Hitotsubashi Journal of Economics 24 (1983) 11-24. © The Hitotsubashi Academy

SKILL FORMATION IN DEVELOPMENT: CASE STUDIES OF PHILIPPINE MANUFACTURING (I)†

By KONOSUKE ODAKA

I. *The Purpose of the Study*

Manpower is a relatively abundant factor of production in most of the developing economies in Asia. Nonetheless, it may also be argued that skilled industrial labor is in short supply and that its generation and efficient allocation are crucial for successful industrialization of the economies. From policy points of view, it is imperative to determine empirically (a) the roles of skilled manpower in improving economic performance and (b) the factors which contribute to the increased supply of industrial skills.

Admittedly, skill is a hard concept to grasp. Few studies in the social sciences have clearly identified the essential ingredients of skills in the context of economic development. Added to the methodological difficulty is the dynamic nature of skills, for they undergo a continuous process of transformation which is induced by changes in technology. Skilled labor today may be substituted tomorrow by automatic machinery, and quickly become obsolete. The average training time required for mastering manual industrial skills will be shortened drastically. At the same time, the skill contents are subject to incessant modifications. The emphasis on manual dexterity is likely to be replaced by that on mental maturity and sophistication which can cope with an ever increasing rate of changes in product design, materials, organizational setups, etc. In terms of statistical observation, it may appear that higher levels of physical investment are accompanied by intensified demand for longer years of professional training and simultaneously by a relative decline in demand for common unskilled labor. In this sense capital and skill are complementary goods whereas unskilled labor is likely to be substitutable for capital equipment [Griliches (1969)].

The present writer wishes to explore the possibility of identifying the factors which constitute the essential elements of production skills as generally practiced in the 1980s. It is desirable to select a group of specific production processes as the object of the study in order to eliminate ambiguity as much as possible from the concept of skills. In view of the unique and essential role that the machine building industry plays in the process of eco-

† The Present research is supported by a grant from the Ministry of Education (Grant No. 57530015). The interviews reported below were conducted originally in 1980-81 while the writer was Japan Foundation visiting professor of economics at the University of the Philippines (Diliman). He is grateful for the cooperation of the company personnel who responded to his inquiries, for the intellecual stimuli received from Professors Harry T. Oshima and Shigeru Ishikawa, and for the editorial assistance of Mr. Ronald M. Siani. Needless to say, the present writer alone is responsible for the reporting of the views recorded in the paper.

nomic development [Odaka (1983)], it is suggested that the production skills in this industry be chosen as the primary target of the investigation.

Hopefully the investigation will be conducted in two broadly-defined, interrelated areas: (1) an economic evaluation of the engineering factors which are directly related to the actual execution of production technology, and (2) the identification of socio-cultural factors which are indirectly (and yet fundamentally) responsible for the intensified and improved industrial performance.

First, an attempt may be made to decompose a given set of specific production process (e.g., machining) into well-defined, major groups of operations, whose performance may then be objectively measured in terms of

a) manual dexterity,
b) the standard of precision,
c) the speed of operation,
d) product quality (i.e., rejection rate of the product),
e) machine failures due to human factors,
f) proper maintenance care, and
g) other general practices of production control.

Having delineated operative skills in terms of these engineering concepts, the study will then try to identify the factors which encourage the improved performance of each of the above-listed items. For example, one of the most basic constraints on manual dexterity may be calorie intake of working people [Leibenstein (1957)]. Once such linkages are established, one can talk sensibly about policy implications, i.e., the ways and means of upgrading production skills.

Second, I would maintain that one's work performance is as much a function of his (or her) mental structure as mere mastery of physical operations. If one succeeds in kindling the inner fire inside a worker, he (or she) is capable of generating all the energy and determination to achieve improved efficiency and better productive records. By contrast, if the worker lacks motivation, much of the resources spent on the development of his (or her) skills is literally wasted. For this reason, it is desirable to relate production skills to the following socio-cultural factors, which should be quantified as much as possible:

1) work discipline (absenteeism, cooperative attitude, etc.),
2) work morale,
3) good work judgement, and
4) willingness to suggest improvement.

Here again one may attempt to identify the factors which are directly and indirectly responsible for determining the performance of each of these variables. For instance, work discipline may be fundamentally related to the process of socialization, the degree of urbanization, family background, familiarity with the factory environment, and so on. Work morale will be affected not only by pecuniary but also by nonpecuniary factors such as the possibility of promotion, social reward (one's feeling of importance), the level of occupational prestige, etc. By the same token, the social virtue of hard work is related to the educational philosophy of one's parents in his (or her) early childhood, as McClleland (1961) has demonstrated. Moreover, well-accepted social ideology has a very important role to play here, as it will equip the society with the capacity to apply pressure on its members to exert effort,

as, for instance, the idea of social Darwinism once did in the United States [Bendix (1959, Ch. 5)].

With these study objectives in mind, the writer conducted in 1980–81 a series of interview surveys of selected manufacturing firms in the Metro Manila districts. The companies were selected on an ad hoc basis; that is, I chose whatever firms attracted my attention because of some unique features, and to which I could be introduced by my acquaintances. The following pages present the writeups of the records of these interview surveys. It should be noted that the inquiries were made primarily to pinpoint the problem areas of the present-day factory labor and to test the relevance of the ideas explained above. The reader will find, however, that the majority of the reports deal with the second batch of problems stipulated above.

On the basis of the findings from the field studies and other investigations pertinent to the subject, the next important task for the writer will be to lay down an analytical framework where the theoretical linkages are established between the afore-mentioned, two-staged indicators (=dependent variables) and the economic and socio-cultural factors (=independent variables) which determine the performance of the former. Some preliminary work is under way in the hope that the outcomes may be utilized to formulate such a framework, which will then form the basis of a concrete proposal of an international comparative study [see Torres (1981)].

II. *ACP*

As a manufacturer of firearms and ammunition, this company is renowned for its revolvers, rifles and shotguns both for hunting and law enforcement purposes (see Figure 1), many of which are shipped abroad. Its production line of arms ammunition, though small, is one of the largest in Southeast Asia.

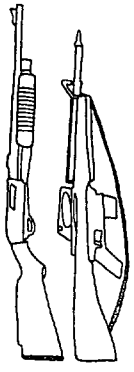
The origin of the company dates back to 1905 when two American army personnel established a print shop which later sold motorcycles and other merchandise. Between 1925 and 1941, the company broadened its trade to the importation and sale of firearms and ammunition.

In 1941, shortly before W.W.II, a Filipino business man (Mr. T) became the owner of the corporation. During the Japanese occupation that followed, however, it barely survived by selling apparel ware, as the importation and selling of guns and ammunition had to be halted completely.

The trading of firearms resumed immediately after W.W.II. Because of the surge of demand for firearms, the management felt that the climate was ripe for local production. A modest space was rented and the general manager dispatched to the United States and England to purchase used machinery at nominal prices.[1] The operation commenced in 1952, and the first marketable rifle was produced in 1954. The product was well received by the market, and it soon prompted the company to move to a more spacious site and build a new, bigger factory in 1958. In the meantime, licensing agreements were actively sought and granted

[1] At 15–20 percent of the price of new machinery, inclusive of three to four percent for shipping charges.

FIG. 1 EXAMPLES OF ACP'S PRODUCTS: SHOTGUN AND RIFLE



from American firms for the manufacture of shotguns (beginning in 1964) and other firearms.

In 1968 the company made special effort to improve the quality and efficiency of its production lines, while expanding its business very rapidly, as domestic demand picked up its pace. An American engineer, Mr. FR, was invited to assume the post of general manager (1968–78).[2] In addition, the company's guns were exported for the first time to the United States in 1967–68 and deemed acceptable by the American market. However, management hesitated to go deeply into the overseas trading because its production capacity was not large enough to meet the extra demand.

The imposition of Martial Law in 1972 drastically changed the situation, for it naturally suffocated the growth of the domestic market (excepting, of course, substantial orders from the government). Consequently, the company was compelled to engage more actively in the export market. In 1980, for instance, exports were made to fifteen different countries. The biggest outlet was Australia, where the company's product virtually dominated the market.[3] The favorable labor cost, together with relatively inexpensive capital equipment (most of which was second-hand)[4] enabled the company to acquire world-wide competitiveness.[5] Despite the subsequent slack in the world demand in 1974 due to the "oilshock," the company continued to perform reasonably well, and the size of its work force grew from about 150 in 1968 to approximately 1,100 in 1980.[6]

In 1980 the company manufactured simultaneously 94 different models of firearms at the rate of approximately 100,000 units per year. Because of the relatively small lot size of the respective models, however, automation of the production process was not feasible,

[2] Mr. FR had served successively as sales engineer (four years), product service manager (two years), and quality control manager (nine years) at a manufacturer of firearms and ammunition in the State of Illinois, the U.S.A. (Incidentally, he thinks that Americans had been very diligent and hard working until the union movement came along. To the extent that he holds this view, his opinions may be slightly biased against American blue-collars).

[3] The American market was comparatively more discriminatory than the Australian and therefore harder to penetrate.

[4] One may observe here that the continued use of the second-hand machinery was not necessarily acceptable from an engineering point of view as represented by Mr. FR.

[5] In 1980, the wholesale price of the company's rifle was about $60, which would be three times more expensive when it reached the United States, but was still quite reasonable by American standards.

[6] Of which engineers numbered about 25.

and the company was making extensive use of general-purpose machine tools.[7]

The success of APC testifies to the industrial potential of the Philippine manufacturing.[8] That is, the country has been perfectly capable of producing fine machine instruments whose technical requirements are quite demanding. For one thing, their parts and components must be 100 percent interchangeable, and therefore strictly homogeneous in quality and standardized.[9]

The blue-collar workers at ACP are normally recruited at the factory gate. After having passed a simple practical test, each of them is taught an operation and assigned to a job for an indefinite period of time. (Job rotation is seldom practiced.) The mean age of the work force is somewhere between 25 and 30, and the average length of service about five years or so. While some workers have stayed with the company for as long as 30 years, the mobility of the skilled operatives has been rising lately as industrialization proceeds. Generally speaking, the blue-collar employees work very well; in fact, Mr. FR. thinks they work much harder than average American workers.

The newly recruited worker becomes competent in production skills in three to four years. In the operation of machinery, for instance, he is as skillful a worker as in any other industrialized countries, although he may need a bit longer time in performing certain operations such as setting-up machine tools. The Filipino operatives are skillful enough to produce perfect replicas of a metal producrt without even looking at the drawings.

However, this does not mean that there are no problems. In terms of occupational category, for example, there is a clear shortage of capable tool makers; whoever is in this category commands a good wage and thus the turnover rate is relatively high. Similarly, the shortage of well-trained technicians/engineers poses a serious headache. This is partly due to defects in the system of formal education, where, for one thing, only low priority is given to practical training.

With regard to work performance, the use of measuring gauges can be a problem because of barriers in communication. The average Filipino blue-collar workers are in need of basic knowledge/experience in machine production; they have had little exposure to machine culture, both in formal schooling and informal education at home. Mr. FR claims, moreover, that Tagalog is essentially an agricultural language which is weak in engineering vocabulary. It is possible, therefore, that the average production worker has difficulty in the perception of certain mechanical principles. In the eyes of a Western engineer, he may appear not to possess certain instincts ("feels") which are taken for granted in the West. Probably for this reason very few Filipinos have made good machine tool makers. Even graduates of trade schools are not skillful enough for this work; they can run lathes but are not sufficiently trained to cope with the unexpected. Thus good maintenance staff (repair men) are generally in short supply.

Finally, the Filipino worker tends to be self-sufficient and is not necessarily eager to

[7] On the other hand, the production of ammunition would probably justify the installation of more capital-intensive (and therefore expensive) machinery because of its continuous production process.

[8] Mr. FR points out, however, that there remains much room for improvement in the quality of iron casting in the Philippines.

[9] Historically, the method of production with interchangeable parts and components was first developed in the United States during the nineteenth century, partly because the country was short of skilled labor [cf. Deyrup (1970)].

learn new things. He has a strong independent spirit and resents instruction from a third party (e.g. a foreign supervisor). In Mr. FR's experience, skilled artisans seldom adopt his suggestions for more than a day; they will follow his advice while he is around but will revert to their old practices by the time he comes back to check their performance on the following day.

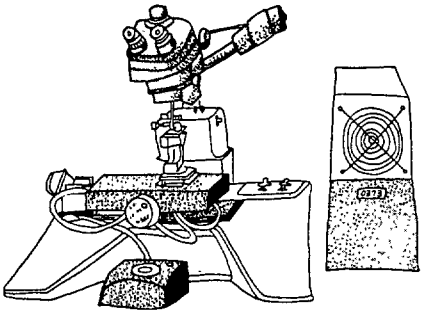
III. *DA Incorporated*

This company began operations in 1977 as a manufacturer of plastic molds. Later, when a powerful financier/businessman sought to take advantage of the company's only salable asset, human embodied technologies (production designing, production technology, and production knowhow), it gradually shifted its business to the manufacture of semiconductor assembly equipment (see Figure 2). By 1978 the company (now crowned with a new name) successfully developed a prototype of the new product. In the following year the operation began to pick up its pace. As a company executive put it, "a machine shop is easy to operate once you know what to make and how to design it." In 1980 the company hired some 400 employees who worked under the supervision of one manager, a few production engineers and about ten well-trained machinists.

DA's factory is made up of two main sections: assembly and machining. In the former, automatic thermosonic bonding systems are assembled by putting together a large number of parts and components, some of which are procured from subcontractors. The employees in this section are mostly women. On the other hand, the latter (a large-sized, unusually well-equipped machine shop) engages itself in producing functionally essential components with an entirely male work force. In addition to these two sections the company maintains its own testing laboratory where its products are carefully checked for quality and performance.

Of the three divisions mentioned above, the machine shop plays a key role in the growth of the firm by supporting R & D activities and by continuously trying out new ideas and new products. A relatively high degree of precision (a selling point of the company's products) is achieved thanks to the skilled craftsmanship which characterizes the shop. More

FIG. 2 A PRODUCT OF THE DA INC.: SEMICONDUCTOR BONDING MACHINE



importantly, whenever management decides to introduce a new product and/or a change in the product design, it is the machine shop that bears the burden of turning such ventures into reality.

The presence of qualified skilled labor has been indispensable for the growth of the firm because

(i) machine tools are not wholly automatized so that constant supervision is needed for the uninterrupted, smooth operation of the production system; and

(ii) the entire production system must be either redesigned and/or realigned occasionally whenever significant changes (either in product design or in the products themselves) take place.

At the start of operations DA lured some skilled labor from SB, a famous machine producing company which is renowned for its workmanship. The raid succeeded mainly because DA offered better wages. Whereas the going rate (as of 1980) hovered around 29 to 31 pesos per day inclusive of the daily living allowances of 8 pesos, DA paid an average of 37 (the range was 32 to 57).[10] In any case, when one or two top men agreed to move, a whole gang of skilled workers eventually followed their leader.

In spite of the relatively high quality of the labor force, however, the standard of precision has not as yet reached the level required by the company's product. Occasionally the rejection rate goes up as high as 20 to 30 percent. Oftentimes the quality of the machine is at fault, but there are other important reasons such as defective materials, operator's failure to check machines, and low work motivation.

An executive engineer (a Westerner) notes that his production workers are not much concerned with the levels of tolerance limit which are clearly below internationally acceptable standards. To give a concrete example, most of the machinists will not be able to pass a precision test (e.g., locating holes with an error margin of (say) 0.001" or less). This may be due largely to the heterogeneity of the work force resulting from the very informal, unstructured recruitment procedure which relies heavily on family ties and the network of friendship. Furthermore, vocational education is rather casually done by way of on-the-job training. These practices may have precluded the identification and selection of workers who are most qualified to work as skilled mechanics.

At the same time, however, there seem to be deeper problems of philosophical cognition and psychological motivation. For instance, the most advanced type of drilling machine (such as a jig borer) is under-utilized because the workers are (so it seems) not accustomed to abstract thinking or mentally visualizing mechanical production as a total system of interdependence. They feel insecure unless they deal with tangible objects. They lack the full understanding of the Cartesian coordinates, and are unwilling to master the handling of the machine by going through its algorithm. They would typically insist on marking lines (manually) on the surface of the metal objects which are to be fabricated, although the machine is perfectly capable of performing highly complicated operations (measuring, setting up, cutting, drilling, etc.) by itself at a very high level of accuracy once the operator feeds the necessary information into the machine with the use of a numerical guage reader.

It was pointed out by the same engineer in this connection that the workers generally

[10] DA has no formal guideline (or rule) to determine the internal wage structure, but individual rates vary depending on the type of machinery, the level of skills required, previous experience, work environment, and the judgement of supervisors on the worker's performance.

do not take good care of the machines to which they are assigned. By and large, the workers do not pay close attention to small details as long as the equipment is in running conditions. It is common to observe minor damage and/or deficiencies in the equipment; the machine tools are not regularly cleaned/polished, broken parts not replaced, metal chips left uncleared, oil leakage casually repaired by stuffing a piece of cloth into the trouble spot, etc. Because of this negligence, a seven-year old drilling machine would look as if it had been used for 20 odd years. One cannot but compare the behavior of the machine operator with the tender care that a farmer (and his family) extends to his water buffaloes (carabaos). The difference may lie in (a) the Filipino perception of machinery and (b) the mode of ownership. Probably the worker has no reason to feel attached to (or identified with) the equipment as it is conceived as a mere nonhuman object owned by somebody else who is not a member of his (extended) family.

Inasmuch as the rank and file take a passive attitude toward their work, it is not surprising that management seldom receives any suggestions from the shop floor as to possible renovations of the production system and/or the method of production; the majority of the production work force do not make best use of their imaginative thinking. This may be interpreted as an indication of the lack of interest on the part of the blue-collar workers for improvement in productive efficiency and/or improvement in shop operation. Moreover, the Filipino workers do not seem accustomed to taking initiatives even in their work places; they would rather be told exactly what to do. Perhaps they are either afraid of committing errors or unwilling to take risks. For the same reason, the workers do not feel particularly at home in the area of product designing.

The problems of production workers notwithstanding, the company boasts of the competitive power of its product in the world market. For instance, the Philippines is miles ahead of other ASEAN countries in this regard. The company's product can be delivered on short notice at a very low price. Admittedly its specifications are much simpler than, and the quality generally inferior to, a similar product manufactured in the United States. The difference in the quality, however, is more than compensated by the price differentials. (It is said that a typical DA product is sold at about a one-seventh the price of a standard American model.)[11]

This competitive power is explained by the cheap cost not only of labor but also of machinery. This is all the more important, because the level of labor efficiency is inferior to that of Taiwan (for instance). In fact, the management staff would guess that its average labor productivity may be only one tenth of that of the United States because of

(a) differences in capital equipment,
(b) deficiency in production control (i.e., lack of experience on the part of middle management), and
(c) insufficient training and skills (deficiency in manual dexterity, poor work coordination, etc.).

Luckily for management, about half of the company's machines and equipment came from its previous business operations. Although originally designed to manufacture plastic molds, the machinery were capable of multi-purpose use and could be—with a few modi-

[11] It should be added here that, in general, a U.S.-made product occupies a much larger space and is harder to maintain.

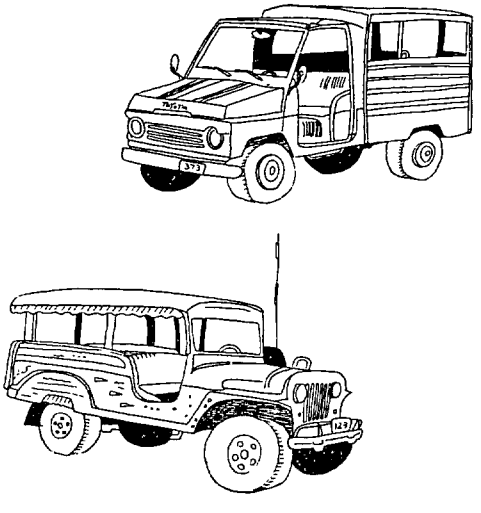
fications—made suitable to new operations. In addition, for the purpose of stepping up the company's production capacity, management purchased good quality, used machine tools. In view of the workers' lack of proficiency as noted previously, it may be necessary in the future to automatize certain machining operations and substitute capital for skilled labor. Nevertheless, management is skeptical about the wisdom of adopting special-purpose machine tools under the present economic circumstances.

IV. *F Motors*

F Motors is one of the major, entirely Filipino-owned manufacturers of jeepneys (originally, converted U.S. Army jeeps) and Asian utility vehicles (AUVs, a simplified, assembly line version of the jeepney; see Figure 3). It was established in 1947 as a small painting shop (with capital of 200 pesos) of jeepneys, cars and trucks as a small family-owned business under a single proprietorship. In 1951 it was named the F Body Builder and expanded its services to include jeepney body building, jeepney repairing, and the manufacturing of bodies for cars and light trucks. Subsequently, only four years later, the company started a complete jeepney assembly line. It was duly incorporated and renamed F Motors in 1960. The company grew mainly due to the successful growth of the jeepney market and to the capable stewardship of its entrepreneurs. As of September 1980 it enjoyed about 35 percent of market share in jeepneys, and employed as many as 2,000 employees, of which about 1,500 were blue-collar workers.

In the past, second-hand engines were imported, overhauled, rebuilt and installed in the jeepneys. But lately the company products are being equipped with Isuzu (diesel) or Mazda (gasoline) engines which are imported at the rate of approximately 500 units per month, of which about 100 units are mounted on the jeepneys. The AUVs and jeepneys can boast an "almost 100 percent" local content with the exception of the engines and power

FIG. 3 AUV (TAMALAW) AND JEEPNEY (BELOW)



trains (axles are supplied locally).

Jeepney industry is characterized by the existence of many, cottage-type family businesses which cater to the specific needs of individual customers. They have coexisted with the larger firms such as F Motors because there has been expanding demand for jeepneys, and probably because they have economized on their prime costs (wages and the cost of capital). However, they are definitely inferior to F Motors in their after-market services, not to mention the latter's active involvement in R & D activities. In any event, multinationals, not these local manufacturers, are the major competitors of F Motors.

There are substantial price differentials between jeepneys and the AUVs (such as Fieras and Tamalaws) which are produced and marketed by companies with close connections with foreign assemblers; an AUV is sold for about 43,000 pesos whereas a jeepney costs about 50,000 pesos (as of September 1980). (Another large-scale, purely Filipino manufacturer of jeepneys makes use of surplus (second-hand) engines, but its products are more expensive (about 55,000 pesos) because their products are largely made-to-order and are thus non-standardized.)

Nonetheless, management is confident that the users of jeepneys are unlikely to switch to AUVs. Not only are jeepneys more easily serviceable anywhere in the country, but have proven to be more durable than the AUVs. Moreover, their parts and components are more readily available locally, and their quality is equally (if not more) dependable compared with those of the AUVs'. While there has been some discussion among government circles that jeepneys should be banned as a major source of public transportation in Manila, management feels that the company has sufficient capacity to compete with multinationals provided that the government does not interfere with the market.

Production skills have recorded tremendous improvement over the past 15 years while the company strove to attain ever improving performance. The predominant method of worker training has been OJT (on-the-job training). The rejection rate has been rather nominal so that it has not been a major management concern. Of late, however, the turnover rate of skilled workers has been on the increase (about 50 per month): painters, welders and machinists especially have quit to go to the Middle East for employment.

Mr. F thinks that it would be a sensible practice to make best use of second-hand machinery whenever possible. At the same time, however, it has been a company rule that certain important functional machines—dies, jigs and fixtures in particular—should be supplied internally.

At the time of the survey, Mr. F saw little prospect for the local manufacture of engines and power trains. There is approximately 20 years of lag in technological know-how. Moreover, the size of the market is still too small, which makes their products much too expensive.

F Motors procures some automobile parts from outside manufacturers (subcontractors), partly because it would be too expensive to produce them internally. By the same token, testing operation is subcontracted from time to time.

Subcontracting has increased lately in terms of physical volume although it has declined in value. The company, in fact, prefers to procure local products whenever possible, provided that the differences in quality are not substantial. The quality of these parts and components are generally acceptable, so there is no need to resort to imported technology. In particular, F Motors' own body-making technology is comparable to that of other foreign

manufacturers of motor vehicles, especially in terms of the durability and quality of the product (body). At the same time, however, Mr. F readily concedes that there is still room for improvement in product designing and the production technology of some automobile parts and components. The company has therefore occasionally extended some technical help to parts suppliers, dispatching engineers, supplying some facilities, etc., but has never offered financial assistance to them.

F Motors has never received any specific assistance from the government. The program of localization would have progressed more rapidly if the domestic content program had started out with commercial vehicles (rather than with passenger vehicles). A program such as ASEAN complementation would have progressed much more easily then.

The management is hopeful that in the future it might be able to export its AUV models. Unfortunately, jeepney is not quite suitable as an export model, as its body is welded. This makes the product stronger and more durable but bulky.

V. *FMC*

FMC is engaged in the integrated production of ceramic tiles. The products are small, densely multicolored mosaic tiles of various shapes. Either unglazed or glazed or colored throughout, they are used as decorative wall (or floor) finishers and sold at six pesos (or above) for a set of nine. Their body type is stoneware and thus requires much higher kiln temperatures than wall tiles which are made of earthware.

FMC was inaugurated in September 1976 as a joint venture of FH Corporation, a Filipino manufacturer of earthware and wall tiles with roughly 30 years of experience, and two Japanese companies: K General Trading and a leading ceramic manufacturer (T Industry Co.). The newly constructed plant was equipped with Japanese-made machinery including two kilns (each with 18 burners), forming presses, ball mills, several pieces of sagger equipment, and a crusher. The capital equipment was equal to that installed in a comparable Japanese plant, although the latter's tended to be more capital intensive due to a higher degree of automation. One might describe FMC's machinery as being the simplest kind available without being obsolete.

Whereas management had no complaint about the quality of the equipment, it realized only after the completion of the plant that one kiln was enough to meet current demand. In retrospect, therefore, it might not have been a good idea to accept all the advice offered by the trading company. In fact, there was at one time a feeling of resentment among company executives that they had been cheated by their Japanese counterparts. This, however, was mainly because of misunderstandings on both sides.

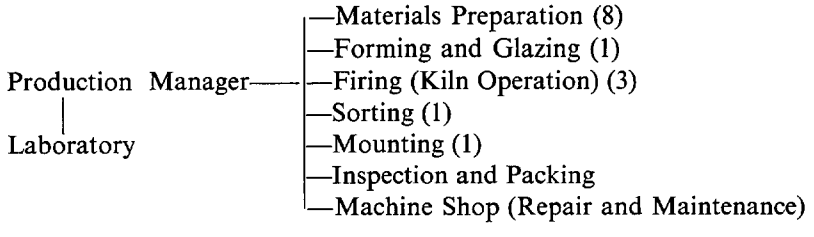
The operation was started in the presence of several Japanese engineers who acted as technical supervisors, and the company, at its peak, hired 527 employees. However, FMC underwent many hardships before finally it mastered the production techniques. A series of technical problems ensued. In addition, there were human and organizational difficulties. For example, the Filipino supervisors had never been trained to appreciate subtle differences in the quality of the products. Consequently, they felt that the Japanese engineers were unreasonable in demanding on ever higher product standard. Eventually the problems became so serious that the plant had to be temporarily closed down in August 1978, whereupon the

Japanese engineers left the company. The majority of the work force was laid off, leaving only about 100 as care takers.

It was April 1979 when production resumed after series of readjustments and reorganizations. Although one Japanese engineer came to oversee the reopening operation, the entire plant has since then been operated solely by Filipinoes. General performance has been more or less satisfactory since the restart of the operation. Nevertheless, there remain some problems. For instance, variance in product quality is still substantial: apprioxmately one out of 50 products (or less) is rejected as a result of inspection. For this reason, all the products have to be inspected before final shipment. (By contrast, only randomly sampled items are examined in the Japanese plant.)

At the time of the survey (August 1980), the company employed about 268 workers, out of which approximately 163 were rank and file, 20 maintenance staff, 3 general service staff, 7 laboratory technicians, and the balance office and supervisory personnel. Take-home pay for direct production workers averaged about 24 pesos/day, and the highest rate for a skilled worker (press mechanic) was approximately 33 pesos/day. Overtime rates were 100 percent extra for legal holidays, and 30 percent extra for special holidays; 25 percent premium was paid for night shifts (5 p.m. – 6 a.m.).

The company's production process begins with the purchase of raw materials. First, clays (mostly imported from Japan) are mixed and developed into castings. Glazes, which are manufactured from chemical compounds and also supplied from Japan, are then applied to the clay castings. The glazed pieces are subsequently put into the kiln where they stay for about 60 minutes (in contrast to 75 minutes in Japan). Finally the tiles are taken out of the kiln, sorted, mounted, inspected, and packed for distribution. About 80 percent of the products are exported. Corresponding to this division of work, rank and file workers are classified roughly into the following seven job categories (the number of supervisors are shown in parentheses):



Of the several kinds of factory operations, obviously the highest levels of skill and experience are required of the chief operator of the kiln, followed probably by the workers in charge of materials preparation. Simple manual operations such as glazing, sorting and packing (some of which require continuous attention to minute details) are dominated by young girls, who compose about 60 percent of the entire work force. Judged by the company wage data, earnings differentials between job categories do not seem substantial.

The qualifications taken into consideration at the time of recruitment are: past experience, health, aptitude, marital status (single status preferred), the proximity of residence, and homogeneity in cultural background. The last point is added to reduce any difficulties in communication. As a matter of principle, only high school graduates (or persons with ten or more years of formal education) are qualified, because (1) certain jobs (materials prepara-

tion, in particular) require good judgement, (2) younger workers are not more economical because of the minimum wage requirement imposed by the government, and (3) high school graduates are more mature and easier to work with. By way of entrance examination, a psychological (Flanagan) test is administered as well as a physical examination and interview.

Once hired, a worker is assigned to his (or her) job where he (or she) stays for the remainder of his working life at the plant; in other words, the worker may be promoted vertically, but seldom moves horizontally from one section to another. No formal occupational training is administered by the company. Any training, if necessary, will be provided informally by way of on-the-job training. The rate of labor turnover has been rather low since the reopening of the factory.

By contrast, a candidate for a supervisory job must hold a college degree. The company rule stipulates that one of the qualifications for a foreman is that the latter meets the basic requirements to be a supervisor. This implies that it is extremely difficult for an ordinary worker to be promoted to foreman; and even if it were possible, it would take at least six or seven years of experience prior to the promotion.

According to Mr. R, managing director of the company at the time of the survey, there are three inherent problems with a Filipino worker: workmanship, measurement, and housekeeping. First, the Filipino is too often satisfied with mediocrity and does not strive to achieve a higher standard. Second, he (or she) is not sufficiently trained to appreciate the basic notions (concepts) of the manufacturing industry such as precision, perseverence, constant attention to details, and so forth. Thirdly, the elementary principles of production control—namely housekeeping techniques—have not quite penetrated into the consciousness of the rank and file.

Perhaps only about ten percent of the rank and file are motivated enough to be seriously interested in their jobs. As their aesthetic sense is not developed sufficiently, supervisors have had a hard time making them realize the importance of standards of quality and quality control of the products, just as the Japanese engineers had tremendous difficulty (at the beginning stage of the operation) in convincing the Filipino supervisors the value of quality control.

The rank and files' indifferent attitude is a characteristic of Filipino workers, who are not particularly concerned with excellence in operations as such. Normally, for instance, they do not take good care of the production equipment. They have to be searched every day at the factory exit before they are finally dismissed, for otherwise various company property would disappear.[12]

The lack of mutual trust in the business community is a topic which repeats itself in conversations with the executive staff who are concerned with how to improve Philippine managerial practices. Moreover, various kinds of managerial information such as physical productivity (of labor), absenteeism, the rate of rejection of the final product, etc., must always be double-checked against other independent sources of information. In the language of economics, the cost of internal information is quite high even inside a small factory such as FMC. Naturally this keeps the size of a well-managed corporation rather small.

The problem is partly organizational but partly entrepreneurial. The top manager

[12] Even seemingly useless goods such as small steel chips and cut-out sheets, are of great use to the company. For this reason the sensible factory manager wishes to keep them for future use.

(owner) suffers from the lack of information because (for one thing) he seldom visits his own factories. In fact, he lives in a location which is quite far away from the factory site; he is, as it were, "out of touch" with the actual, day-to-day problems of factory life.

Compared with the problems of the blue-collar workers and of top managers, Mr. R thinks that the supply of well-trained middle management personnel poses a less serious problem, as there are many newly graduated college seniors available for these positions.

(To be continued)

HITOTSUBASHI UNIVERSITY

REFERENCES

Bendix, R., 1959, *Work and Authority in Industry, Ideologies of Management in the Course of Industrialization*, N.Y. and Evanston, Harper and Row.

Deyrup, F.J., 1970, *Arms Making in the Connecticut Valley, A Regional Study of the Economic Development of the Small Arms Industry 1798–1870*, York, Pennsylvania, George Shumway.

Griliches, Z., 1969, Capital-Skill Complementarity, *Review of Economics and Statistics* 51, 465–68.

Leibenstein, H., 1957, *Economic Backwardness and Economic Growth, Studies in the Theory of Economic Development*, N.Y., John Wiley and Sons.

McClelland, D. C., 1961, *The Achieving Society*, N.Y., The Free Press.

Odaka, K., 1983, A Theory of Ancillary Firm Development, in K. Odaka, ed., *The Motor Vehicle Industry in Asia, A Study of Ancillary Firm Development*, Singapore University Press, 1–16.

Torres, A. T., 1981, The Filipino Worker in a Changing Society; Social Psychological Perspectives, Unpublished Ph. D. thesis, College of Arts and Sciences, University of the Philippines.