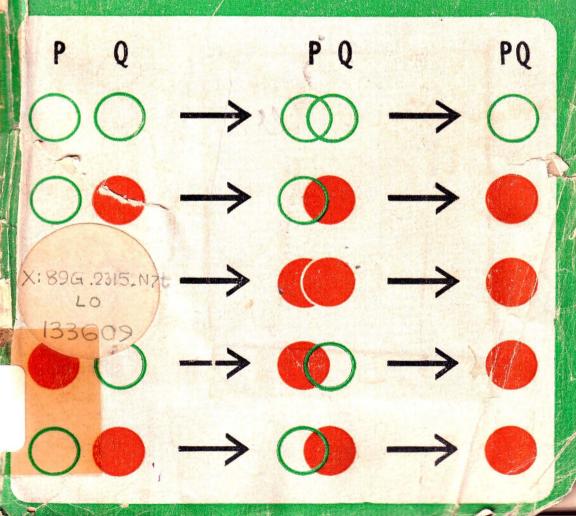


# REPORT OF THE WORKS STUDY TEAM ON AUTOMATION (OFFICE AUTOMATION) IN MAHARASHTRA, STATE





GOVERNMENT OF MAHARASHTRA INDUSTRIES & LABOUR DEPARTMENT

REPORT of the WORKS STUDY TEAN. on AUTOMATION (OFFICE AUTOMATION) IN MAHARASHTRA STATE

## CONTENTS

CHAP	TEB						PAGE
	Composition of Study Ter	.m		••		•••	i
	Contents of Chapters	••	••	••	••		iii
	Contents of Tables	••	••	••	••	••	viii
	Contents of Annexures	••	••	••	••	••	xi
	Contents of Appendix	••	••	••	••	••	xi
1.	PRELIMINARY	·· ,	••		••	••	1
2.	AUTOMATION : ITS NAT	URE AND	SIGNIF	ICANCE	••	••	12
3.	COMPUTERISATION IN	MAHARASI	HTRA	••	••		26
4.	PERSONNEL IN THE E.	D. P. DEI	ARTME	NT	•••	••	64
5.	IMPACT OF COMPUTE MANAGEMENT.	RIZATION	-WORK	ORGA	NIZATION	AND	74
6.	IMPACT OF COMPUTER	SATION-	EMPLOY	MENT A	SPECTS	••	81
7.	HIRING OF COMPUTER	TIME	••	••	••	••	1ú9
8.	STATUS OF DATA PR MACHINES (U.R.M.).	OCESSING	EQUII	PMENT	UNIT RI	ECORD	119
9.	COMPUTERISATION : E	CONOMIC A	AND SO	CIAL CON	NSEQUENC	ES	156
10.	FUTURE OF COMPUTER	S		••	••		166
11.	SUMMARY OF FINDING		TOT TISTO	NR			176

## THE WORKS STUDY TEAM ON AUTOMATION IN MAHARASHTRA STATE

Appointed on : October 10, 1968

**COMPOSITION** 

#### **MEMBERS**

Prof. P. N. Mathur Prof. N. S. Ramaswamy Dr. L. S. Kanodia Dr. V. G. Mhetras

#### MEMBER-SECRETARY

Shri P. J. Ovid

Note.-Other Members associated with the work of the Study Team were

Prof. D. B. Sardesai Dr. M. V. Kirloskar

Report Signed on : 16th April 1970

1.	PRELIMINARY	PAGE
	•	-
	Our Constitution	1
	Our Terms of Reference	1
	Our Procedure	2
	Our Meetings	5
	Meetings with various Parties	6
	Meetings with the Representatives of the Unions Operating in E. D. P. Establishments.	6
	Meetings with the Representatives of the Organisation of Employers and Workers.	6
	Principal Decision taken by us during Our Meetings	7
	Deliberations with various Parties	- 8
	Literature on "Automation"	9
	Our Acknowledgements	, 9
	5	10
	Time Limit for sumbmission of our Report	10
2.	AUTOMATION: ITS NATURE AND SIGNIFICANCE	
	The Beginnings	12
	Two Aspects of Production Process	12
	The Meaning	12
	New Way of Thinking	12
	Second Industrial Revolution	13
	Third Phase	13
	Labour and Automation	13
	Three Forms	13
	The Computer	14
	Computers Operations	14
	Growth of Computerisation	14
	Information System	15
	Information Communication	15
	Management Information System (MIS)	15
	A Powerful Tool	16
	Two Categories	16
	Types of Computers	17
	Size of Computers	17
	Indigenous Computer Makers	17
	Developments	18
	Inevitability	19
	Challenge of Change	20

2.

3.	COMPUTERISATION IN MAHARASHTRA	PAGE
	Current Status	26
	Economic Sectors	27
	Volume of Business	27
	Input-Output Devices	29
	Cost of Computerisations	34
	Total Investment	34
	Major Objectives	37
	Feasibility Studies	39
	Labour's Response	40
	Time Lag	41
	Uses of Computer	43
	Job priorities	41
	Job Applications	4 <del>1</del>
	Minor Job Applications	45
	Utilization of E.D.P. Facilities	49
	Selling Computer—Time	51
	Current Utilization	52
	A Special Study	58
	Fuller Utilizaton	60
4.	PERSONNEL IN THE E.D.P. DEPARTMENT	
	Recruitment	65
	Computer Programmers and Systems Analysts	66
	From U.R.M. to E.D.P.	- 67
_	Condition of Service	69
	Economic Benefits	69
	Criteria for Selection	72
5.	IMPACT OF COMPUTERIZATION—WORK ORG MANAGEMENT	
`	Advantages to Employees	74
	Working Conditions	74
	Occupation Nature	75
	Conditions of Service	76
	Advantage to Managemen	77
•	Personnel Criteria	79
6.	IMPACT OF COMPUTERIZATION—EMPLOYMENT ASPECTS	
	The Implications	81
	Analysis by Results	86
	'Span' and' Speed' of Automation	90
	Adjustment Programmes for Displaced Personnel	105
,	The Indian Scene	106
	Recruitment in Future	108

•

iv.

7.	HIRING OF COMPUTER TIME	PAGE
1.		109
		109
		110
	Job Applications Utilization of Computer Time	110
	Training of Personnel	114
	Impact on Employment	114
	Impace on Employment	115
8.	STATUS OF DATA PROCESSING EQUIPMENT—UNIT RECORD MACHINES (URM)—	
	Survey of URM	119
	Legal Status	120
	Volume of Business	120
	Financial Commitment	121
	The Objectives	124
	Understanding with Labour	126
	Installation of URM	127
	The Time Lag	129
	First Production Run	129
	Current URM Applications	131
	Branches Using URM Facility	134
	URM Workload	136
	Utilization of URM	136
	URM Personnel	138
	Employment Trends	141
	Individual Peculiarities	148
	Overall Trends	148
	Alternative Approach	149
	Overall Picture	· 150
	Staff Adjustment	150
	THE REAL PRONOUTO AND DOUTLY CONDECTIONS	
9.	COMPUTERISATION : ECONOMIC AND SOCIAL CONSEQUENCES	•
	Changing Economic and Social Relations	156
	Optimum Resource Utilization	156
	Capital Investment	157
	Social Productivity	157
	Limiting Factors	158
	Impact of Computerisation	158
	Gradual Spread	158
	A Seemy Side	159
	Manpower Effects	159
	Labour's Protest	160
	Issues Involved	160

9.	COMPUTERISATION-con	td.			PAGE
	Unfavourable Reactions	••			161
	Our Assessment	••			162
	Picture of Maharashtra	••			162
	Future Recruitment	••			164
	Inter-State Effects of Au				164
	Extent of Computerization	n			164
	Computer Application	••			164
	Computer—Utilization	••			165
	Our Observations	••			165
10.	FUTURE OF COMPUTER	RS			
	Indigenous Experiments				166
	A few Estimates	••			166
	The Current Situation	••			167
	The Perspective ≺	••			167
	Computer Environment	••			168
	Unlike Situations	••			168
	Labour's Look	••			169
	Labour-Management Fri	ction			169
	The Union's Plea	••			170
	Some Suggestions	••			170
	Institutional Set-up	••			171
	Meeting Ground	••			171
	World of Computers	••			171
	The Changing Role	••			172
	A Fundamental Change				172
	In 1970s	••			172
	Towards Centralised Com	puter Syster	n	••	172
11.			NCLUSIO	NS	
	Technological Development	nts	•• .	••	176
	Meaning of Automation	••	••	• •	176
	The Computers	••	••	••	176
	The Growth	••	••	••	176
	Inevitability	••	••	••	177
	The Computer-Scene in M	faharashtra		••	177
	Major Objectives	••	••	••	177
	Installing of Computers		••	••	178
	Nature of Computerisatio		••	••	178
	Character of Applications		••	••	178
	Branch Offices and Comp	uter Facility	7	••	179
	Extent of Computer-uti	lization	••	••	179

vi

•

#### 11. SUMMARY OF FINDINGS AND CONCLUSIONS-contd.

Employment in EDP Dep		••	••	••	••	179
Conditions of work and se	ervice	••	•••	••	••	180
Training Aspect	••	••	•••	••	••	180
Effects on Work Organisa	tion	••	••	••	••	180
Advantages to Managemen	nt	••	••	••	••	181
Impact on Labour	••	••	••	••	• •	181
Employment Situation	••	••	••	••	••	181
Indicative Trends	••	••	••	••	• •	182
Methods of Adjustment	••	••	••	••	••	182
Hiring of Computer Time		••	••	••	••	183
Employment Aspects	••	••	•• .	••	••	183
URM Sector	••	••	••	•• •	••	18 <del>4</del>
The Investment	•• .	••	••	••	••	184
The Objectives		••	••	••	••	184
Developments	••	••	••	••	••	184
Job-Applications	••	••	••	••	••	185
Level of Utilization	••	••	••	••	••	185
Some Features	••	••	••	••		185
Employment Side	••	••	••	••	••	186
Manpower-Adjustments		••	••	••	•• •	186
Economic and Social Cons	equences	(of Office-	Automation	1)	••	186
Capital Investment	••	••	••	••		186
Some Arguments			••	••	••	187
Manpower Effects	••	••	••	••	••	187
Labour's Look	••	••	••		••	188
A Few Reactions	••	••	••			188
Institutional Arrangement	8		••	••		189
Some Implications	••	••	••	••	••	189
The Meeting Ground			••	••	••	189
Employment Equilibrium			••	••	••	190
A Different Context		••	••		••	190
Compulsive Element						191
Spread in Maharashtra		••	••			191
Some Indications	••	••			••	192
Inter-State Impact						192
Certain Implications				••	••	193
Self-Reliance			••		••	193
Overall Picture	••		••	••	••	193
The Prospects	••	••		••	••	194 194
Selective Automation			•• •	••	••	
Towards the Future	••	••	••	••	••	195 196
TOMBINE ING LUCIO	••	••	••	••	••	190

vii

.

## CONTENTS OF TABLES

Table No.		PAGE
	The second	
•	Types of Questionnaires	4
	Our Meetings	5
	Meetings with EDP Managers	6
	Meeting with Representatives of Unions Operating in EDP Establish- ments.	6
	Meeting with Representatives of Organizations of Employers and Workers.	6
2 <b>A</b>	Trend of the Number of Computers in use in Western Europe (1959-1971).	19
3A	Current Status of Electronic Computers (in India)	26
3B	Classification of Organizations having Electronic Computers	27
3C	EDP Installations in Maharashtra by Volume of Business	28
3D	Input Output Devices and Off-Line Equipment in use by EDP Installations.	<b>3</b> 0
3E	Number of Organizations Having Input Output Devices and Off-Line Equipment.	32
<b>3F</b>	Total Investment and Running Expenditure on Electronic Computer.	36
3G	Major Objectives for Going in for Computers	38
<b>3H</b>	Understanding between the EDP Organizations and the Trade Unions.	40
3I	Years Elapsing between Installation of UR Machines and Computers.	41
3J	Months Elapsing between Installation of the Computer and First Production-Run.	42
3K -	EDP Organizations Currently Doing Selected Jobs on Computers by Usage of Computer—Time and Benefit Consideration	. 46
3Ka	EDP Organizations Currently Doing Selected Jobs on Computers by Usage of Computer—Time and Benefit Consideration.	48
3L	Branches Using EDP Facilities	50
3M	Number of Installations Giving Computer-Time on Hire to Outside Organizations.	51
3N	Classification of EDP Installations According to Current Utilization of Electronic Computers (in Relation to Established Goals of the Organizations).	53
<b>3</b> 0	Classification of EDP Installations According to Their Utilization (in Relation to the Established Goals of the Organization).	56
3P	Extent of Computer Utilization	59
3Q	Extent of Computer Utilization since Installation and Expected Time for Full—Utilization of Computer System.	62
<b>4</b> A	Percentage Distribution of Employees in Each Operational Category.	64
<b>4</b> B	Employment in EDP Department of Organizations	65
4C	Employment of Programmers and System Analysts at the EDP Installations.	66
4D	Men and Machines in UR Department at the Computer Installations.	68
4E	Conditions of Service of EDP Personnel	70
4F	Conditions of Service by Qualification and Range of Pay-Scales	71

#### CONTENTS OF TABLES

Table No.	· · · · · · · · · · · · · · · · · · ·	PAGE
5A	Impact of Computerization on Working Conditions	75
5B	Impact of Computerization on the Occupational Nature in the Organization.	76
5C	Change in Conditions of Service due to Introduction of EDP	77
5D	Impact of Electronic Computer on Decision-Making in the Organi- sation.	78
5E	Consequences of EDP Installation in Organization	· 80
6A	Office Employment in Maharashtra in Organizations Having EDP Installations (by Types of Organizations).	<b>84</b>
6B	Office Employment in Maharashtra in Organizations Having EDP Installations (Analysis by Results).	88
6C	Selected Jobs Currently Done on Computers by Way of Usage and Benefit Considerations.	92
6D	Selected Jobs Currently Done on Computers by Way of Usage and Benefit Considerations (Analysis by Time-Period).	98
6E	Office Employment in Maharashtra in Organizations Having EDP Installations (Analysis by Time-Period).	102
6 <b>F</b>	Methods of Adjustment of Displaced Staff in the Organization	107
<b>7A</b>	Year since the Organizations Started Using EDP Facilities	110
7B	Types of Jobs Done on a Computer on Hire-Time Basis	111
7C	Utilization of Computer on Hire Basis	112
7D	Consequences Due to Hiring of EDP Facilities	113
7E	Nature of Computer Department in Organizations Hiring EDP Time.	113
$7\mathbf{F}$	Personnel in Computer Unit or Department of Organizations Hiring Computer-Time.	114
7G	Office Employment in Organizations Hiring Computer-Time	116
8A	Response by Parties to G and H Questionnaires	119
8B	Classification of Organizations Having URM Installations	120
8C	URM Organizations in Maharashtra by Volume of Business	121
8D	Total Investment in Punched Card Machines	122
8E	Major Objectives for Going in for Data Processing Equipment	125
8F	Understanding with Labour Union	126
8G	Year of Installation of URM	128
8 <b>H</b>	Time-Lag Between the Dates of Decision and Installation of URM	130
۶I	Time Lag Between the Dates of Installation and First Production-Run on URM.	132

#### CONTENTS OF TABLES

Table No.		PAGE
8J	No. of Organizations (Users) Currently Doing Selective Jobs on UR Machines by Usage and Benefit consideration.	133
8Ja	No. of Organizations (Users) Currently Doing Selective Jobs on UR Machines by Usage and Benefit Consideration.	134
8K	Number of Branches Using URM Facility	135
8L	Use of UR Machines in Terms of Number of Cards Used Per Month	137
8 <b>M</b>	Utilization of UR Machines	138
8N	Number of Personnel in URM Departments	139
80	Number of Personnel in URM Departments	140
8 <b>P</b>	Effects of the Use of Data Processing Equipment	141
8Q	Office Employment in Maharashtra with UR Equipment Installed Before 1960.	142
8R	Office Employment in Maharashtra with UR Equipment Installed Between 1960-64.	142
8S	Office Employment in Maharashtra with UR Equipment Installed Before 1960 (Analysis by Results).	144
8 <b>T</b>	Office Employment in Maharashtra with UR Equipment Installed Between 1960-64 (Analysis by Results).	146
8U	Method of Adjustment of Displaced Staff	150
9A	Employment Situation in Maharashtra	163

**X** 

### CONTENTS OF ANNEXTURES AND APPENDICES xi

	ANNEXTURES		PAGE
2(i)	Automation as a Concept: Viewpoints		20
2(ii)	Computers : Terminology	••	24
8(i)	A Note on Automation and Application of Computers	••	151
10(i)	A Centralised Tele-Process Time Sharing Computer vs. B Processing Computer System.	udget	173

	APPENDICES	PAGE
I	Government Resolution	198
II	Extract from Speech by Mr. Tidke, Minister for Labour, Government of Maharashtra.	199
IIa	National Commission on Labour: on Automation and Computerisa- tion (A Selective Approach).	201
III	Names of the Parties replying to Questionnaires of the Study Team $\dots$	202
IV -	Selected Bibliography of Books and Reports	206
v	Questionnaires	211