a complex matter and that its successful operation calls for a much wider range of ability on the part of the entrepreneur than does ordinary trading. It will also be apparent that the risks are likely to be higher and the time which will elapse before any return is obtained for the capital invested will be much longer. Nevertheless, there will be in coming years an increasing need for such developments within Nigeria and they will be of considerable benefit to the country as a whole provided they are planned on a sound basis.

2. Financial Management

IN THE WORLD OF TO-DAY there are a number of means by which money can be made to increase. Banking or money-lending is one; trading is another; industry is a third. In a highly mechanised society, industry provides the consumer goods which can raise the standard of living; trading distributes them to the people who want them; and banking provides the ' lubricant ' in the form of money or credit to keep the whole process turning smoothly. All three play their part in making goods available where they are wanted. Without industry, trade would consist only of an interchange of such natural products as would serve to keep the people fed, housed and clothed; within narrow limits it might still be carried on, as in the distant past, by a system of barter, without money or a banking system.

Industry to-day is, in essence, the art of employing financial resources so that the best use is made of human skill in producing goods for the benefit of the community.

If he is to succeed in the face of intensive modern competition, the industrialist must use his financial resources to the best advantage in the provision of equipment, supplies and labour and in the distribution and marketing of his products. This involves the exercise of skill in financial management, as distinct from commercial or technical skill, or skill in the management of the labour force and in the operation of the factory.

Capital

The distinction between ' working capital ' and ' fixed capital ' and possible means of raising the required amount of capital to set up an industry were discussed on pages 3-6.

To be certain of retaining full control of the undertaking, the industrialist (and his associates) will have to provide the majority of the ' risk ' capital. He will also have to ensure that the proportion of ' loan ' capital is not so high, nor the terms of the loan so onerous, that its repayment and the payment of interest on it will cripple the project.

Allocation of resources

In setting up a factory, expenses under a variety of heads have to be met. Adequate funds must be made available for each, according to circum-

stances, but care must be taken to ensure that a disproportionate amount is not spent on some to the detriment of others.

Formation of a Company.—Expenses will be incurred in floating a company and in inducing members of the public to subscribe shares.

Acquisition of Land.—If there is a choice between renting land and acquiring a freehold or a leasehold, it will be necessary to make a close study of the ultimate cost of each alternative. A short term lease or rental may result in a considerable saving in the initial outlay but at the same time may involve the risk that in a few years the factory will have to be rebuilt on a new site.

The financial effects of a possible enforced removal of the factory after a term of years must not be underestimated. Sometimes a large amount of fixed capital is invested in the construction of works (such as special buildings and concrete work) and in paying labour for the installation of equipment. In such cases it will be expensive to move before the heavy initial outlay can be written off by means of allowances for depreciation made in the operating costs.

Engineering and construction

Under this head are included the selection and installation of all equipment needed and the design and construction of buildings, stores, offices, roads and services—in fact everything which will be required to enable raw materials to be converted into finished goods packed ready for despatch. The engineering aspects are treated in some detail on pages 13-18; but it must be stressed here that considerable waste of resources can occur at this stage if finances are mismanaged.

Firstly, orders for equipment must be placed in the correct sequence, having regard to the varying lengths of time required for manufacture and delivery. Otherwise expensive machinery may be delivered too soon to the site and stand idle long after it has been paid for. Alternatively, if one item of equipment is late in arriving, the whole factory may be out of action with consequent loss of earnings.

Secondly, it is often possible to arrange for completion of part of the factory in advance of the rest. Production can then start in a small way and bring in some income earlier than would otherwise be possible.

Thirdly, if installation is started too soon, it may be found that a desirable change of plan will involve moving a machine already set up, thus doubling its installation cost.

Fourthly, if funds are not available at the right moment to pay for equipment which is ready for delivery or for the labour engaged in construction, there will be delay in completing the factory and consequent loss of earnings.

The fixed capital invested in buildings and equipment will be unproductive until the products from the factory begin to sell. If steps are not taken

to limit this unproductive period, the payment of interest on loans and the loss of potential earnings may be serious. It will often be worth spending more money to advance the starting date, by taking on additional construction staff, by hiring or buying mechanical equipment to speed up the work, or by paying for overtime.

Starting up and operation of the factory

Raw material and supplies in sufficient quantities to enable production to begin must be bought and delivered to the factory just before the date on which it will start up. At the same time future supplies at the required rate must be assured by placing contracts. Labour must also be engaged in advance and if necessary a course of training provided for the key workers.

All this will require the investment of a certain amount of working capital. A balance must be struck between spending the money too soon and risking delays in getting started.

Once the factory is in operation the working capital will be permanently tied up; it will amount roughly to the total of all operating expenses over a period equivalent to the time which elapses between paying for supplies and receiving payment for the finished goods. Anything which can be done to reduce this period and to reduce the average amount of raw material, semi-finished goods and finished products which have to be kept in the factory will make the business more profitable. But it should be remembered that any shortage of materials or labour arising from failure to provide money for them at the right time will cause a loss of income (and hence of profits) which may be far in excess of such potential savings.

Accounting and cost finding

The information upon which financial control of an undertaking is based will be provided by the accounts system.

During the construction period, inspection of the accounts will show whether undue delays are occurring. If money is not being spent fast enough, something is wrong with the construction programme.

Once the factory is in operation, inspection of the accounts will show whether production targets are being achieved; whether costs are too high in certain departments; whether stocks of finished goods are building up because of inadequate salesmanship; and whether customers are being allowed too much credit.

Accounting methods

Many small businessmen tend to treat accounts as a nuisance and make use of them, if at all, only in their most rudimentary form. Some even think that the keeping of accounts will involve them in a liability, which might otherwise be escaped, for the payment of income tax.

Accounting in the modern sense, however, is becoming more and more important. Indeed, failure to keep accounts nowadays is one of the surest ways of condemning an industrial enterprise to bankruptcy, for such will be its certain fate if those in charge cannot tell how the money invested in it is utilised and where the profits are made or the losses incurred.

There is no need for the industrialist to feel nervous about setting up an accounting system. In its simplest form, as applied to a small self-contained industrial unit, it is a task which any reasonably intelligent person can undertake, given the necessary initial guidance. In a large and diverse industry, of course, it becomes a much more complicated matter and trained accountants will have to be called in.

It is not intended in this article to present a textbook on accounting, but to bring to the notice of the would-be industrialist the types of accounts he should consider keeping in connection with his project, the purposes for which these particular accounts are required and the benefits to be derived from them.

The object of accounting is to provide an accurate record of *every* transaction in a form which will not only show the results of operations and the state of the business, but also provide a basis upon which controls over cash, stores, stocks, wages, etc., can be maintained. For this purpose —and to mention only a few of the many types of transactions likely to be encountered—all money received and paid out, all goods purchased for use in the business or for sale to others, all wages paid to staff and all sales must be recorded in detail. Similarly, accurate records must be kept of all that is owned by the business—i.e. the machinery, buildings and stocks— and also of all that is owing *by* and owing *to* it. These records are maintained in subsidiary account books from which they are finally incorporated into the ledger.

It is from the ledger that the final statements are compiled. These comprise the manufacturing and/or trading account, the profit and loss account and the balance sheet.

Manufacturing and/or trading account

The trader or manufacturer naturally aims at selling his goods at a higher price than that at which he buys or at which he manufactures; the margin between the two is termed *gross profit*. A trading firm ascertains the gross profit from the trading account, which is a record of total sales and of the original cost of the goods sold. A manufacturing concern relies on the manufacturing account to show the cost of the goods produced; this is incorporated in the trading account to arrive at the gross profit.

Profit and loss account

Apart from the actual cost of the goods sold, other items of expense, not directly connected with the purchase or manufacture of goods, but incurred in the conduct of the business, such as rent, light, transport, insurance, the wages of workers not directly concerned with production, administrative

expenses, etc., have to be accounted for. All these supplementary expenses are entered into the profit and loss account and set against the gross profit referred to above. The margin by which the latter exceeds the former is termed the *net profit*. This is the actual value of the business to the proprietor and shows the adequacy or otherwise of the return on the capital invested in the enterprise.

Balance sheet

The capital used for the acquisition of premises, for the purchase of machinery, stock, etc., and to meet commitments in the initial stages until a regular return is forthcoming from the sale of goods, forms the assets of the undertaking—in so far as this initial capital outlay is properly controlled so that money is not wasted.

In due course a well-conducted business will accumulate further assets; at the same time it will also incur liabilities. All these must be properly accounted for and it is in the balance sheet that the solvency of the business at a given date is disclosed. Here is shown on the one hand all that belongs *to* or is owing *to* the business—i.e., its *assets* (cash, stock, debtors, buildings, machinery, etc.) and on the other hand all that is owing *by* the business—i.e., its *liabilities* (creditors, borrowed capital, etc., plus such items as the proprietor's investment and accruals of profit which have been placed in reserve).

From these accounts and balance sheet the proprietor obtains the vital knowledge of the exact result of his operations and the state of his business. It is not sufficient to *think* that the business is prospering; it is essential to *know* the exact amount of the profits, as well as the value of all assets and liabilities, from year to year.

Cost accounts

Under modern competitive conditions, a manufacturer who lacks a precise knowledge of his current production costs is working completely in the dark. In his ignorance of these vital figures he may inadvertently fix his selling prices so high that his goods are too costly to compete. Conversely, he may sell his products so cheaply that before long he has incurred debts which make it impossible for him to continue in business. The introduction of a reliable system of cost accounts is, however, a task requiring careful and expert treatment. There are many pitfalls in producing even the simplest cost accounts and it is essential that costings are accurately assessed. The dangers of relying on inaccurate figures are obvious but, once a proper system has been set up, it requires only periodical checks to ensure that it keeps pace with changes in the manufacturing processes or in the method of marketing, etc.

In preparing a system of cost accounts it is necessary to differentiate between (*a*) fixed costs, such as managerial salaries, rent, insurance, interest on loans, debentures, mortgages, and other similar expenses which remain constant irrespective of the volume of production; (*b*) semi-variable costs,

such as unproductive labour, bonuses, maintenance charges, etc., which fluctuate indirectly with production; and (*c*) variable costs, such as the cost of raw materials, power, productive labour, etc., which are directly related to the volume of production.

It is important to allocate costings on the basis of a normal year's production. When trade is bad it is tempting to say: ' I will only produce 50,000 units this quarter instead of 100,000, and I will therefore allocate my costings on that basis.' Yet to do this means that selling prices must be raised at the very moment when it is expedient to keep them down. Machines may be standing idle for want of orders and to keep the business going it is essential to quote rock-bottom prices. The importance of dividing costings into fixed, semi-variable and variable expenses now becomes evident, for it provides the manufacturer with the means of ascertaining how fixed and semi-variable costs can be spread by taking on more business at lower prices and of balancing this against the cost of allowing his plant to remain idle.

It will be seen that accounts are a vital pre-requisite to the efficient financial management of an industrial enterprise. Indeed, if the capital is contributed by more than one person, the partners or shareholders rightly insist on the management presenting accurate accounts at regular intervals. Staff with qualifications suited to the size and complexity of the business must therefore be employed to undertake the accounting. Small businesses which cannot support their own qualified accounting staff may obtain the services of firms of accountants to advise on the introduction of accounting systems. The cost of employing these experts is reasonable and represents money well spent to ensure that a business starts and continues to operate on a sound financial basis.

3. Engineering

The term 'engineering' is used to cover all the practical details which have to be thought of before the contractors' teams move in to carry out their part of the job. It is a process of fitting together a large number of technical details (often conflicting), with the financial angle always in view. The objective which must never be lost sight of is to build a factory which will give maximum return on a minimum investment

IT IS ASSUMED that a decision has already been taken to set up a factory in Nigeria to manufacture some particular product; that suitable raw material has been located; that the approximate yearly output of the factory has been determined; that adequate technical knowledge of the processes involved has been acquired, either by the owner-manager of the firm or by an industrial manager who will act on his behalf; that market conditions have been exhaustively studied; that the approximate capital investment required is known; and that arrangements have been made to finance the undertaking. It now remains to 'engineer' the factory in detail, before construction can begin.

Location

The first thing to be decided is the best place in which to build the factory. It may be that family commitments or business connections make it desirable to build it in a particular town or area. If the question is open, however, the various factors for and against a number of areas will have to be weighed one against the other. The points to be taken into consideration are :—

1. availability and cost of supplies—raw materials, packages, power, fuel and water;

2. availability of labour—skilled technicians, process operators and unskilled workers;

3. facilities for the transport of raw materials and supplies from their sources to the factory and of finished products to the markets;

4. the incidence of local rates and taxes.

The first of these is a fairly straightforward choice between the alternatives of locating a source of local material in sufficient quantity and of suitable quality; and of arranging to import. Attention must be given to uniformity and continuity of supplies. Certain natural materials may only be available at some seasons and variations in quality may make it necessary to carry out frequent analyses and adjustments in the processes or the machinery. If uniformity and continuity can be guaranteed by paying a little more for the material, this will often prove cheaper in the long run.

The second point—labour—is not likely in Nigeria to provide much bias in the choice of a location, except for a factory which needs a large number of operatives with a high degree of skill in a particular process. Where a factory with these requirements is to be set up, it may be an advantage to establish it in an area where this particular process, or one similar to it, is traditional. If the labour force required is likely to fluctuate appreciably, it will be better to choose an area where alternative employment is available when the factory is on short time.

The third point—transport—may warrant detailed study. Transport services in Nigeria are still far from adequate and are often delayed by weather conditions. This alone may rule out a site which is otherwise desirable, for instance one which must be approached across a bridge or causeway liable to be carried away by floods. Another important consideration is whether the cost of transporting supplies to the factory will be greater or less than the cost of transporting the products of the factory to the market; in other words, whether it is better to build the factory where the raw material is, or where the products will be sold.

In some manufacturing processes the final product is considerably lighter in weight and smaller in size than the volume of all the materials which must be brought to the factory in order to make the product. The balance of advantage will usually be in favour of establishing the factory near the source of the bulkiest of the supplies required—fuel, or one of the raw materials.

Examples of this type of process are :—

1. The production of copra and coir fibre from coconuts. From one ton of coconuts as harvested the yield is only about 150 lbs. of dried copra and 175 lbs. of coir. In respect of transport costs, therefore, the advantage is strongly on the side of a factory in the plantation area.

2. Manufacture of cement. The production of 100 tons of cement requires roughly 130 tons of limestone, 40 tons of clay and 35 tons of coal. The ideal location is therefore alongside a deposit of limestone, with clay and coal available near by.

In other processes where there is little or no shrinkage in the weight of the materials consumed, the influence of transport costs disappears and with it the need to locate the factory close to the source of supply. An example of this type of process is cotton spinning and weaving where the loss of weight in processing is small and the amount of fuel used is inconsiderable.

In some manufacturing processes there is actually an increase in bulk, although some weight is lost. An example is furniture making where, although perhaps a third of the raw material—sawn timber—is lost, the volume of the finished article is many times that of the original planks.

Site selection

Once a decision has been reached as to the town or area in which the factory is to be set up, the next step is to acquire a suitable piece of land on which to build it. Again, a number of factors will influence the choice and the costs involved for each possible site must be balanced against each other to arrive at the most economical result.

Surface and subsoil.—Obviously a well-drained, flat piece of land with clay or gravel subsoil will be cheaper to prepare for the buildings than a hilly or rocky site, or low lying marshland liable to floods.

Access.—The cost of providing access to the site from the public highway and of building a railway siding (if required) will have to be considered. If the proposed plot is a long way from the area in which most of the workers live, either transport will have to be provided for them (which will increase the effective wages bill) or new houses will have to be built near by (which will increase the capital outlay).

Water Supply.—Most factories need at least a small supply of water. The cost of providing this, without risk of shortage in the dry season, either from public mains or from a river or well must be estimated.

Electricity.—A quotation for the cost of connecting the site to the public supply mains will be given by the Electricity Corporation. If no public supply is available, power will have to be generated in the factory and the cost will be much the same for any site in a given area.

Disposal of effluent.—In certain factories such as chemical works and paper mills the disposal of contaminated water may prove a difficult problem. If a suitable stream or creek capable of absorbing the effluents is not available near the site, considerable capital expenditure may be involved in providing plant and equipment to render the effluents innocuous.

Offensive industries.—Certain processes, such as tanning, are banned from some township areas because of their generally offensive nature. Local bye-laws on this point will have to be studied.

Selection of machinery and equipment

For all the normal processes it will be found that there are a number of suppliers who make suitable machinery and equipment. It is advisable to obtain full technical details and prices from at least two or preferably four potential suppliers. Detailed consideration must then be given to the technical advantages and costs of the various types of machinery and equipment offered, to make sure that the most economical selection is made.

This is not always a matter of selecting the lowest priced machines because installation costs, power consumption, labour requirements, efficiency and reliability will all influence the final economic assessment of the project.

In addition to the actual productive machinery, it may be necessary to include equipment for moving materials from one place to another, for repairing the productive machinery, for checking the amount and quality of the product at various stages and for making and filling suitable packages.

At this stage in the development of the scheme it is advisable to bring into the picture the manager who will ultimately be responsible for the operation of the factory. He will have his own ideas on the methods to be used for the management and control of operations and these are bound to influence the choice of equipment. Consultation with independent experts in the various processes involved is also highly desirable.

Layout of machinery, equipment and services

Work in the drawing office on the layout of the machinery, equipment and services will have to start before the final selection is made and orders are placed. If there is any possibility that the output of the factory will need to be increased within say five years, this should be taken into account from the start and provision made for the eventual installation of additional equipment. It frequently happens that a particular machine in the sequence of processes has an output capacity far greater than the initial planned capacity of the factory. This may occur because a particular type of machine is not readily available in a size small enough for the needs of the factory, or it may be that a large machine costs little more than a small one. In these circumstances it will be necessary to arrange the layout so as to provide storage space for an accumulation of material both before and after processing by this particular machine. Often the space so allocated can be filled up later by the duplicate machines which will be installed for the earlier and later processes, when the factory capacity is increased.

The final layout will need to include a number of items besides the productive machinery itself.

The most important of these are :—

(i) *Storage space*

(*a*) for raw materials. The contingency of fluctuations in supplies should be borne in mind and adequate space reserved;

(*b*) for materials in process, space should be provided at certain points to even out inequalities in processing rates and to allow for checks on quality and quantity;

(*c*) for finished products, both before and after packaging, space should be sufficient to allow for variations in the rate of despatch to wholesalers.

(ii) *Offices*

to accommodate the administrative, clerical and accounting staff.

(iii) *Services*

(*a*) plant for the supply and distribution of steam, water, compressed air, electricity, etc., as required;

(*b*) workshops for the repair and maintenance of the equipment;

(*c*) transport sheds;

(*d*) waste disposal;

(*e*) fire fighting equipment.

(iv) *Amenities for staff and workers*

(*a*) lavatories and changing rooms;

(*b*) first aid rooms;

(*c*) refectories.

Some of these, of course, are not necessary for a small factory, though they are desirable in a large one. It may, for instance, be possible to rely on the local fire brigade for protection against fire; on the local hospital for first aid; and on external facilities for the provision of meals.

Design of buildings

Work on the design of the buildings to be erected will need to be integrated with the work described in the last section. The layout of the machinery and equipment will have to conform with the outlines of a practicable and economic building, so that each will influence the final form of the other.

Designs for lighting, ventilation and access will be dictated by the requirements of the processes being carried out. The strength and type of construction of the building will be determined by the loads and vibrations imposed on it by the machinery.

The spacing and positioning of buildings on the site will be influenced by the nature of the ground as well as by the need for access roads, drains, parking spaces and areas to be left for future extensions.

Usually the detailed design of the building and of the civil engineering work is best delegated to an independent architect. It will be his duty to see that all requirements of the factory owner and of the local Town or County Council or Native Authority are met. He will also obtain quotations for the work from competent contractors and later supervise construction to ensure that the work is of an adequate standard in all respects.

Conclusion

It will be seen that the ' engineering ' of a factory involves the exercise of skill in many different fields. If the factory is to be a very small one, it may be possible for one man to undertake the whole of the ' engineering ' of it himself, perhaps with the advice of people with expert knowledge of certain aspects of the work. But where a large enterprise is projected, many specialists should be called in—technological experts in the required processes, engineers of all kinds (civil, mechanical, chemical, electrical) and architects. All these must work as a team under the guidance of the owner himself or of an industrial manager or consultant appointed by him, whose continual aim it must be to design and construct a factory capable of selling its output at an adequate profit.

4. Management

THE WORK OF MANAGEMENT is to plan, direct and control the operation of an industrial enterprise and to integrate its various parts so that each will function properly and all those engaged in it will co-operate—that is, work together for a common purpose.

What is management?

The term 'management' as related to a business, embraces all those members of the staff who direct the work of others. It extends right down the line from the top management, concerned with the operation of the business as a whole and responsible for the conduct of the major departments, through the various subordinate levels to the foreman in charge of a gang of labourers.

How is a modern industrial enterprise organised?

To appreciate the problems involved in management it is necessary to know how modern industry is organised. During the last thirty years, considerable progress has been made in formulating organisation techniques. Management has emerged as a profession, and specialisation in the various branches of industrial management is a recognised occupation.

There is a basic pattern of management organisation common to most large industrial concerns to-day and examination of a typical organisation structure will show the scope of the problem.

Every industry, and every manufacturing unit within it, requires a different organisation in detail. Some industries may have relatively large research departments, for example the pharmaceutical and chemical industries; others may require large personnel departments, where the incidence of wages of the employees is high compared with the capital invested in the business. In a very large organisation, each specialist function may have its own department. In the medium size unit some functions may be the responsibility of an individual and in the smallest some of them may be combined or even dispensed with altogether. Nevertheless, someone must be responsible for all the aspects of management. The chart on page 23 gives a typical organisation structure for a large manufacturing company.

Problem of recruitment in Nigeria

While the project is still in the development stage, it is as essential to plan its organisation as it is to design the most suitable factory layout and

decide on the manufacturing methods to be used. This is particularly true in Nigeria where skilled management personnel are few and far between. If the unit is of small or even medium size, it may be unable to afford overseas specialists for each function and the selection and training of suitable local candidates will take time and possibly entail a preliminary, though sometimes protracted, course of instruction abroad. The Federation is establishing a series of technical institutes and trade centres, such as the Yaba Technical Institute in Lagos where students are prepared for more responsible positions in Industry. It may be that certain functions, such as those of the legal and accounting branches, can be more economically discharged by an outside firm of professional consultants and this possibility must be examined.

The first step

When considering what management staff will be required, the first step which, as already stated, must be taken early in the planning stage, is to draw up an organisation chart for the enterprise showing the essential posts and then to determine those functions which can be carried out by Nigerians, those for which it will be most economical to rely on consultants already available locally and those requiring the services of employees who will have to be recruited from overseas.

The qualifications required for each post must then be set down and a search made for staff, either ready-trained or suitable for training in their respective duties. It may, of course, be necessary to employ specialists from overseas during the early years of the company's operation while suitable Nigerians are learning the duties which they will take over later on.

As overseas personnel not only command higher salaries, especially for short-term engagement, but involve the company in additional overhead expenses for leave passages, housing, etc., it becomes uneconomical to employ them once competent local candidates are available.

Personnel must be carefully selected and where overseas employees are concerned it is particularly important to ensure that only first-class men are engaged, even if higher salaries have to be offered to attract them since they will be responsible not only for bringing the plant into efficient operation but also for training the Nigerian staff and imparting their own technical knowledge and experience. Indeed, on such highly qualified keymen may depend the future success of the enterprise.

Specialised branches of management

The experienced industrial manager requires a general knowledge of the various techniques used in the main branches of factory organisation. Some of these are obvious, e.g., labour legislation, chemistry, engineering, man management, etc., but as industry becomes increasingly complex, there is a corresponding need for more and more specialists.

Nowadays an industrialist has to consider how many specialists he must employ to ensure that his enterprise is properly managed. The functions of some of these experts are discussed below.

Cost Accountant.—The cost accountant is skilled in the preparation and presentation of working accounts in industry. It is his responsibility to present to the management up-to-date figures of factory expenses and to point out where these are increasing and where they might be reduced. In the small business, one accountant may be responsible for both cost accounting and commercial accounting (the preparation of invoices, statements, and the maintenance of sales ledgers, etc.), as well as being in charge of the pay office and responsible for the preparation of annual accounts, and the balance sheet of the enterprise.

Production Engineer.—The production engineer is responsible for the technique of laying out a factory, deciding which machines are best for each process, what methods of mechanical handling should be employed and so on. If a manufacturing enterprise is to flourish, it must always keep abreast of the latest advances in technology and be quick to take advantage of any new process, material or machine, the introduction of which would lead to greater efficiency and economy. For this reason many firms maintain their own production engineering section. Others rely on the services of outside consultants and the technical staffs of the machinery manufacturers.

Office Manager.—Apart from being in charge of the secretarial side of the business, the office manager is responsible for the pay rolls, time sheets and other records; and for the legal, taxation, insurance and similar aspects of the enterprise. He is also required to organise and control the clerical system employed in both the factory and the office and to advise on the use of suitable mechanical aids.

Personnel Manager.—The personnel manager is fully versed in all branches of staff management, including methods of selection and training, the maintenance of staff records and staff welfare (which includes the running of canteens, workers' dispensaries and social clubs, etc.). He is also qualified to negotiate with trade unions on matters affecting wages and working conditions.

Market Research Officer.—A market research officer should be qualified to evaluate potential markets for the products of the factory in particular areas and to determine consumer preference for the style, size or presentation of pack. Usually he is also an expert in sales forecasting, that is to say, in estimating what sales can be expected over a future period, taking into account the standard of living and changes in design, price and competition from other firms and other comparable products of the home or overseas market.

Production Planning and Control Manager.—To draw up production programmes for the factory in the light of the sales forecast and the capacity of the plant; to agree such programmes with the works manager and then to institute and maintain a system to ensure that the set programme is adhered to, is the function of the production planning and control manager. He will also advise the purchasing manager on his buying programme in

order that the factory should not be held up for lack of materials; and the sales manager on probable delivery dates, so that customers will know with reasonable certainty when they can expect to receive their goods.

Sales Manager.—The sales manager is an expert in sales techniques and it is his duty to decide which method of selling should be employed (e.g., through wholesalers, direct to retailers, or through mail orders); what sales staff should be maintained in the field, and what advertising programmes should be carried out.

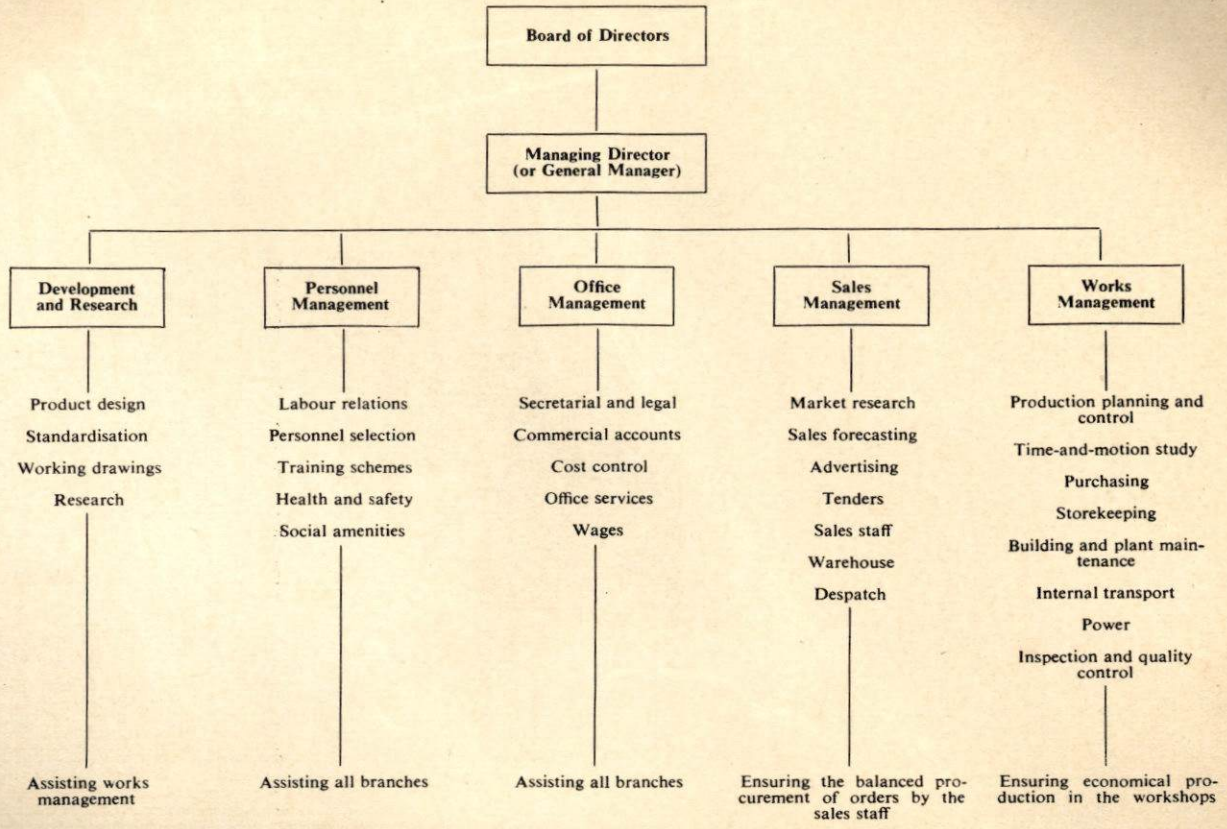
Buying Officer.—The buying officer is conversant with the many aspects of large-scale purchasing and requires a thorough knowledge of the markets in which he buys. He keeps in close touch with all possible suppliers and is constantly on the look-out for new materials which could be used economically.

Works Manager.—The co-ordination and control of all sections of the factory is the responsibility of the works manager. It is his function to ensure that the agreed output programme is adhered to, that work flows evenly through the shops, that production costs are kept as low as possible and that investment in stocks and working capital is reduced to a miminum. The works manager realises that production is not an end in itself and therefore works in close liaison with the sales manager to ensure that the right goods are produced at the right time; and with the development staff to ensure that new and improved methods are introduced speedily.

Foreman and Charge Hand.—Although specialisation has tended to transfer some of the traditional functions of the junior management staff to specialists, advances in management technique have increased the need for the proper training of foremen and charge hands. They are still ultimately responsible for ensuring that the manufacturing programme is fulfilled. It is their job to see that workers are employed on tasks best suited to them, and that machines are not allowed to stand idle through lack of materials or operatives. They advise the time-and-motion-study department on piece-work prices, they maintain discipline and their constant aim is to secure harmony among the various groups working under them. In addition, they apply their practical technical knowledge so as to ensure that the work is done in the most efficient manner and that waste is reduced to a minimum.

Conclusion

Even when capital, technical knowledge and land are available to start an industrial enterprise in Nigeria there remain problems of organisation and management; in particular the selection and training of management staff may prove difficult of solution. Only detailed planning and careful staff selection in the early stages will produce the organisation and technical ' know-how ' necessary for the continued success of the venture.


Board of Directors
Managing Director (or General Manager)
Development and Research
Personnel Management
Office Management
Sales Management
Works Management
Product design
Standardisation
Working drawings
Research
Labour relations
Personnel selection
Training schemes
Health and safety
Social amenities
Secretarial and legal
Commercial accounts
Cost control
Office services
Wages
Market research
Sales forecasting
Advertising
Tenders
Sales staff
Warehouse
Despatch
Production planning and control
Time-and-motion study
Purchasing
Storekeeping
Building and plant maintenance
Internal transport
Power
Inspection and quality control
Assisting works management
Assisting all branches
Assisting all branches
Ensuring the balanced procurement of orders by the sales staff
Ensuring economical production in the workshops

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