

SOME PROBLEMS OF MANPOWER DEVELOPMENT IN SINGAPORE *

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May I first say how privileged I feel by the invitation from the Council of the Academy of Medicine to deliver this address? It is by no means easy to select a theme which will do justice to the distinguished person whose outstanding contributions to the teaching and practice of medicine this series of biennial orations commemorates. Professor Ransome was noted as an outstanding scholar and practitioner; high though his attainments were in this field, what made him so widely respected, is, I think, his total and undivided commitment to his profession.

In Singapore, where distractions are many and the criterion of success is often taken to be the size of one's bank balance, Professor Ransome's example of total commitment cannot but be an example and inspiration to all of us.

In saying this, I am not expressing a conventional honorific. For in Singapore, we survive and prosper or we decline into insignificance, depending solely on what our combined human effort amounts to.

Because of the crucial importance of human effort, I thought it appropriate to speak on this occasion on some of the problems we face as a people in raising the performance level of the work we do. I have therefore chosen as the title of my address: "Some Problems of Manpower Development in Singapore".¹

This is a very broad subject, but I intend to approach it from a rather specialised viewpoint, the point of view of the econo-

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mist. The questions that are raised here go something as follows: "Are we training the right sort of people and in sufficient numbers? In fact, do we know what sort of trained people are required to sustain the momentum of our economic growth? And in what numbers? Who should do the training? If it is the government, can we be sure that the taxpayer's money spent on technical education, for instance, yields a reasonable return? What do we mean by reasonable return? In fact, how do we measure what the returns are?"

These and similar questions are studied in a sub-discipline of economics called "Manpower Planning". Let me therefore say something about manpower planning and what manpower planners do, or to be more exact, what they hope to do. For this is a new sub-discipline of economics, though a rapidly growing one. Interest in manpower planning is of recent origin, the major theoretical formulations being developed not much more than ten years ago. Interest in the subject grew from various causes.

Among the poorer countries of the world, people were questioning whether the prescriptions of the experts for achieving fast economic growth were correct. The main emphasis in expert recommendations for economic growth centred on capital investment. When in many instances, this did not produce the results hoped for, people began to ask whether this was not due to neglect of the other sectors of the economic system.

A natural component to examine was manpower, or the labour force. Since these have to work in the factories or installations created by capital investment, some people believe that, perhaps with the proper development of skilled manpower, the missing link to fast development would be found.

1. Mr. Chua Seng Kiat has given me considerable assistance in the collection of data and documents. I have also benefited from discussions with him and Dr. Pang Eng Fong.

There was also another reason for interest in manpower problems in many of these countries. This was the increasing and widespread unemployment of educated youth.² In a sense, unemployment of school leavers, and even of university graduates, ran contrary to the theories about economic growth.

To oversimplify a complex argument, we can set it out as follows. One of the causes of poverty is ignorance. Ignorance is due to lack of education, and uneducated, superstitious people cannot be trained in modern techniques of production and management. Therefore, the extension of education and the raising of educational standards were necessary conditions of economic growth.

Experience in many countries, however, has shown that increasing the number of school leavers merely increased the number of the educated unemployed. It was not only a puzzling outcome of public expenditure but also a dangerous one. For nothing is more likely to produce political instability than the increase in the numbers of such people. And so the educators, the economists and government administrators in these countries decided to take a fresh look at the subject and in this way became entangled with the problems of manpower planning.

What is manpower planning? There are probably as many definitions of the term as there are economists. But broadly, what is grandly called "manpower planning" consists of a number of activities.

The first activity is collecting information about the labour force. This is done either by routine administrative exercises, such as the decennial census of population, or periodic returns of employees to the Ministry of Labour, or by *ad hoc* studies conducted either by government agencies or by universities and other research institutions. Such data give details of number of people engaged in various occupations, in various industries as well as details of their ages, place of residence and whether they are men or women.

The second stage of manpower planning consists of making forecasts of future requirements of manpower. Such forecasts could be made either in minute detail, that is, for each and every occupation appearing in the official classification used in labour statistics; or they may be in broad categories such as requirements of skilled, semi-skilled or unskilled workers. Or forecasts may relate to a specific industry, such as the number of cooks, chamber maids, bar men, receptionists and other occupations required in the hotel industry in the next five years.

There are many ways of making these forecasts; but they share one common feature, and that is, they are usually undependable. The reasons are not far to seek. You may ask employers what their labour requirements would be twelve months from now. Let us assume that all employers take this exercise seriously — a very big assumption, which in real life, is not always fulfilled. While some employers may have an accurate idea of what they need, this is by no means true of all or even most of them. It is one of the inescapable facts of business in a free enterprise system that the future is uncertain. So, even with the best will in the world, you get data of uncertain reliability.

Where manpower forecasts are required for planning of education, long term forecasts extending to ten years or more are required. Such forecasts begin with the current stock of gainfully occupied population as distributed over various industries and occupations. Assumptions are then made about the following:—

- i) Annual growth of the Gross National Product
- ii) Growth of individual industries or sectors of industries consistent with assumed growth of GNP
- iii) Increase in productivity, enabling a given output to be produced by fewer men
- iv) Certain demographic and social factors — death rates, migration, age of retirement, etc.

Given the assumptions, projections do not call for more than simple, if tedious, arithmetic.

2. Blaug, M., *Economics of Education 2*, selected Readings, Penguin Modern Economics Readings, 1969, p. 54.

Experience of government collection agencies in countries which have asked employers of future manpower requirements generally shows a pronounced bias towards optimism. Also, the more detailed the manpower classification is, the greater the likelihood of error of individual items. Further, the longer the period of forecast is, the more undependable is the projection. This is hardly a surprising result.

The next step in manpower planning is to study the supply of labour. Again, this could be done on a comprehensive basis covering the whole economy and using detailed statistical classifications. Or the study could be done in broad aggregates. As with studies of requirements, supply studies could deal with specific sectors or industries.

Estimation of supply is usually based on output expected from schools and tertiary and professional training institutions as well as from general population data, such as the number of males and females in specific age groups expected to survive in a given year. In working on the latter, that is, general population data, we have to apply what is called "a labour force participation rate". This gives the proportion of people within a given sex and age category, who can be expected to be working or looking for work. As with studies of requirements, forecasts of supply may be produced for each year over the next five, ten or even twenty years.

The next stage in manpower planning is the matching of future projections of manpower requirements with estimates of future supplies. In this way, shortfalls or excesses can be detected in particular occupations or industries at least in principle, though not always in practice. There are some conceptual and theoretical problems as to what this matching up process means. But these need not detain us here.

The matching of expected manpower supplies with forecasts of requirements really completes the manpower planning exercise. If we leave it at that, one may well argue that this is an exercise in futility, juggling about with data of uncertain reliability, resulting in estimates open to question.

Despite these very serious limitations, there is no evidence of any diminishing interest in manpower planning as a subsidiary discipline of economics, or even, as some would like to have it, as an independent discipline in its own right. On the contrary, the evidence is one of growing interest, to judge by the number of international conferences held on the subject and the proliferation of literature on it. In Singapore, an international conference on manpower planning took place in May 1971. The conference assembled more than 70 scholars and policy-makers from East and Southeast Asia as well as from several developed countries. The conference discussed the problems of measuring labour supplies, problems of unemployment and problems of manpower development and training.

What is the reason for this sustained interest, apart from the tenacity and will to survive of manpower planners themselves? First, the planners defend their activities on the ground that it is better to have some kind of estimates than none, and that anyway, estimation techniques continue to improve.

The second, and I believe, the real reason, is the importance of the subject for government policy purposes. To be sure, government interest in the subject varies from country to country. In the United States, for instance, the Bureau of Labour Statistics publishes biennial forecasts of requirements of more than 700 occupations. These are released to the public and to the main customers such as school-leavers or their parents, university graduates and, presumably, vocational guidance counsellors attached to institutions.³

In Singapore, our interest in manpower planning is a simple one. It is to ensure that there is sufficient labour in all grades and skills to meet the demands of the rapidly growing manufacturing industry. The main concern is to ensure that industrial growth, particularly in new industries using more advanced technology, such as those introduced by multi-national corporations, does not experience such difficulties over labour supply that factories are unable to

3. Lester, Richard A., *Manpower Planning in a Free Society*, Princeton University, New Jersey, 1966, p. 112.

fulfil their production plans. Should this happen, not only will it slow down the rate of economic growth, it will also reduce the effectiveness of our industrial promotion work in foreign countries.

I propose to describe our experience in manpower development in Singapore, in three stages. First, I will discuss studies of Singapore's manpower situation, carried out by academic institutions and Government departments, comprising mostly the kind of work associated with manpower planning. I will then discuss what changes and innovations have taken place in Singapore both in training institutions and private industry to produce skilled manpower. Finally, I will put forward some ideas about how one could integrate the activities of the planners and implementers into a coherent system.

By Singapore standards, the subject of manpower planning has received widespread and intensive attention, both in academic and official circles. In a paper to the "Committee for Asian Manpower Studies", Dr. Pang Eng Fong reported an inventory of research material carried out between 1967 and 1971 of no less than 72 titles.⁴ There were 20 published articles produced by staff of the Economic Research Centre of the University of Singapore and other university scholars. There were no less than 22 unpublished academic exercises and Ph.D. theses in the library of the University of Singapore. The National Productivity Board was another prolific source with 22 studies. The Economic Development Division of the Finance Ministry contributed 8 publications on manpower problems.

This does not exhaust the list of research. The Ministry of Science and Technology has conducted one survey of scientists⁵ and is planning two other surveys next year, one on engineers and another on scientists. The latter is a follow-up of the first survey. The Engineering Faculty of the University of Singapore, in conjunction with

the Singapore Institute of Engineers, also conducted a survey of engineers in 1970.⁶

The Research and Statistical Unit of the Ministry of Education has undertaken a number of research projects, which though unpublished, are made available to serious students. They consist of studies of the electronics, electrical, hotel and engine repair industries.⁷ These make use of the pupils of the vocational institutes and other training establishments under the control of the Technical Education Department. The studies try to forecast future requirements, enquire into experience of new workers as well as the attitudes of employers towards the products of the Ministry's training efforts.

The other studies can be conveniently grouped as follows. First, descriptions of training methods and institutions in Singapore to produce the personnel required by industry, sometimes supplemented with comparisons of what is done in other countries. Such studies deal with both on-the-job training as well as formal systems of training. The Finance Ministry's studies belong to this category.

Then there are studies relating to forecasts of manpower requirements in various industries, particular attention being paid to recently established industries with growth potential. The National Productivity Board between July 1970 and September 1972 produced a number of such studies, which have now been discontinued.⁸ Industries covered included Metal and Engineering, Shipbuilding and Repairing, Electronics, Textiles, Plastics and others. Particular attention in these studies was paid to methods of recruitment of new workers, categories of workers difficult to recruit, estimates of labour shortfalls and labour turnover. These reports were circulated to Government ministries but it is not certain what action,

4. Pang Eng Fong, *Country Statement (Singapore)*, Committee for Asian Manpower Studies, Division III Meeting, June 26-28, 1972 (Singapore: Economic Research Centre).

5. Ministry of Science and Technology, Singapore, *National Survey of Scientists, 1971*.

6. University of Singapore, Faculty of Engineering, *The Engineering Profession in Singapore: Survey 1971*.

7. A series of studies by the Research and Statistics Unit, Ministry of Education, Singapore, entitled (a) *Evaluation of the electronics and related trade courses of the Technical Education Department*, (b) *Evaluation of the electrical and related trade courses of the Technical Education Department*, (c) *The young workers in the Hotel and Catering Industry*, and (d) *A survey on the demand for diesel/plant mechanics*.

8. A series of Quarterly Manpower Surveys on various industries by the National Productivity Board, Singapore.

if any, was taken in consequence of their findings.

A Manpower Planning Unit was set up in the Ministry of Finance in 1971 and is currently preparing the forecast of national manpower supply and requirements for the next five years. The methods used follow the general forecasting technique I described earlier. One interesting result that their preliminary estimates indicates is that it should be possible to sustain our present growth of 15% a year and at the same time reduce the number of migrant labourers imported each year.

The third category of manpower studies consists of those produced by the Economic Research Centre and the University of Singapore. These are of three kinds. First, the unpublished academic exercises produced by final year honours students of Economics. They were mostly studies of the use of manpower in particular industries, dealing with numbers, categories of workers, wage structure, productivity and output, training and other aspects. Industries studied included Banks, Printing, Public Utilities, Textiles, Metal-working to give a few examples. There were also studies of employment of university graduates.

The weightier studies were carried out by the permanent staff of the Economic Research Centre which has always displayed a special interest in Manpower subjects. In the early years of the institute, the emphasis seemed to have been on the demographic structure and the social and economic characteristics of Singapore's population. Much of the work was based on material collected in the sample household survey of 1966 carried out jointly by the Economic Research Centre (ERC) and the Ministry of National Development.⁹

Later work of the Economic Research Centre (ERC) analysed the data collected in the manpower survey carried out in 1969, a joint operation of the ERC with the Ministry of Science and Technology, the Ministry of Labour and the Singapore Institute of Management. It was a manpower stock-

taking exercise and covered all establishments employing 50 workers or more, not only in manufacturing but also in trade, finance and other services. Both private and public sector enterprises were included. Two types of questionnaires were used — one for each employee and one for the establishment.

The more recent works of the ERC, particularly those by Professor David H. Clark and Dr. Pang Eng Fong, are important landmarks in manpower studies in Singapore. It is not only their intrepid treatment of uncertain data which is noteworthy, but also their broader assessment of the manpower situation in Singapore.

The studies by Clark¹⁰ and Pang¹¹ on earnings of workers with various grades and types of education concluded that the structure of secondary, technical and tertiary education in Singapore seemed to be consistent with market supply and demand. The differentials between different levels of academic education are in keeping with the cost of education; the same can be said for technical education, higher pay keeping pace with higher cost of training. The conclusion suggested in the studies supports a policy of subsidies from public funds for both apprenticeship training schemes, on-the-job as well as technical, craft and vocational education provided in Singapore.

The paper on "Manpower in Larger Manufacturing Firms in Singapore"¹² rather confirmed the opinion of an informed layman as to the nature of Singapore's business practices. The study reveals a remarkable adaptability on the part of these firms. For instance, it was found that few of their skilled and semi-skilled workers have had technical or vocational education and they acquired their skills in the course of their working careers. Those with technical education, say, of Polytechnic level, are usually not found in jobs classified as

9. You Poh Seng & Stephen H.K. Yeh, "The Sample Household Survey of Singapore, 1966, Malayan Economic Review, XII, 1 April 1967. Issued as Reprint Monograph Series No. 3.

10. Clark, David H., "Manpower Planning in Singapore", Conference on Manpower Problems in East and South-east Asia, Singapore, May 1971.

11. Pang Eng Fong, "A Cost-Benefit Analysis of Science and Engineering Education in Singapore", Unpublished.

12. Clark, David H., "Manpower in Larger Manufacturing Firms in Singapore", published in *Malayan Economic Review*, Vol. XVI, No. 1, April 1971.

technicians, but are doing work at higher levels, as supervisors or in managerial or even professional capacities.

The general picture emerging seems to be that of a Singaporean doing work much beyond what his educational and technical background would normally have prepared him for. For instance, out of 886 persons classified as professional and technical, no less than 172 claimed to have either primary education or no education at all. Out of 557 in managerial positions as many as 35 received primary or no education. The study concluded that not only in blue-collar jobs but also in professional, technical and managerial positions, while these firms may prefer workers with an adequate educational background, many of those have risen to these ranks through informal job training.¹³

So much for manpower studies and planning. The picture is one of scattered, un-coordinated if zestful work.¹⁴ Despite the lack of co-ordination, which is freely admitted by the participants themselves, it would be wrong to decry the value of the work. Taken together, they amount to a useful increase of our knowledge of manpower problems in Singapore. The experiments with techniques of data collection and data analysis would improve future efforts if lessons learnt were applied.

Despite all this, these studies had virtually no impact on government policies and action to solve manpower problems. Studies and planning on the one hand and policy and action on the other moved in two separate watertight compartments. Before I go into the reasons for this extraordinary state of affairs, I will describe the government's perceptions of what manpower problems were and what it did to surmount them.

The government was primarily concerned that economic growth would not be stifled by shortages of skilled manpower. While it was possible to ease a difficult situation by importing skilled workers, the

basic solution must be found in training our citizens in required skills.

The government's efforts to provide technical training and instruction can be considered conveniently under four headings:—

- (i) crash programmes mounted in response to some foreseen urgent situation;
- (ii) some experimental trials sponsored by the EDB with the assistance of UN agencies and foreign governments;
- (iii) structural innovations in the system of formal education;
- (iv) joint training programmes with employers.

Two crash programmes to provide technical training were carried out in recent years. In March 1968, a scheme was introduced to re-train clerical and other workers expected to become redundant on the closure of British military bases. There were 20,324 Singapore citizens known to be in need of re-employment; in addition, there were 5,021 non-citizens. It was estimated that some 9,000 citizens could be re-trained and would benefit from it.

Training facilities in the form of instructors, classrooms, and workshops were found in the vocational institutes of the Ministry of Education, the secondary technical schools and the workshops of the Engineering Industry Development Agency.

Because these Base employees were still working, courses had to be arranged in the evenings and during week-ends. Courses offered included turning and fitting, sheet metal work, plumbing, radio maintenance and repairs. 3,309 citizens applied, of whom only 1,749 were found suitable on grounds of education, age, and willingness to undertake courses offered.

In all, seven sessions at elementary level were conducted between April 1968 and March 1971. Two additional sessions of upgrading trainings programmes were also conducted from some 295 trainees who had completed the elementary session

13. Clark, David H., "Managerial Resources and Management Training in Singapore's Larger Manufacturing Firms", *The Singapore Manager*, July 1971.

14. Clark, David H., "Manpower Planning in Singapore", Conference on Manpower Problems in East and South-east Asia, Singapore, May 1971. Published in *Malayan Economic Review*, Vol. XVI, No. 2, October 1971.

Unfortunately, the follow-up on the results of this interesting experiment in re-training of redundant labour was less than thorough. Perhaps, this was due to other urgent preoccupations on the part of those in charge, or it could have been due to the belief that with the rapid growth of the economy, laid-off Base workers would find little difficulty in getting re-employment. In the event, only 232 of the 1,749 trainees were traced in their new occupations, and of these half were re-employed in Sembawang Shipyard, the former Naval Base under new management.

The second crash programme occurred in 1970 when it became evident that the economy was experiencing a grave shortage of welders. This was expected to worsen unless output of welders was increased substantially and rapidly. The unexpectedly rapid increase in the demand for welders was due to the rapid increase in ship-repairing. This was again a consequence of the closure of the Suez Canal so that ships plying between Europe and the Far East no longer found it convenient to dock at one of the Mediterranean ports for repairs. Also, the burgeoning offshore oil exploration in the South East Asian archipelago created an entirely new industry in Singapore — the fabrication of oil drilling rigs and associated equipment. And this required large numbers of welders. The construction of new oil refineries and the expansion of existing refineries also increased the demand for welders.

The Technical Education Department of the Ministry of Education made use of all available training facilities to turn out welders in specially designed courses. From 1970 and up to June 1973, 1,789 trainee welders were trained through full-time, *ad hoc* and part-time courses.

While this effort undoubtedly got Singapore through a critical situation, the same cannot be said for an elaborate and expensive experiment in training which was initiated by the Economic Development Board.

Because of its vigorous promotion activities, the EDB succeeded in attracting to Singapore not only a wide range of new industries but also technical and financial assistance from a number of foreign govern-

ments and from the United Nations Development Programme aimed at producing industrial skills.

By 1968, no less than six training centres had been established, namely:

- (i) The Metal Industries Ltd.
- (ii) The Prototype Production and Training Centre
- (iii) The Electro-Mechanical Training Centre
- (iv) The Electro-Chemical Engineering Centre
- (v) The Woodworking Industries Ltd.; and
- (vi) The Precision Engineering Development Centre.

Foreign governments donating both machinery and experts included Japan, Britain and France. The six training centres received substantial donations of machine tools and a lavish supply of experts. One feature of these centres was that they trained workers by producing articles or components needed by industry. But there were certain restrictions on sales which somewhat nullified the value of this approach.

It soon became apparent that the management of six different training and production centres, sponsored and assisted by different countries, possibly for different purposes, each working under constraints of one kind or another laid down by the donors — all these added up to a severe management problem. In fact, management became unmanageable.

Nevertheless, EDB struggled manfully. It set up the Engineering Industry Development Agency, or EIDA, in April 1968, to exercise supervision and control over these six centres. A six-man committee was formed to run EIDA in January 1969. In just over a year, an entirely new committee was appointed and this again was replaced by another clean sweep after 15 months.

EIDA was one of the unsolved problems which I left to my successor in the Finance Ministry in August 1970 to assume

my present position. Failure to solve this problem was not due to lack of trying. I had no less than three experts as advisers — two Americans sent under the International Executive Service Corps scheme and an Australian, an outstanding industrialist. However, after due consideration, I felt that their recommendations either involved a risk of throwing good money after bad, or required the services of high-powered management personnel which did not exist.

Between 1968 and 1972, EIDA turned out 886 trained personnel at a total cost of some \$12 million in government subsidy. There are obviously more economical ways of industrial training.

EIDA's woes may soon come to an end. The last Committee proposed conversion of the Agency into a business enterprise which must survive on its earnings. This recommendation was accepted by the Finance Ministry and accordingly a new Company named "National Engineering Services Pte. Ltd." was incorporated on 1st July this year.

The third effort of the government was to restructure the system of education. By 1968, it was becoming increasingly apparent in the Ministry of Finance that the prospective output of technically trained workers produced by the school system, on-the-job training schemes and by other means would not be sufficient to meet the requirements of new industries which have decided to commence operations in Singapore. It did not require any elaborate process of manpower planning or research to reach this conclusion. Because of certain external developments favourable to Singapore, and as a result of energetic industrial promotion abroad, together with developed physical infrastructure at home, a substantial increase in the rate of industrial growth was expected, for which skilled manpower was clearly not available in Singapore.

Accordingly the government decided to accelerate the plans under consideration in the Ministry of Education for the expansion of technical education. In addition, other training schemes were initiated.

In April 1968, a ministerial committee, chaired by the Minister for Education with

the Finance and Labour Ministers as members together with their staffs, was established to expand technical education in schools as quickly as possible. A Technical Education Department was set up within the Ministry of Education in June 1968 to implement this programme.

The new education policy aimed at increasing the proportion of secondary pupils in the technical stream to one third of the total. It also sought to improve standards of instruction in terms of curricula content, class work and workshop facilities, the number and quality of instructors. Secondary I and II students in the academic stream were also required to do a minimum amount of workshop practice, three hours per week.

To enable the Education Ministry to achieve the targets in respect of construction of new buildings, classrooms and workshops, the purchase of equipment and training aids, the recruitment and training or re-training of teachers, the Finance Ministry made funds freely available for such purposes. As a result of these exertions, it was possible to expand the volume of technical education very rapidly. For instance, in 1968, there were only 425 technical teachers in the school system. By 1970, this had increased to 1,386 and had reached 1,950 in 1972. This was no mean achievement as the labour market was getting increasingly tight. The number of vocational institutes increased from 3 in 1968 to 11 in 1973. The output of students increased from 287 in 1969 to 3,544 in 1972. Similar increases were registered in the secondary technical schools, which, unlike the vocational institutes, did not train students in individual trades or craft, but gave them an academic education with a technical bias.

The vocational institutes offer a wide range of courses. The most popular courses include Electrical, Electronics, Maintenance and repair of motor vehicles, Refrigeration and Airconditioning and Plumbing. These classes are running to capacity. The courses on Building, Carpentry and Masonry are not popular, a strange situation when there exists a severe shortage of construction workers in Singapore.

The output of technical and vocation training in schools, while they gave a background knowledge in a craft or trade, had sometimes to be supplemented by specialised training. For this purpose, two schemes were resorted to. First, government encouraged and subsidized the cost of training overseas in the case of foreign investors starting a branch in Singapore. By 1972, 1,264 trainees had been sent on such courses.

In addition, training in Singapore under a formal system of apprenticeship was revived. The apprenticeship system has had a long history in Singapore, but as there was no compulsion or incentives for firms running such programmes to acquaint the Ministry of Labour with what was going on, information was scanty. When responsibility for supervising apprenticeships was transferred to the Technical Education Department, and, more particularly, when graduated apprentices obtained deferment from full-time national service, a clearer picture of the position emerged.

The terms and conditions of the apprenticeships as embodied in the agreements, syllabus content and training programmes, have to be submitted to the Department for approval.

At the end of June 1973, the number of apprenticeship agreements on the Live register of the Industrial Training Board was 1,029. Of these, 756, were of national service age, but were deferred from full-time national service by virtue of their apprenticeship training.

Let us now take a broad view of the process of manpower development which I have just presented. The most outstanding feature is the virtually total absence of communications between those who study manpower problems and those in the government who have to make decisions to solve these problems. There are several reasons for this. Partly, manpower planning as a sub-discipline of economics, being newly arrived, has yet to win recognition. Also, the introduction of manpower studies in academic circles, principally the Economic Research Centre, came at a time when the government itself had to face critical problems and make urgent major decisions

about them. Yet, even within the government machinery, there seems to be little evidence that those who collected data and made studies on manpower problems had any influence, or even contact, with the decision-makers. It may be surprising, in the circumstances, that the major decisions on manpower development by the government turned out to be generally correct according to Professor Clark's assessment.¹⁵

This happy outcome may be possible in a small country like Singapore with an uncomplicated one-tier system of government. Even so, while the decisions may be correct in broad outline, the implementation of policy embodied in such decisions would be more effectively carried out if up-to-date and accurate data were available to the administrators. This is particularly so when matters such as the types of courses to be offered in vocational institutes are being planned. Decisions on such matters involve costly outlays in specialised equipment as well as in recruitment and training of instructors. Mistakes may result in substantial financial losses, as such equipment is usually specific to a trade or craft, as we have seen with EIDA.

Co-ordination is not only poor between planners and decision-makers, it is also virtually non-existent among the researchers themselves. One gets the impression of groups of highly educated personnel working in virtual isolation from one another. It is true that they did not always deal with identical subjects, yet they are all working in the same field. The reason is partly historical; different government agencies either felt the need to collect information or else parts of such organisations thought it incumbent upon themselves to do so, regardless of whether their efforts were read by anybody, let alone appreciated or understood.

No less than five ministries are directly interested in manpower studies — the Ministry of Education, the Ministry of Finance, the Ministry of Labour, the Ministry of Science and Technology and the Ministry of Defence. All this is in addition to the academics of the University of Singapore

15. *Ibid*, p. 210.

and the Economic Research Centre, not to mention Nanyang University and the Polytechnic.

Undoubtedly, the most valuable work in this field is done by the Economic Research Centre of the University of Singapore, led by the pioneering work of Professor You Poh Seng and Professor D. H. Clark. The work done by them and their assistants in the Economic Research Centre included not only field studies but applications of techniques of analysis and evaluation to the situation in Singapore. In the process of their work they have produced a number of trained personnel, who are now available to contribute to manpower planning in the light of this accumulated experience.

The last comment that I want to make on manpower studies is the long time taken to complete the studies. For instance, much of the results of the manpower studies initiated in 1969 did not appear until two or three years later. The census of population, basic to all manpower planning, was carried out in June, 1970. Today, three years later, the main report has still to be published. If research findings are to be used for policy decisions, some way must be found to produce quick results without sacrifice of accuracy or quality.

Obviously the present state of disjointed and unco-ordinated effort needs to be remedied. The gains from team work are tangible and immediate. This is because manpower studies consist of a number of phases, each of which needs specialist knowledge and experience for good performance. Where the study requires the collection of data by field studies, as is often the case, the process of data collection involves the following steps:- design of questionnaire, definition of terms and preparation of field manuals, design and selection of sample, selection and training of field staff, preparation of codes and classification, checking and editing of field returns, preparation of statistical formats, and finally, the analysis, interpretation and evaluation of data.

Each stage in this process requires specialised knowledge. One gets the impression that much of the field work carried

out in manpower studies was done by people with rather limited knowledge and experience.

By now, a good number of workers in the field would have accumulated such experience and this should be made available in future efforts, provided co-ordinated team work is practised. In the course of time, workers in the field will specialise in one aspect or the other and their participation in any given project cannot but raise the quality of work and reduce the time of planning and preparation.

The second requirement is to raise standards of work in all aspects in the treatment of data collected, such as data processing into statistical formats, their analysis, interpretation and evaluation. Most of the studies that have been produced are by no means of negligible significance or inadequate standards. Nevertheless, many show evidence of weaknesses, which are hardly avoidable in first efforts. These are of no great concern as improvements will take place with accumulated experience.

There is, however, a danger that needs to be guarded against, and that is the very natural fault of human bias. To give a concrete example, take the forecast of future requirements of engineers. Engineers are prone to believe that their activities are essential to human progress and happiness. This is debatable seeing that some human societies have reached great heights of enlightenment before engineers existed, such as Athens of the age of Pericles, China during the reign of the T'ang Emperor Hsuan Ts'eng and Italy in the later Renaissance. Nevertheless, from this premise, it is a short step to the proposition that the more the engineers, the greater would be human progress and happiness. Accordingly, forecast of requirements of engineers if made by engineers, must be regarded as highly suspect. To be fair to engineers, this kind of tribal feeling is not peculiar to their profession.

The third aspect of work in which improvement can take place relates to the subject matter of manpower study. In place of what looks like a free-for-all, there should be a method whereby an agreement over priorities could be reached in the interests

of our better understanding of these problems. In other words, manpower planners must begin to plan their own activities.

It is not merely a matter of avoiding duplication, but of giving some sense of direction and purpose to all those who are engaged in this work. One could divide the field of study into three convenient divisions. First, there are the basic studies which are not related to immediate needs. These would include work on the theoretical concepts underlying the thinking on manpower planning. These are still at an early stage of development. In addition to what one might call pure research of this kind, there could be applied research in the way, for instance, of refined analysis of past census data.

The second scope of research work would relate to experiments in methodology. This is rather important for Singapore as our economic system is quite unlike those of countries which have introduced techniques of data analysis. The long-term manpower forecast conducted by the Manpower Planning Unit of the Ministry of Finance belongs to this category. Systems of data collection in field work under the multi-racial conditions of Singapore need to be studied as a project in itself, so that we can have a better idea of the accuracy and efficiency of different systems of field work. While sampling theories have developed advanced methods of relating sample design to cost and accuracy, very little work has been done on minimising errors resulting from data inaccuracies in field work. Yet these errors — called non-sampling errors — are probably more dangerous in practical work than sampling errors.

Third, part of manpower studies must serve the practical needs of decision-makers in government, in private industry, in trade unions and, possible, of the more enlightened members of the general public. It would be wrong to insist that all research must have a practical policy orientation. Nevertheless, because policy decisions, and, more particularly, policy implementation can be more efficiently effected on the basis of ascertained facts instead of inspired guesses, this constitutes fair claim on the resources available for manpower studies. The difficulty here is not merely the identi-

fication of policy needs and translation of these into relevant research operations, but there is also the need that the results satisfy certain conditions. First, they must be made available quickly. Second, they must be accurate. Third, they must be presented in a way that can be understood by decision-makers or policy implementors. It is not easy to satisfy all these requirements, especially in Singapore where, despite progress achieved, the amount of expertise is still limited in relation to what has to be done.

The importance of manpower development need hardly be emphasised. We are being repeatedly told that a small, overcrowded island republic with no natural resources must depend on the efforts of its citizens to survive and prosper. Yet, interest in manpower problems, even knowledge of what these are, can hardly be said to be widespread. This curious lack of interest in what is a matter of crucial importance can be gauged by the scant attention given to the subject in the business section of the local press. On the other hand, space allotted to the gyrations of the stock market and the activities of companies whose shares are quoted, is exceeded only by reports on the current form of race horses.

Even among the specialist circles who have to make decisions or carry out government policies, among employers and trade unions, it is extremely doubtful whether more than a handful of people have read any of the 72 manpower studies I mentioned earlier, even though many of these are relevant to their work.

The root of the trouble is that the subject matter concerns not one agency but several. But there is already awareness of the need for better liaison and some steps have already been taken to effect this. But instead of *ad hoc* measures so typical of efforts in the past, one should aim for something more durable. To do this, it is necessary to define both immediate and distant objectives. The long-term objective should be to create a feeling of common identity among those working in this field. While manpower planners may be interested in different stages of work, such as the study, planning or implementation process, the ultimate purpose is the same. And that is

to raise the performance level of all categories of manpower in Singapore by ensuring that adequate and timely resources are made available for their training and absorption, and, as far as possible, requirements are foreseen and made available in time. There is a community of interest here which could be developed and sustained in several ways.

First, seminars could be held from time to time. The subjects should be not so much the findings of studies, as discussions of methods and techniques, in field work, in data analysis, in effective means of presentation and such like. It is necessary to get the right approach to these seminars. The object is not to show off one's skill or display one's successes. It is rather to highlight problems and difficulties which were only partially resolved. Exchange of experience along these lines will be more productive to improvements in future work, and in this way, make it easier to earn respect and recognition from others.

A second way of fostering this community of interest is to issue what may be termed a "house paper" at regular intervals. Again, this should not be a channel for publication of research findings, as there are other well-established media of publications, such as the Malayan Economic Review. Papers of narrow technical or professional interest which may not be suitable for publication in a journal like the Malayan Economic Review are best delivered at seminars. The "house papers" should give news about studies being planned, reports on progress of projects under way, and give resumes of findings of completed studies. There may also be news items about important developments in training projects, the starting of new ones, changes in curricula or syllabus content, departures or arrivals of trainees to and from abroad and such like topical items. The object of the "house paper" is to give an impression to workers on manpower studies that they work in a real, living and changing environment in Singapore. At present, a good number may be overcome by the feeling of working in isolation, a condition which does not produce an attitude of mind conducive to creative work in applied social research.

The "house paper" should also take into account the needs and interest of those who read or should read their studies. In particular, the decision-makers at policy or action levels need to know what studies are going on which may be useful to them. But many of them may not be trained in manpower economics and presentation must therefore make a point of avoiding jargon or technicalities so beloved of the specialist but also so irritating to the potential user.

If the steps recommended above are successfully taken, there will develop in course of time an awareness of common interests. That will be the time when a less informal kind of association may be formed which would be the principal machinery through which a consensus on priorities may be developed. The association could also ensure that professional standards are safeguarded. It is too early to say just when this would take place, who should be responsible for forming such an association and what kind of leadership is required to make it effective. One would hesitate even to suggest where the boundary line should be drawn between the kind of work described here and other closely allied subjects in labour economics such as industrial relations, productivity and demography.

Wherever the line of demarcation among the specialists, it will be necessary at some time to bring in the non-specialists in the administration so that they will know the tools of data collection and analysis available to them for decision making purposes. I do not know when this would or should happen and how it is to take place. It is partly a matter of establishing confidence in research results, partly a matter of educating the non-specialist. Perhaps it will be a gradual process but both sides should work to end as early as possible the present failure in communications between the two groups.

We should not lose sight of the principal objective — that is, to ensure that our sole natural resource, productive labour by brain and brawn, is used to the maximum advantage. The fact that in the past, the system had shown sufficient flexibility should not lead us to believe that in running the more complex industrial system of the future, the unguided and unco-ordinated

methods of the past will suffice. We are more likely to succeed if we gear properly co-ordinated research efforts into the decision-making process. The more complicated problems of the future are not likely to be successfully solved by hunches, intuitive judgment and inspired guesses. What we need to create is a system whereby adjustments that need to be made are quickly identified and studied with the evaluation sent to interested quarters in the administration for timely action.

May I conclude my observations with a few words of caution? First, the implanting of skill in a work force is only one way of achieving higher performance. As important, perhaps even more important, is the maintenance of proper attitudes towards work among the general population and the enforcement of work discipline in factories, offices and other work-places. The weakening of the work ethic observed in so many parts of the world, both among the advanced nations and, astonishingly enough, among some poor countries as well, serves as a warning to Singapore on how necessary it is to prevent its occurrence here.

Work discipline at places of work is a specific subject in industrial relations. These matters are, however, outside the scope of my address. But there is one subject which

is relevant, but which I have not dealt with, and that is the subject of high-quality manpower. Though some of the ERC and other studies dealt with management, professional and engineering personnel, they formed a small proportion of the total effort. A study of high-quality manpower raises issues beyond what economists are accustomed to deal with. One is immediately involved in the controversy as to whether genetic or environmental and cultural influences determine levels of excellence in intellectual performance. Then there is the subject of the celebrated brain drain, the flow of talent from poor countries to rich countries, impoverishing the one and further enriching the other.¹⁶ Then again there is the brain drain in reverse, the inflow of expatriate talent to developing countries. People who deplore, and rightly so, the brain drain from poor to rich countries, illogically enough object to the reverse brain drain, and want to place limitations on it. These issues open up fascinating vistas of thought but I must reserve them for some other occasion.

16. Van Hoeh, F.J. "The Migration of High Level Manpower from Developing to Developed Countries" Publications of the Institute of Social Studies, the Hague (1970) pp. 19-21 gives the following estimates:- Between 1961 and 1967 31,091 scientists, engineers and doctors migrated to the USA from developing countries. The brain drain of similar professionals into Canada between 1963-67 was 21,278. The disturbing feature was not only the large numbers but the accelerating pace of the brain drain.