NATIONAL TECHNICAL MANPOWER INFORMATION SYSTEM ITS ROLE AND IMPLICATIONS

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Historical Perspective :

The post independence period has witnessed a rapidly accelerating growth of industrialization and as a consequence, it has helped to create challenging opportunities to its planning, administrative, executive and training institutions. The training programmes affecting human factor and also research and development activity. These efforts provide a vital link between planning and the administrative wings on one side and executive on the other. In addition to meeting the requirements of the state, programmes have to conform to the overriding needs arising out of national policies and synthesis between the two is an essential factor in the context of development. The education system makes its impact on social and economic development and is required to contribute significantly to the development of the character of individuals who build the nation. Education in social field is expected to serve as an instrument of change as also to anticipate change to be an effective instrument. Education in economic field is required to help to improve productive efficiency, increase national wealth and thereby raise the standard of living of the people. The education in the State of Maharashtra in general and technical education in particular aims at development of science and technology and their various branches. For harmonious, balanced and uninterrupted development, technical education has to play its role in preparing right type of manpower, the State of Maharashtra fortunately has not lost sight of this vital link.

Technical Manpower :

The human resources of a country constitute a national asset of great value as fertile soil, rich minerals, forests and other resources. It is required to harness various material, natural and other resources, that is why effective and optimum utilization of available resources is very much needed. But it requires an appropriate policy framework not only to accelerate pace of economic development but adoption of appropriate manpower planning strategies. In the age of technological development for productive process in the country, qualified and competent manpower is needed to man the technology and related processes in the growth sectors and industries. Industrial growth is related to the available manpower at desired time. Duly qualified and competent human resources to match the

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varieties of activities to be performed in the industry and other projects are equally important. The technologies of modern industries are becoming sophisticated and requires personnel with several years of education and training. Therefore, country's growth and development depends upon availability of sufficient professionals, technicians, administrators and managers, who are required by the industrial establishments. The gap and imbalances in the requirements at different occupational levels can be reduced only by assessing the technical manpower for future years. The assessment of future manpower will help in preparing the desired level of manpower with required competencies at a particular time to man the industrial processes and projects.

Manpower Planning Instruments :

The awareness towards the data base relating to high level manpower of which Engineering Manpower is a major and important component began with the attainment of independence & commencement of planning era in 1951-52. The foremost concern of the planning process was to make available the number of Engineers & Scientists needed for accelerating the development of industries, irrigation, power & other development projects. In the beginning, the approach was more adhoc in nature rather than systematic and comprehensive covering all aspects. Later on, the need to institutionalise the arrangements for advising planning commission with regard to formulation of five year plans was recognised and system of setting up working groups to cover each of the major sectors of economy was initiated. In view of the crucial importance of manpower in promoting economic growth, it was felt that there is a need for continuous research in the subject. The Institute of Applied Manpower Research was, therefore, set up in 1962 under the control of planning commission.

Early Manpower Planning Efforts :

The various adhoc committees set up in early fifties and working groups in early sixties to study manpower aspects of Engineering Education mainly focussed their attention to their existing educational & training facilities vis-a-vis their adequacy in relation to socio economic development programmes, the Education Commission in 1964, for the first time, inter alia, reviewed the existing arrangements for technical education and suggested necessary changes in enrolment rates for serving the engineering manpower requirement of the country. The steering committees and working groups set-up in seventees for the purposes of fourth & fifth five year plans, also took recourse to carryout adhoc studies by different organisation like I.A.M.R., D.G.E. & T and C.S.I.R. It is, therefore, clear that none of the engineering manpower exercise done so far is based on regular time series data which is essential for developing a continuous and regular basis for manpower planning. Various adhoc committees, working groups and steering groups carried out the following studies.

1) Scientific Manpower Committee 1947

2) Rivers valley projects Technical Personnel Committee 1954

3) Engineering Personnel Committee 1956

4) Working group on Technical Education and Training 1959

5) Technical Manpower Committee 1962

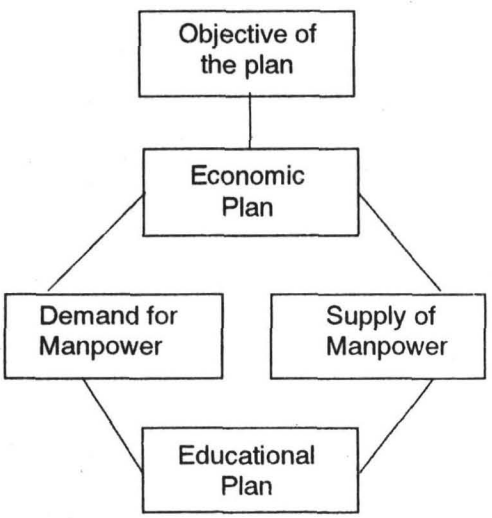
6) Sub-group on Manpower 1968

All these studies had a limited objectives, they had not taken into account the whole gamut of technical manpower. Each study had their own limitations. It is not intended to explain them in detail in the present paper. In absence of a suitable data base on factors governing demand for and supply of engineering personnel, the 'hide and seek' sort of situation persisted. Any manpower planning in absence of a data base, hence, becomes a search in darkness and void.

Importance of Manpower Planning :

As all of us know India is a labour surplus economy. In this surplus situation manpower planning is too vital a subject to be left to the manpower planning alone and it should be an integral part of economic planning. The following simple model will indicate how manpower planning can be integrated with economic planning.

Interlinkages of Economic Plan, Manpower Plan & Educational Plan :



It is a fact that Manpower Planning is an integral part of Economic Plan. Once the Economic plan is formulated, it can be translated in terms of manpower requirements, or demand with the available supply, decisions regarding setting up new educational institutions or increasing the intake capacity can be taken. This means manpower planning takes its blood and flesh from educational planning. The Educational Plan determines the future supply. Thus, it is seen that there should be a proper equilibrium amongst these three factors viz. Economic Planning, Manpower Planning & Educational Planning.

Manpower Planning has both static and dynamic aspects. The static part relates to accountability factors, in other words, would imply quantitative estimation of demand and supply in order to chalk out a consistent plan. At the same time there is a dynamic aspect which deals with qualitative changes such as changes in skill requirements, productivity changes, changes demanded by rapid technological transformation. In other words, skill have to be identified both qualitatively and quantitatively, thus making it obligatory to review the educational programmes continuously and modified to match the needs.

NTMIS Background :

Considering the importance of Manpower Planning especially in the field of technical education, in November 1977, the Ministry of Education and Social Welfare, Government of India, set up a Working Group on Technical Education for reviewing the present status of the nation's needs during the coming decade and for suggesting reorientation and improvements in the existing programmes. The working group interalia considered the question of

national manpower survey in all its aspects and observed that a reliable information system is a pre-requisite to planning specially in the field of technical education and training. It was further observed that in the absence of upto date and meaningful manpower information, it was not possible to anticipate the areas of growth in the field of science and technology. The working group, therefore, recommended the establishment of a National Technical Manpower Information System (NTMIS). The All India Council for Technical Education at its meeting held in February 1978, endorsing the recommendation of the working group resolved that for assisting technical education planning a NTMIS should be established with a lead centre in the Institute of Applied Manpower Research and 17 Nodal Centres all over the country for storage, updating, retrieval and analysis of manpower information.

Accordingly, the National Technical Manpower Information System has been set up for providing uptodate and meaningful manpower information on a continuing basis to enable the concerned authorities to anticipate areas of growth in the field of science and technology and consequently plan for technical manpower development on proper lines. According to the scheme approved by the Government of India, the NTMIS comprises a Lead Centre in the IAMR, a Manpower Information Cell in the Ministry of Education, 17 Nodal Centres in the selected higher institutes of engineering and technology and four Nodal Centres in the Regional Boards of Apprenticiceship Training under the Ministry of Education.

The inter-department committee consisting of members from the Ministry of Education and Social Welfare, Planning Commission and the I.A.M.R. was set up for developing the structure of the system. The committee adopted the following as the objectives of the National Technical Manpower Information System:

(a) Estimation of short-term and long-term requirement of different categories of engineering and technical manpower.

(b) Estimation of supply of different categories of engineering and technical manpower on the basis of the existing intake and outturn figures.

(c) Assessment of anticipated gaps in demand and supply position presently and in the future years.

(d) Collection and analysis of data to match the job requirements with fascilities for education and training.

(e) Undertake studies for assessment of future needs and for giving indication about the specialised areas and fields requiring urgent attention in respect of expansion of facilities for education and training.

To achieve this end, the system would perform three basic functions, i.e. (a) storage of information (b) updating and dissemination of the stored information and (C) retrieval of stored information for undertaking various studies to make assessment and forecasts.

Objectives & Coverage

The Lead Centre at the Institute of Applied Manpower Research is concerned with the following :

1 Developing insights and suggestions regarding the type of data to be collected, the format for collection of

the data, methodology for processing of data etc.

2 Coordinating the functions of all the Nodal points and final processing of the data

3 Organising collection of data from all Nodal points and final processing of the data and

4 Conducting in a routine manner varieties of analytical studies for developing insights, ideas and concepts so that the information system succeeds in providing answers to the questions sought from it.

The Nodal Centre is concerned with collection of data and the preliminary processing of data as would make it suitable for further processing in a computer. The Nodal Centres have been selected at such centres in the states which have significant concentration of industrial activity. This would help considerably in collection of data. They are expected to undertake analytical works, wherever required, so that with the data collected within a State and the preliminary work carried there in, a first level module of the national manpower information sytem is to be formed in each state. In other cases also, the information system would be so organised as to make the individual states independent modules so that at any point of time the information system could answer questions raised at the level of the state.

The Regional Boards of Apprenticeship Training would be generally concerned with collection of data from the industrial establishments. Preliminary processing of data like other Nodal centres could also be undertaken by the Boards.

At present, data are being gathered from three types of respondents namely : graduates of degree and diploma institu tions, engineering educational institutions and establishments (both in public and private sectors). The analysis of the data would help in developing a number of relevant indicators (both analytical and monitor). Study of changes of the value of these indicators (both in absolute sense and relative to others) would provide answers to most of the above said questions. For example the data gathered from graduates from degree and diploma institu tions would focus on -

i) Structure of labour market for degree and diploma holders in engineering ;

ii) Activities status of a particular batch of engineering degree and diploma holders two years after the publication of the results ;

iii) Rates of absorption of engineering graduates disciplinewise ;

iv) Migration - For education and employment subject wise ;

v) Unemployment among engineering graduates subject wise ;

The data collected from engineering educational institutions would give details ;

i) Number of institutions, sanctioned seats, actual intake, enrolment, outturn, number of teachers ;

ii) Teacher-Pupils ratio ;

iii) Arrangements for continuing education;

iv) Expenditure of Technical Education ;

v) Consultancy activities;

The data collected through establishment questionnaires would highlight :

i) Changes in total employment ;

ii) Changes in engineering employment ;

iii) Changes in skill composition of work-force ;

iv) Changes in employment of practicals in engineering posts ;

v) Changes in investments ;

vi) Changes in value of production ;

vii) Number of unfilled vacancies for each categories of engineers ;

viii) Total turn over ; and

ix) Plan for expansion.

The specific questions that are asked regarding demand for and supply on technical manpower are expected to be answered by analysing the changes in the indicators that will be developed through the data collected under the scheme.

Nodal Centre, V.J.T.I., Background

1.7 The present Nodal Centre was established in June 1986 after it was carved out from the Board of Apprenticeship Training, Western Region, Bombay. This Centre is entrusted the work of carrying out institutional survey and students follow up study beginning from 1983-84 and 1982 respectively. This institutional study 1983-84 and students follow up study 1982 was taken up.

Study 1982-85

Since the Government of Maharashtra had done a massive expansion in the field of engineering and technological institutions from 1983-84 onwards, this centre undertook a review of identifying all institutions and outturn from various sources mainly publica- tions brought out by the Directorate of Technical Education, M.S., Bombay and Education and Employment Dept. of Mantralaya, Bombay and finally for 1983-884 this Centre had identified 58 colleges and higher institutions and 140 polytechnics in the State of Maharashtra and 100 percent coverage was attempted, in respect of colleges 100 percent institution are covered and in respect of polytechnics 136 were covered, as two were found to be closed and two did not respond despite repeated efforts. So the Percentage coverage was 97 which is quite appreciable.

The outturn of students identified was (1) Degree-2795 (2) Diploma-5671 (3)Post graduate-423 (4)Post graduate diploma-135 & (5)Post Diploma-109. In addition to above, the Board of Apprenticeship Training, Bombay covered 654 establishments. The analysis of the above data is over and final report is published. Its findings are given below in nutshell.

The data are organised to monitor a variety of parameters which are crucial in the choice of the following decision options at State and National levels in respect of each course like Civil, Mechanical, Electrical etc. and its level-Degree, Post graduate and diploma etc.

(a) Need for immediate expansion or curtailment facilities.

(b) Need for reviewing the position keeping in view the future socioeconomic conditions of the area.

(c) Need for continuing the important parameters of each course and level being monitored are :

(1) The rate of absorption per year in gainful emmployment in the state.

(2) Speed of absorption.

(3) Current backlog of unemployment in the state.

(4) The rate and the direction of change of unemployment in the State.

The data bank is also holding relevent data for concretizing the decision process. The data which are necessary for reviewing the intake/enrolment relations in respect of each course of education, and in particular, for determining the magnitude of necessary change will also be kept in the State Level Data Bank which can be used by the State Educational administrators.

Conclusions of students follow up study 1982

The data furnished by the students, follow up survey have been analysed in two ways. Firstly, the rates of their absorption were worked and also time taken by them in finally getting the job was also studied. Secondly, on the basis of data gathered, the year wise rates of absorption rates were applied to the engineering graduates and diploma holders available for employment pertaining to the graduates of 1982, 1983, 1984 & 1985 batches. This yielded number of fresh engineering graduates and diploma holders likely to have been employed during the year 1986, by subtracting this number of employed engineers and diploma holders available for employment, the size of unemployment was estimated.

Absorption rates

The table number 1.1 & 1.2 indicate the rates of absorption in case of Graduates & Diploma holders.

Estimates of Unemployment

(I) Absorption rates: Table 1.3 & 1.4 indicate total absorption during 1986, the estimated unemployment at the end of 1986 and outturn available for employment for Graduates and Diploma hold ers. An attempt is also made to identify appropriate decision options for different courses of education at various levels and appropriate remark is indicated in remarks coloumn.

On the basis of analysis of absorption rates, it was observed that in the case of:

(1) Graduates The following discipline had 100 percent absorption rates during 1st year itself:

(a) Instrumentation (b) Plastic Tech. (c) Civil Engg. (d) Textile Chemistry

They had more than 80 percent absorption rate in the first year.

Out of twenty one disciplines studied, only students of three disciplines viz. (i) Pharmacy (ii) Food Technology & (iii) Petro chemical Technology had to wait for absorption upto 3rd year but the percentage

of such students was less than twenty percent.

(2) Diploma Holders : Out of twenty two disciplines studied, it was observed that in almost all disciplines, more than 50% students were absorbed in the 1st year itself. In case of (a) Pharmacy (b) Man made Textile 10 percent or less had to wait for absorption upto the 4th year.

(II) Size of unemployment : Table numbers 1.3 & 1.4 indicate the size of unemployment at the end of 1986, rate of absorption in 1986 and estimated outturns of 1983, 1984 & 1985. In remarks column probable remarks are also given for each speciality. However they will have to be critically examined. No final conclusion can be drawn on single year study.

The Nodal Centre has completed second round of study (1983-86) and data is being processed. Now two rounds (1984-85) and 1988-91 are launched simultaneously. On the basis of this time series, demand and supply for 8th plan & beyond will be estimated.

Reference : Annual Technical Manpower Review (1982-85) published by Nodal Centre V.J.T.I. Matunga - Bombay.

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Table 1.1

Statement showing the Absorption Rate of Engineering Graduates in Maharashtra State based on students follow-up survey of 1982 batch.

Sr.No.	Discipline	Absorption Rate			Remarks
		Ist Year	IInd Year	IIIyear	
1.	Civil Engg.	87.22	12.70	--	
2.	Mechanical Engg.	71.2	28.8	--	
3.	Electrical Engg.	80.5	19.5	--	
4.	Metallurgy Engg.	80.8	19.2	--	
5.	Chemical Engg.	71.1	28.9	--	
6.	Production Engg.	78.3	21.7	--	
7.	Aeronautical Engg.	60.0	40.0	--	
8.	Instrumentation	100.00	--	--	
9.	Textile Mfg.	73.0	27.0	--	
10.	Electronics & Telecom.	70.8	29.2	--	
11.	Pharmacy	44.7	37.6	17.7	
12.	Architecture	79.6	20.4	--	
13.	Textile Chemistry	86.6	13.4	--	
14.	Food Technology	50.3	31.3	18.4	
15.	Oil Technology	66.0	34.0	--	
16.	Paint Technology	78.0	22.0	--	
17.	Plastics Technology	100.0	--	--	
18.	Petro-chemical Tech.	64.0	22.0	14.0	
19.	Pharm-Fine Chemical Technology	100.0	--	--	
20.	Cellulose Technology	74.0	26.0	--	
21.	Intermediates & Dyes				

Table 1.2

Statement showing the Absorption Rate of Engineering Diploma Holders in Maharashtra State based on students follow up survey of 1982 batch.

Sr.No.	Discipline	Absorption Rate				Remarks
		Ist Year	IInd Year	III Year	IV Yr.	
1.	Civil Engg.	77.9	22.1	--	--	
2.	Mechanical Engg.	65.8	34.2	--	--	
3.	Electrical Engg.	59.2	40.8	--	--	
4.	Metallurgy Engg.	66.7	21.2	12.1	--	
5.	Chemical Engg.	72.7	27.3	--	--	
6.	Production Engg.	78.7	21.3	--	--	
7.	Civil & Rural Engg.	63.9	36.1	--	--	
8.	Plastic Engg.	90.9	9.1	--	--	
9.	Sound & T.V. Engg.	54.5	45.5	--	--	
10.	Textile Mfg.	82.5	17.5	--	--	
11.	Textile Design	83.4	16.6	--	--	
12.	Electronics & Telecomm.	64.7	35.3	--	--	
13.	Industrial Electronics	67.5	22.5	10.0	--	
14.	Electronics & Radio Engg.	75.8	24.2	--	--	
15.	Man made Textile Chemistry	72.1	16.0	11.9	--	
16.	Man made Textile Technology	27.0	23.0	13.0	7.0	
17.	Food Technology	55.6	44.4	--	--	
18.	Surface coating technology	50.3	49.7	--	--	
19.	Leather Technology	78.1	21.9	--	--	
20.	Hotel Management & Catering Tech.	97.5	2.5	--	--	
21.	Pharmacy	38.7	28.4	22.9	10.00	
22.	Architecture	88.1	11.9	--	--	

Table 1.3

Statement showing the total absorption during 1986 the estimated Unemployment at the end of 1986 and outturn (available for employment) of graduates in engineering by Discipline.

Sr. No.	Discipline as per order of absorption.	Total absorption during 1986	1983	1984	1985	Size of Umemployment at the end of 1986 (excluding 1986 outturn)	Remarks
1.	Civil Engg.	614	574	548	624	80	Adequate
2.	Mechanical Engg.	642	655	647	640	100	Adequate
3.	Electrical Engg.	511	522	495	514	184	Adequate
4.	Metallurgy Engg.	83	60	78	84	16	Adequate
5.	Chemical Engg.	138	142	146	135	39	Adequate
6.	Production Engg.	44	47	44	43	9	Adequate
7.	Aeronautical Engg.	14	7	7	18	7	Adequate
8.	Instrumentation	35	33	38	35	--	Review
9.	Textile Mfg.	20	24	24	19	5	Adequate
10.	Electronics & Telecomm.	73	50	51	83	25	Scope for Expansion
11.	Pharmacy	132	148	163	158	116	Review
12.	Architecture	113	92	125	110	22	Adequate
13.	Textile Chemistry	27	30	26	28	4	Adequate
14.	Food Tech.	15	14	16	14	10	Scope for Expansion
15.	Oil Technology	13	14	13	13	4	Adequate
16.	Paint Technology	9	7	9	9	2	Review for Expansion
17.	Plastic Tech.	8	8	10	8	--	Review for Expansion
18.	Petro-chemical Tech.	9	15	11	11	6	Refiew for Expansion
19.	Pharm. Fine Chemical Tech.	18	12	11	18	--	Review for Expansion
20.	Cellulose Tech.	6	8	8	8	2	Review for Expansion
21.	Intermediates & Dyes	14	13	8	14	--	Review for Expansion
	Total	**2538**	**2475**	**2478**	**2586**	**631**	

Table 1.4

Statement showing the total absorption during 1986 the estimated unemployment at the end of 1986 and outturn (available for employment of Diploma Holders in Engineering by Discipline.

Sr. No.	Discipline as per order of absorption	Total absorp-ption during 1986	1983	1984	1985	Size of Unemploy-ment at the end of 1986 (exclud-ing 1986 outturn)	Remarks
1.	Civil Engineering	1649	1662	1601	1663	368	Adequate
2.	Mechanical Engg.	1271	1305	1283	1264	432	Review
3.	Electrical Engg.	1104	1206	1091	1114	455	Review
4.	Metallurgy Engg.	49	68	55	43	20	Review
5.	Chemical Engg.	24	45	28	22	6	Adequate
6.	Production Engg.	86	79	77	89	19	Adequate
7.	Civil & Rural Engg.	333	263	290	372	134	Review
8.	Plastic Engg.	22	53	25	22	2	Adequate
9.	Sound & T.V. Engg.	30	36	40	22	2	Adequate
10.	Textile Mfg.	46	54	46	46	8	Adequate
11.	Textile Design	7	4	10	6	1	Adequate
12.	Electronics & Telecomm.	21	21	21	22	8	Review
13.	Industrial Electronics	114	65	120	165	66	Review
14.	Electronics & Radio Engg.	145	111	193	129	31	Review
15.	Man Made Textile Chemistry	66	66	66	66	25	Review
16.	Man Made Textile Technology	74	80	78	75	54	Review
17.	Food Tech.	19	20	14	24	11	No Expan.
18.	Surface coating Tech.	30	27	33	27	13	Review
19.	Leather Tech.	4	5	4	4	1	Adequate
20.	Hotel Management & Catering Tech.	114	110	127	114	3	Scope for Expan.
21.	Pharmacy	615	668	755	852	1001	No Scope for Expan.
22.	Architecture	127	102	101	130	15	Adequate
	Total	**5980**	**6050**	**6058**	**6271**	**2683**	