

Principal Component Analysis

The Principal Component Analysis is a multivariate choice method. This approach develops a composite index by defining a real valued function over the relevant variables objectively. Given a set of explanatory variables, if we have to select the most important variable or a limited number of variables from the set, Principal Component Analysis helps. The principle of this method lies in the fact that when different characteristics are observed about a set of events, the characteristic with more variation explains more of the variation in the dependent variable compared to a variable with lesser variation in it. Therefore, the issue is one of finding weights to be given to each of the concerned variables. Weight to be given to each of the variables is determined on the principle that the variation in the linear composite of these variables should be the maximum. Once the weight to be given to each of these variables is decided, we can focus on the important variables in order to reduce the noise in the data. A set of assumptions has been used in our method of construction of a composite index. These are:

- the condition of weak pareto rule demands that when a state registers values of indicators uniformly higher than those of the other - the former should have a higher ranking than the latter ones;
- the condition of non-dictatorship implies that no single indicator should be considered so significant as to determine the final ordering all by itself;
- the condition of unrestricted domain implies that the method should be capable of giving the final ranking for all possible data matrices;
- the final condition is that of independence from irrelevant alternatives, which demands that while ranking two, the decision must be guided by

the values of the indicators for these units under study alone and not by any other irrelevant phenomenon

Given these general assumptions, the composite index is defined as,

$$C_i = W_1x_{i1} + W_2x_{i2} + W_3x_{i3} + \dots + W_nx_{in}$$

$$\text{or, } C_i = \sum W_j x_{ij}$$

where C_i is the composite index for the i^{th} observation, W_j is the weight assigned to j^{th} indicator and x_{ij} is the observation value after elimination of the scale bias.

It is evident from the above formula that to compute the composite index two major components are to be known, i.e., the weights assigned to the indicators and the observation values after elimination of the scale bias for the available indicators. These two have been discussed below in detail.

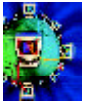
Elimination of scale bias

Variables chosen for any analysis are usually measured in different units and are generally not additive. Hence, it is necessary to convert them in some standard comparable units such that the initial scale chosen for measuring them do not bias the results. The method adopted to standardise the variable is

$$x_{ij} = (X_{ij} - X_m) / s$$

where, x_{ij} is the scale free observation, X_{ij} is the original observation and X_m is the mean of the series and s is the standard deviation.

The transformed series now would be scale free and



would have a mean of zero and a standard deviation of unity.

Assigning weights objectively using Factor Analytic Model

Once the bias of measurement is removed from the observations, the crucial problem that remains is that of assigning appropriate weights to the selected indicators. If one has sufficient insight into the nature and magnitude of inter-relationships among the variables and their implications, one might choose to determine the weights on the basis of independent judgement. This way of constructing an index stands exposed to subjectivity. Assigning equal weight (or no weight) would imply assumption of equal correlation of each indicator with the composite index of importance which would hardly be a realistic approach in this case. Therefore, in this analysis, the weights for individual indicators have been assigned on the basis of the factor analytic model.

Factor Analysis or Principal Component Analysis is a tool used to construct a composite index in such a way that the weights given maximise the sum of the squares of correlation (of the indicators with the composite index). The application of Factor Analysis in this specific case has been accepted in 'objective ranking' of the regions. This method enables one to determine a vector known as the first Principal Component or Factor, which is

linearly dependent on the variables, having the maximum sum of squared correlation with the variables.

The weights given to the indicators are chosen in such a way so that the Principal Components satisfy two conditions:

- The number of Principal Components are equal to the number of indicators and are uncorrelated or orthogonal in nature.
- The first Principal Component or P_1 absorbs or accounts for the maximum possible proportion of variation in the set of the indicators. This is the reason why it serves as the ideal measure of composite index.

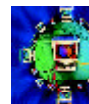
Method

Step 1 We start by taking the simple correlation coefficients of the k numbers of indicators. These correlation coefficients may be arranged in a table, which is called the correlation table. The elements of the diagonal would be unity as they are the self-correlated, i.e., the correlation of each X_i with itself ($r_{xi xi} = 1$ for all the i 's). The correlation matrix is symmetrical, i.e., the elements of each row are identical to the elements of the corresponding columns, since

$$r_{xi xj} = r_{xj xi}$$

Correlation Table of the set of K Variables

	X_1	X_2	X_3	X_k	$\sum_i^k r_{xi xj}$
X_1	$r_{x1 x1}$	$r_{x1 x2}$	..	$r_{x1 xk}$	$\sum_i^k r_{x1 xi}$
X_2	$r_{x2 x1}$	$r_{x2 x2}$	..	$r_{x2 xk}$	
"	
"	
X_k	..	..	..	..
"	$r_{xk x1}$	..	..	$r_{xk xk}$	
$\sum_i^k r_{x1 xj}$	$\sum_i^k r_{xi x1}$	$\sum_i^k r_{xi x2}$	$\sum_i^k r_{xi x3}$	$\sum_i^k r_{xi xk}$	$\sum_i^k \sum_1^k r_{xi xj}$



Step 2 Sum of each column (or row) of the correlation table is computed, obtaining k number of sums of simple correlation coefficient.

$$S_i^k r_{xi xj} = S_i^k r_{xi xj}$$

Step 3 We compute the sum total of the column (or row) sums-

$$S_i^k S_j^k r_{xi xj}$$

and we take its square roots.

Step 4 Finally, we obtain the factor loadings for the first Principal Component P_1 by dividing each column (or row) sum by the square root of the grand total.

$$a_{ij} = (S_i^k r_{xi xj}) / (\sqrt{S_i^k S_i^k r_{xi xj}})$$

It should be clear that the loadings thus obtained are the correlation coefficients of the respective indicator with the composite index.

Step 5 The P_1 or the first Principal Component is constructed in the following way

$$P_1 = a_{11} x_1 + a_{12} x_2 + \dots + a_{1k} x_k$$

Step 6 The sum of the squares of the loading of the Principal Component is called the latent root (or Eigen Value) of this component and are denoted by the Greek letter λ with the subscript of the Principal Component to which it refers. For example, the latent root of the first Principal Component P_1 is

$$\begin{aligned} \lambda_1 &= [\text{latent root of } P_1] \\ &= S_i^k \lambda_1^2 \\ &= \lambda_1^2 + \lambda_2^2 + \dots + \lambda_k^2 \end{aligned}$$

The sum of the latent root of all the Principal Components would be equal to the number of indicators:

$$S_i^k \lambda_i = k$$

The importance of the latent root or the eigen value lies in the fact that it expresses the percentage of variation in the set of indicators the Principal Component explains. If for example, $\lambda_1 = 2.797$ and the number of variables are 8, then the P_1 expresses -

$$\lambda_1 / k = (2.797/8) * 100 = 35\% \text{ of the variations of the set of 8 variables.}$$

Tests of significance of the loadings: the loadings in our study have been tested based on the levels of significance of the Pearson Correlation coefficients.

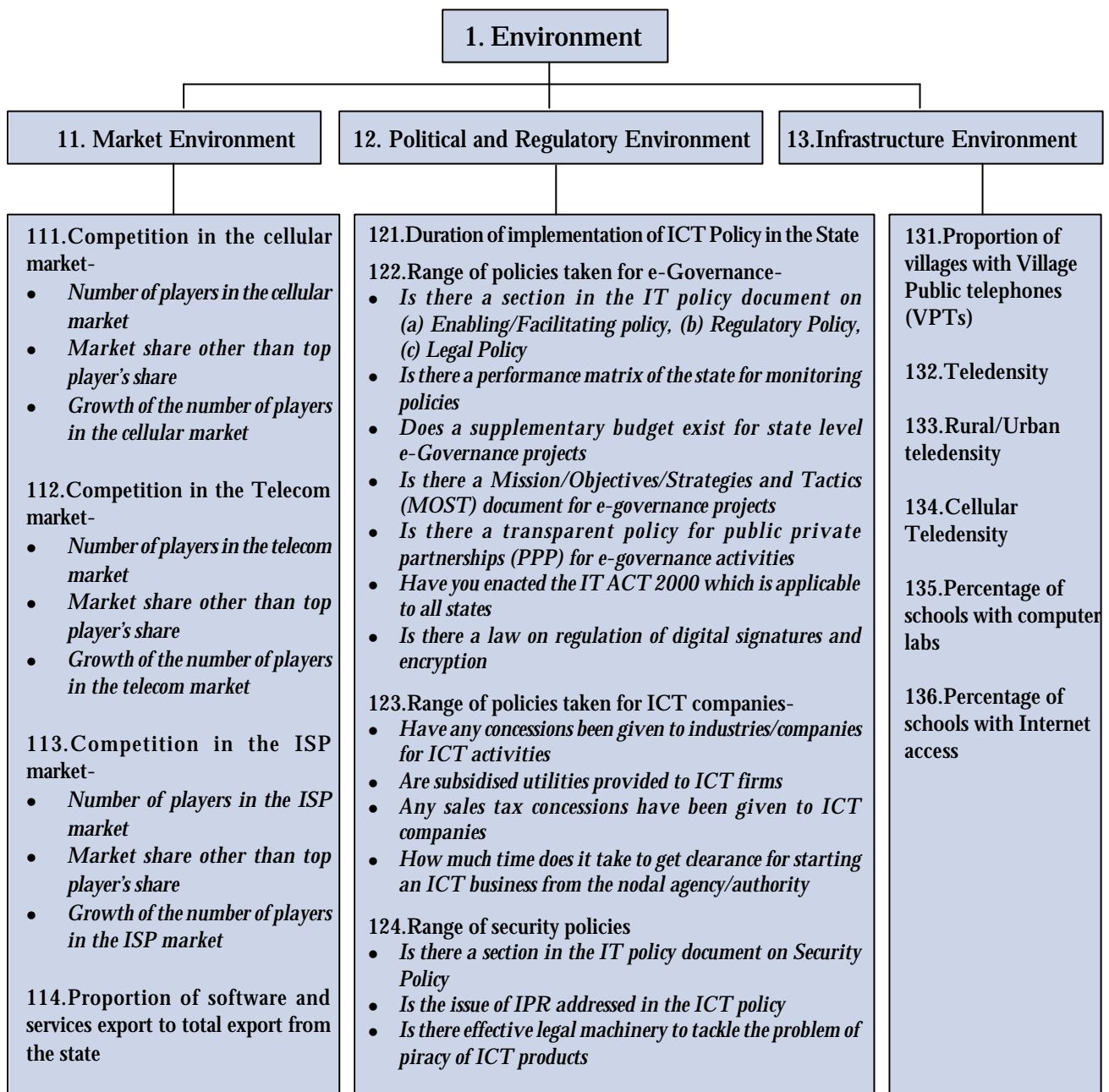
Multi-Stage Principal Component Analysis

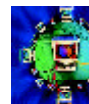
In this particular exercise, we have attempted a method of normal or single stage Principal Component Analysis as well as the multi-stage Principal Component Analysis. For performing the single stage Principal Component Analysis, all the indicators are taken together and the procedure discussed above is followed. In case of multi-stage Principal Component Analysis selected variables are divided into well-defined sub-groups depending on the nature of the indicators. Within a sub-group, they have a high degree of inter-correlation, while the canonical correlation between pairs of sub-groups is low on an average. The Principal Component Analysis has then been applied to each of these sub-groups of variables. The first Principal Components obtained from different sub-groups have been treated as a set of new variables and combined at a second stage to obtain the Final Composite Index. It has been argued that this method overcomes the necessity of taking more than one Principal Component in the analysis, since the correlation among the variables in a subgroup are generally high and consequently, the first Principal Component explains an 'adequate' proportion of the variation in the data matrix. However, the results are almost similar in both the procedure followed in this study which are discussed in the section where the results are analysed.



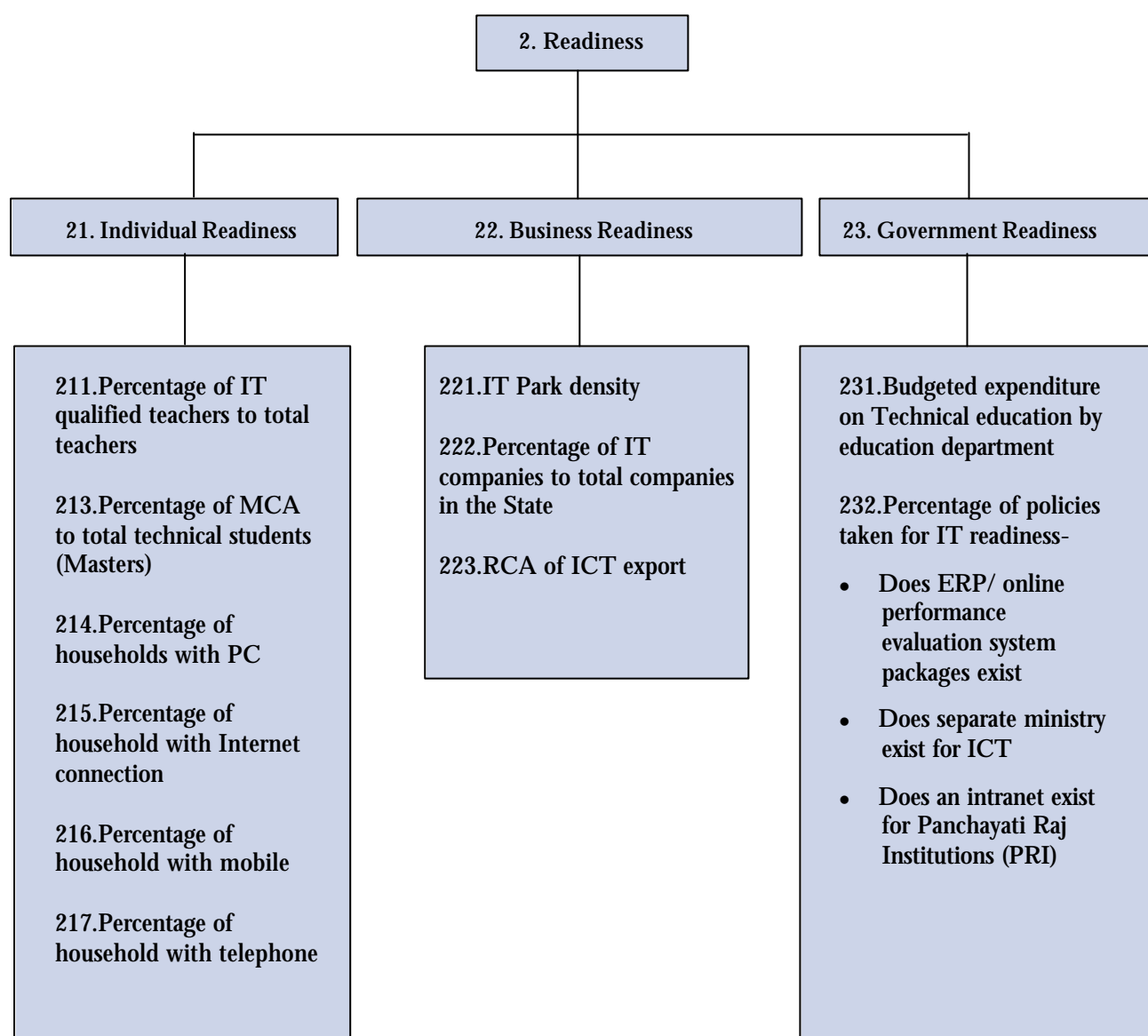
Flowchart of Major Category Indicators of e-Readiness

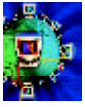
Flowchart of Environment



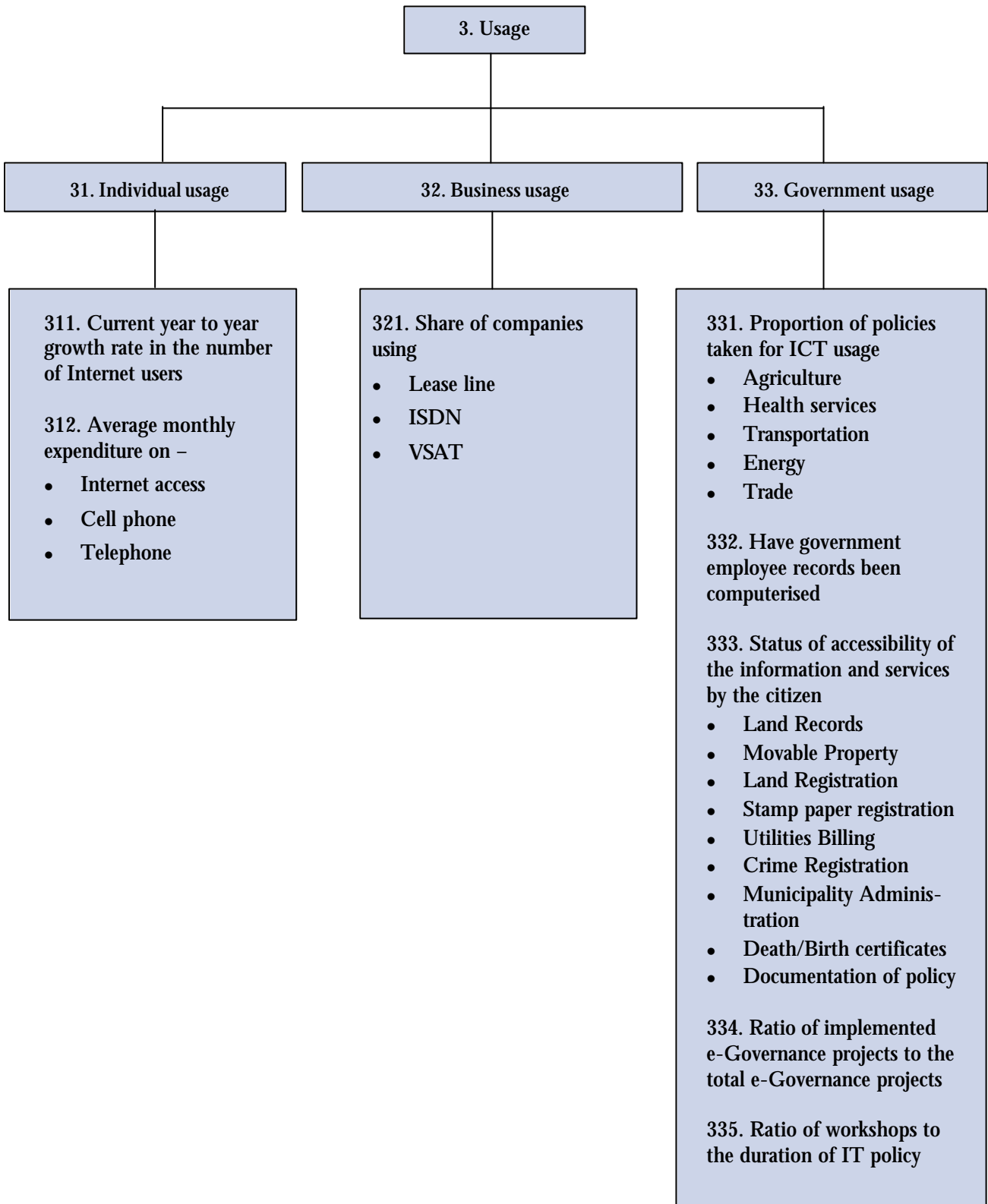


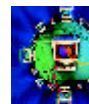
Flowchart of Readiness





Flowchart of Usage



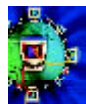


ANNEXURE III

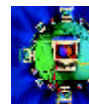
List of Indicators for State Level Assessment

Indicators for Environment

sub-major category	Minor category	Minor category Indicators of Significance
Market Environment	<p>Competition in the cellular market-</p> <ul style="list-style-type: none"> • <i>Number of players in the cellular market</i> • <i>Market share other than top player's share</i> • <i>Growth of the number of players in the cellular market</i> <p>Competition in the Telecom market-</p> <ul style="list-style-type: none"> • <i>Number of players in the telecom market</i> • <i>Market share other than top player's share</i> • <i>Growth of the number of players in the telecom market</i> <p>Competition in the ISP market-</p> <ul style="list-style-type: none"> • <i>Number of players in the ISP market</i> • <i>Market share other than top player's share</i> • <i>Growth of the number of players in the ISP market</i> <p>Proportion of software and services export to total export from the state</p> <p>Range of price charged for Internet connection(per 100 hours)</p>	<p>Competition in the cellular market-</p> <ul style="list-style-type: none"> • <i>Number of players in the cellular market</i> • <i>Market share other than top player's share</i> • <i>Growth of the number of players in the cellular market</i> <p>Competition in the Telecom market-</p> <ul style="list-style-type: none"> • <i>Number of players in the telecom market</i> • <i>Market share other than top player's share</i> • <i>Growth of the number of players in the telecom market</i> <p>Competition in the ISP market-</p> <ul style="list-style-type: none"> • <i>Number of players in the ISP market</i> • <i>Market share other than top player's share</i> • <i>Growth of the number of players in the ISP market</i> <p>Proportion of software and services export to total export from the state</p>
Political and Regulatory Environment	<ul style="list-style-type: none"> • Does IT policy exist? <ul style="list-style-type: none"> - When was the ICT Policy initiated? - How often is the ICT Policy revised? • Is there a section in the following sections: <ul style="list-style-type: none"> - Enabling Policy - Regulatory Policy - Legal Policy - Security Policy 	<p>Duration of implementation of ICT Policy in the State</p> <p>Range of policies taken for e-Governance-</p> <ul style="list-style-type: none"> • <i>Is there a section in the IT policy document on (a) Enabling/</i>



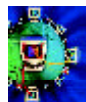
sub-major category	Minor category	Minor category Indicators of Significance
	<ul style="list-style-type: none"> • Is there a Performance Matrix of the state for monitoring policies? • Is the issue of IPR addressed in the ICT policy? • Is there effective legal machinery to tackle the problem of piracy of ICT products? • Does a state level action plan exist? • State e-Governance mission team (SeMT) been set up for e-Governance projects? • Is there a transparent policy for public private partnerships (PPP) for e-Governance activities? • Has the government given support to ICT in way of initiatives, priorities, policies and interests? • Time taken to get clearance for starting an ICT business • Does a supplementary budget exist for state level projects? • Has an e-Governance committee been set up? • Is there a Mission/Objectives/Strategies and Tactics (MOST) document for e-Governance? • Have you enacted the IT ACT 2000 which is applicable to all states? • Are there cyber laws that confer legal status to electronic transactions and documents? • Is there a law on regulation of digital signatures and encryption? • Have any concessions been given to industries/companies for ICT activities? • Are subsidized utilities provided to ICT firms? • Any sales tax concessions have been given to ICT companies? • Give the total number of complaints/cases registered relating to IPR • Number of initiatives taken for telecom regulation and ICT trade policy? • Are there any public private partnerships for development of ICT infrastructure? 	<p><i>Facilitating policy, (b) Regulatory Policy, (c) Legal Policy</i></p> <ul style="list-style-type: none"> • <i>Is there a performance matrix of the state for monitoring policies</i> • <i>Does a supplementary budget exist for state level e-Governance projects</i> • <i>Is there a Mission/Objectives/Strategies and Tactics (MOST) document for e-Governance projects</i> • <i>Is there a transparent policy for public private partnerships (PPP) for e-Governance activities</i> • <i>Have you enacted the IT ACT 2000 which is applicable to all states</i> • <i>Is there a law on regulation of digital signatures and encryption</i> <p>Range of policies taken for ICT companies-</p> <ul style="list-style-type: none"> • <i>Have any concessions been given to industries/companies for ICT activities</i> • <i>Are subsidised utilities provided to ICT firms</i> • <i>Any sales tax concessions have been given to ICT companies</i> • <i>How much time does it take to get clearance for starting an ICT business from the nodal agency/authority</i> <p>Range of security policies</p> <ul style="list-style-type: none"> • <i>Is there a section in the IT policy document on Security Policy</i> • <i>Is the issue of IPR addressed in the ICT policy</i> • <i>Is there effective legal machinery to tackle the problem of piracy of ICT products</i>
Infrastructure Environment	<ul style="list-style-type: none"> • Proportion of villages with Village Public telephones (VPTs). • Teledensity • Rural/Urban teledensity • Waiting time for telephone lines (Number of days). 	<ul style="list-style-type: none"> • Proportion of villages with Village Public telephones (VPTs) • Teledensity • Rural/Urban teledensity



sub-major category	Minor category	Minor category Indicators of Significance
	<ul style="list-style-type: none"> • Total number of telephone mainlines / total population. • Total number of cellular connections / '00 fixed lines. • Percentage of schools with computer labs • Percentage of schools with Internet access • Percentage of schools with websites. • Percentage of colleges with Internet access • Percentage of colleges with Computer labs access • Percentage of colleges with websites • Percentage of universities offering ICT courses • Percentage of universities / Institutes with online courses • Is there dedicated infrastructure for ICT? <ul style="list-style-type: none"> - Wireless networks - Optical Fibre Cable (OFC)/Networks - IT parks - State Wide Area Network (SWAN) - State Data Centers (SDCs) • Number of kiosks in rural areas per village • Number of community information centre per lakh population 	<ul style="list-style-type: none"> • Cellular Teledensity • Percentage of schools with computer labs • Percentage of schools with Internet access

Indicators for Readiness

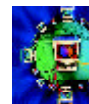
sub-major category	Minor category	Minor category Indicators of Significance
Individual Readiness	<ul style="list-style-type: none"> • Percentage of IT qualified teachers to total teachers • Percentage of computer engineers to total engineers. • Percentage of MCA to total technical students (masters) • Percentage of BSc (Computer Science) students to total Technical students graduates • Percentage of Diploma in Computer Application students to total Technical diploma students • Percentage of 12th pass (computer science subjects) students to total 12th pass students • Percentage of households with PC • Percentage of household with Internet connection • Percentage of household with mobile • Percentage of household with telephone • Percentage of IT qualified teachers to total teachers 	<ul style="list-style-type: none"> • Percentage of MCA to total technical students (masters) • Percentage of households with PC • Percentage of household with Internet connection • Percentage of household with mobile • Percentage of household with telephone



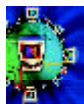
sub-major category	Minor category	Minor category Indicators of Significance
Business Readiness	<ul style="list-style-type: none"> IT park density Percentage of IT companies to total companies in the State RCA of ICT export Number of ICT jobs to total jobs 	<ul style="list-style-type: none"> IT park density Percentage of IT companies to total companies in the State RCA of ICT export
Government Readiness	<ul style="list-style-type: none"> Percentage of expenditure on technical education to total expenditure Ratio of number of government websites in local languages to number of government websites Percentage of policies taken for IT readiness- <ul style="list-style-type: none"> Does ERP/ online performance evaluation system packages exist Does separate ministry exist for ICT Does an intranet exist for Panchayati Raj Institutions (PRI) Percentage of departments use ICT in governance process/functioning process to total Government departments in the state Percentage of internet connections <ul style="list-style-type: none"> Dial up Wide band-not dial-up upto 256 kbps Broadband (registrations received by BSNL and MTNL, 2005) Percentage of top officials with ICT online training to total Government officials 	<ul style="list-style-type: none"> Percentage of expenditure on technical education to total expenditure Percentage of policies taken for IT readiness- <ul style="list-style-type: none"> Does ERP/ online performance evaluation system packages exist Does separate ministry exist for ICT Does an intranet exist for Panchayati Raj Institutions (PRI)

Indicators for Usage

sub-major category	Minor category	Minor category Indicators of Significance
Individual Usage	<ul style="list-style-type: none"> Current year to year growth rate in the number of Internet users Average monthly expenditure on – <ul style="list-style-type: none"> Internet access Cell phone Telephone 	<ul style="list-style-type: none"> Current year to year growth rate in the number of Internet users Average monthly expenditure on– <ul style="list-style-type: none"> Internet access Cell phone Telephone
Business Usage	<ul style="list-style-type: none"> Share of companies using <ul style="list-style-type: none"> Lease Lines ISDN VSAT 	<ul style="list-style-type: none"> Share of companies using <ul style="list-style-type: none"> Lease line ISDN VSAT



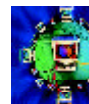
sub-major category	Minor category	Minor category Indicators of Significance
Government Usage	<ul style="list-style-type: none"> • Proportion of policies taken for ICT usage <ul style="list-style-type: none"> - <i>Agriculture</i> - <i>Health services</i> - <i>Transportation</i> - <i>Energy</i> - <i>Trade</i> - Have government employee records been computerised? • Status of accessibility of the information and services by the citizen <ul style="list-style-type: none"> - <i>Land Records</i> - <i>Movable Property</i> - <i>Land Registration</i> - <i>Stamp paper registration</i> - <i>Utilities Billing</i> - <i>Crime Registration</i> - <i>Municipality Administration</i> - <i>Death/Birth certificates</i> - <i>Documentation of policy</i> • Proportion Government expenditure on ICT to NSDP • Ratio of e-Governance workshops to total state level e-Governance projects • Ratio of implemented e-Governance projects to the total e-Governance projects • Ratio of workshops to the duration of IT policy 	<ul style="list-style-type: none"> • Proportion of policies taken for ICT usage <ul style="list-style-type: none"> - <i>Agriculture</i> - <i>Health services</i> - <i>Transportation</i> - <i>Energy</i> - <i>Trade</i> • Have government employee records been computerised • Status of accessibility of the information and services by the citizen <ul style="list-style-type: none"> - <i>Land Records</i> - <i>Movable Property</i> - <i>Land Registration</i> - <i>Stamp paper registration</i> - <i>Utilities Billing</i> - <i>Crime Registration</i> - <i>Municipality Administration</i> - <i>Death/Birth certificates</i> - <i>Documentation of policy</i> • Proportion of implemented e-Governance projects to the total initiated, ongoing and implemented e-Governance projects • Proportion of workshops to the duration of IT policy



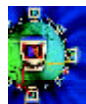
Sources of Data for State Level Assessment

Indicators for Usage

Sub-major category	Minor category	Source
Market Environment	<ul style="list-style-type: none"> • ICT exports / total exports • <i>Competition in the ISP sector:</i> <ul style="list-style-type: none"> - Number of Players - Market share of lead players (in per cent) • <i>Competition in the cellular sector:</i> <ul style="list-style-type: none"> - Number of Players - Market share of lead players (in per cent) • <i>Competition in the Telecom sector:</i> <ul style="list-style-type: none"> - Number of Players - Market share of lead players (in per cent) - Range of price charged for internet connection (per 100 hours) 	State Government
Political and Regulatory Environment	<ul style="list-style-type: none"> • Does IT policy exist? <ul style="list-style-type: none"> - When was the ICT Policy initiated? - How often is the ICT Policy revised? • Is there a section in the following sections: <ul style="list-style-type: none"> - Enabling Policy - Regulatory Policy - Legal Policy - Security Policy • Is there a Performance Matrix of the state for monitoring policies? • Is the issue of IPR addressed in the ICT policy? • Is there effective legal machinery to tackle the problem of piracy of ICT products? • Does a state level action plan exist? • State e-governance mission team (SeMT) been set up for e-Governance projects? • Is there a transparent policy for public private partnerships (PPP) for e-Governance activities? 	State Government



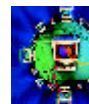
Sub-major category	Minor category	Source
	<ul style="list-style-type: none"> • Has the government given support to ICT in way of initiatives, priorities, policies and interests? • Time taken to get clearance for starting an ICT business • Does a supplementary budget exist for state level projects? • Has an e-Governance committee been set up? • Is there a Mission/Objectives/Strategies and Tactics (MOST) document for e-Governance? • Have you enacted the IT ACT 2000 which is applicable to all states? • Are there cyber laws that confer legal status to electronic transactions and documents? • Is there a law on regulation of digital signatures and encryption? • Have any concessions been given to industries/companies for ICT activities? • Are subsidised utilities provided to ICT firms? • Any sales tax concessions have been given to ICT companies? • Give the total number of complaints/cases registered relating to IPR • Number of initiatives taken for telecom regulation and ICT trade policy? • Are there any public private partnerships for development of ICT infrastructure? 	
Infrastructure Environment	<ul style="list-style-type: none"> • Number of villages with VPTs / total villages. • Number of public pay telephones / '000 population. 	Department of Telecommunications (DOT)
	<ul style="list-style-type: none"> • Waiting time for telephone lines (Number of days). • Total number of telephone mainlines / total population. • Total number of cellular connections /'00 fixed lines. • Number of schools with Internet access /total schools • Number of schools with Computer labs access /total schools. • Number of schools with websites / total schools. • Number of colleges with Internet access / total colleges. • Number of colleges with Computer labs access / total colleges. • Number of colleges with websites / total colleges. • Number of universities offering ICT courses / total number of universities. • Number of universities / Institutes with online courses / total number of universities. • Is there a dedicated infrastructure for ICT? <ul style="list-style-type: none"> - Wireless networks - Optical Fibre Cable (OFC)/Networks 	State Government



Sub-major category	Minor category	Source
	<ul style="list-style-type: none"> - IT parks - State Wide Area Network (SWAN) - State Data Centers (SDCs) • Number of kiosks in rural areas per village • Number of public access to the internet (cyber cafes registered) • Average distance in kilometres from the nearest <ul style="list-style-type: none"> - Primary School - Post Office - Public Telephone booth - Computer Training Center - College - Internet Kiosk - Medical Store 	Market Information Survey of Households (MISH)

Indicators for Readiness

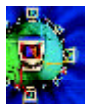
Sub-major category	Minor category	Source
Individual Readiness	<ul style="list-style-type: none"> • Percent of total household with the following consumer goods <ul style="list-style-type: none"> - Television (TV) - Personal Computer (PC) - Telephone - Cellular Phone - Internet Connection - Cable Connection 	Market Information Survey of Households (MISH)
	<ul style="list-style-type: none"> • Number of IT qualified teachers / total teachers. • Total number of Engineering students / total Technical students. • Total MCA Students/ total Technical students • Total BSc (Computer Science) students/ total Technical students • Total Diploma in Computer Application students/ total Technical students • Total 12th pass (computer science subjects) students/ total Technical students 	State Government
	<ul style="list-style-type: none"> • Literacy rate 	Census of India, 2001
Business Readiness	<ul style="list-style-type: none"> • Total number of IT parks. • Companies registered in IT parks per IT park • Total number of employment in IT companies / total number of IT parks. • Number of registered training centres / '000 population. • ICT exports to total exports. • Number of ICT jobs to total jobs 	State Government



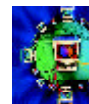
Sub-major category	Minor category	Source
Government Readiness	<ul style="list-style-type: none"> • Percentage of government expenditure on <ul style="list-style-type: none"> - Primary Education - Secondary Education - Under Graduate Education • Does an intranet exist in government departments? • Total number of government websites. • Total number of websites in local language. • Do ERP/online Performance Evaluation System packages exist? • Does a PERT chart exist for new ventures? • Percentage of CICs set up by the Government • Percentage of CICs set up by Private sector • Number of CICs per village • How many ministries use ICT in governance process/functioning process? • Percentage of internet connections <ul style="list-style-type: none"> - Dial up - Wide band-not dial-up upto 256 kbps - Broadband (registrations received by BSNL and MTNL, 2005) • Does a separate ministry exist for ICT? • %age of top officials trained in ICT/with access to computer training programme. • Number of government officials with online training programme. 	State Government

Indicators for Usage

Sub-major category	Minor category	Source
Individual Usage	<ul style="list-style-type: none"> • Average household monthly expenditure on <ul style="list-style-type: none"> - Internet Access - Cell phone - Cable Connection - Telephone 	Market Information Survey of Households (MISH)
	<ul style="list-style-type: none"> • Current year to year growth rate in the number of internet users in past 2 years 	State Government
	<ul style="list-style-type: none"> • Per Capita Net State Domestic Product 	Handbook of Statistics on Indian Economy, RBI
Business Usage	<ul style="list-style-type: none"> • Share of companies using <ul style="list-style-type: none"> - Lease Lines - ISDN - VSAT 	State Government



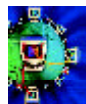
Sub-major category	Minor category	Source
Government Usage	<ul style="list-style-type: none">• WLL phones in rural areas / total number of villages.• Application of ICT in Agriculture.• Application of ICT in Health services.• Application of ICT in Transportation.• Application of ICT in Energy.• Application of ICT in Trade.• Total number of e-Governance projects undertaken.• Have government employee records been computerised?• Facilities available online:<ul style="list-style-type: none">- Land records- Movable Property- Stamp paper registration- Utilities billing- Crime registration- Municipality administration- Birth & Death Certificates- Documentation of Policy• Government expenditure on IT/NSDP• Status of accessibility of the info & services by the citizen?• e-Governance training progs and workshops per e-Governance project• Number of participants per e-Governance workshop State Government	State Government



National Industrial Classification 1998 - at 2 Digit Level for Manufacturing units

Table A.3

- | | |
|----|---|
| 15 | Manufacture of food products and beverages |
| 16 | Manufacture of tobacco products |
| 17 | Manufacture of textiles |
| 18 | Manufacture of wearing apparel; dressing and dyeing of fur |
| 19 | Tanning and dressing of leather; manufacture of luggage, handbags, saddlery, harness and footwear |
| 20 | Manufacture of wood and of products of wood and cork, except furniture; manufacture of articles of straw and plaiting materials |
| 21 | Manufacture of paper and paper products |
| 22 | Publishing, printing and reproduction of recorded media |
| 23 | Manufacture of coke, refined petroleum products and nuclear fuel |
| 24 | Manufacture of chemicals and chemical products |
| 25 | Manufacture of rubber and plastics products |
| 26 | Manufacture of other non-metallic mineral products |
| 27 | Manufacture of basic metals |
| 28 | Manufacture of fabricated metal products, except machinery and equipment |
| 29 | Manufacture of machinery and equipment n.e.c. |
| 30 | Manufacture of office, accounting and computing machinery |
| 31 | Manufacture of electrical machinery and apparatus n.e.c. |
| 32 | Manufacture of radio, television and communication equipment and apparatus |
| 33 | Manufacture of medical, precision and optical instruments, watches and clocks |
| 34 | Manufacture of motor vehicles, trailers and semi-trailers |
| 35 | Manufacture of other transport equipment |
| 36 | Manufacture of furniture; manufacturing n.e.c. |
| 37 | Recycling |



Important Tables Related to Ranks, Levels and Index Value for States/UTs

Table A 4.1: Distribution of States in Different Levels in Terms of Environment Index

Levels	States	Number of States
L1	Punjab, Haryana, Delhi, Chandigarh, Gujarat, Maharashtra	6
L2	Karnataka, Tamil Nadu, Kerala, Goa, West Bengal, Uttar Pradesh, Andhra Pradesh	7
L3	Puducherry, Rajasthan, Himachal Pradesh, Mizoram	4
L4	Jharkhand, Orissa, Madhya Pradesh, Nagaland, Assam, Chhatisgarh	6
L5	Sikkim, Uttarakhand, Meghalaya, Tripura, Bihar, Manipur, Andaman & Nicobar Island	7
L6	Lakshadweep, Dadra & Nagar Haveli, Jammu & Kashmir, Daman & Diu, Arunachal Pradesh	5

Table A 4.2: Distribution of States in Different Levels in Terms of Readiness Index

Levels	States	Number of States
L1	Haryana, Chandigarh, Kerala	3
L2	Karnataka, Andhra Pradesh, Delhi, Tamil Nadu	4
L3	Uttar Pradesh, Goa, Punjab, Maharashtra, Puducherry, West Bengal	6
L4	Orissa, Lakshadweep, Jharkhand, Uttarakhand, Madhya Pradesh, Gujarat, Chhatisgarh, Sikkim, Himachal Pradesh, Rajasthan, Meghalaya, Andaman & Nicobar Island, Assam	13
L5	Nagaland, Jammu & Kashmir, Mizoram, Dadra & Nagar Haveli, Manipur, Arunachal Pradesh, Daman & Diu, Bihar	8
L6	Tripura	1

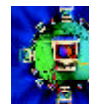


Table A 4.3: Distribution of States in Different Levels in Terms of Usage Index

Levels	States	Number of States
L1		0
L2	Chandigarh, Delhi, Karnataka, Chhatisgarh	4
L3	Andhra Pradesh, Tamil Nadu, Rajasthan, Maharashtra, Punjab, Mizoram, Haryana, Kerala, Himachal Pradesh, Jharkhand, West Bengal, Gujarat, Goa, Uttar Pradesh	14
L4	Sikkim, Meghalaya, Orissa, Uttarakhand, Assam, Madhya Pradesh, Andaman & Nicobar Island	7
L5	Bihar, Tripura, Nagaland, Daman & Diu, Puducherry, Manipur,	8
	Arunachal Pradesh, Lakshadweep	
L6	Jammu & Kashmir, Dadra & Nagar Haveli	2

Table A 4.4: Distribution of States in Different Levels in Terms of e-Readiness Index

Levels	States	Number of States
L1	Chandigarh, Delhi, Haryana, Karnataka, Punjab, Andhra Pradesh, Kerala, Tamil Nadu	8
L2	Maharashtra, Gujarat, Uttar Pradesh, Goa	4
L3	Rajasthan, West Bengal, Himachal Pradesh, Chhatisgarh, Jharkhand	5
L4	Mizoram, Orissa, Puducherry, Madhya Pradesh, Sikkim, Meghalaya, Uttarakhand	7
L5	Assam, Nagaland, Andaman & Nicobar Island, Lakshadweep	4
L6	Bihar, Tripura, Manipur, Daman & Diu, Jammu & Kashmir, Dadra & Nagar Haveli, Arunachal Pradesh	7

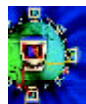


Table A 4.5: Comparison of Ranks of e-Readiness Indices

<i>State & UT</i>	<i>2003</i>	<i>2004</i>	<i>2005</i>	<i>2006</i>
Karnataka	1	1	3	1
Andhra Pradesh	4	3	1	2
Chandigarh	8	5	5	3
Haryana	15	11	9	4
Delhi	7	9	8	5
Maharashtra	2	4	6	6
Tamil Nadu	3	2	2	7
Uttar Pradesh	10	15	12	8
Punjab	13	10	7	9
Kerala	11	6	4	10
Rajasthan	16	20	14	11
Gujarat	5	7	11	12
West Bengal	9	12	15	13
Goa	6	8	10	14
Chattisgarh	19	16	16	15
Himachal Pradesh	17	19	17	16
Madhya Pradesh	12	14	21	17
Jharkhand	26	26	22	18
Orissa	20	17	20	19
Mizoram	21	21	23	20
Puducherry	14	13	13	21
Sikkim	30	18	19	22
Uttarakhand	18	25	18	23
Meghalaya	23	24	24	24
Assam	25	23	25	25
Nagaland	32	35	32	26
Bihar	28	32	28	27
Andaman & Nicobar	24	31	31	28
Lakshadweep	27	27	26	29
Jammu & Kashmir	29	22	27	30
Tripura	22	29	33	31
Manipur	34	28	29	32
Daman & Diu	33	33	35	33
Arunachal Pradesh	31	30	30	34
Dadra & Nagar Haveli	35	34	34	35

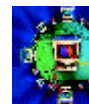


Table A 4.6: Comparison of Range Equalised Indices for Sub-Components of e-Readiness, 2006 and 2005

States	RE Environment 2006	Environment 2005	Environment Difference	RE Readiness 2006	RE Readiness 2005	Readiness Difference	RE Usage 2006	RE Usage 2005	Usage Difference
Andaman & Nicobar	0.21	0.15	0.06	0.34	0.04	0.30	0.43	0.28	0.14
Andhra Pradesh	0.60	0.85	-0.26	0.87	1.00	-0.13	0.90	0.62	0.28
Arunachal Pradesh	0.00	0.16	-0.16	0.17	0.05	0.12	0.14	0.27	-0.12
Assam	0.36	0.54	-0.18	0.31	0.24	0.07	0.48	0.20	0.28
Bihar	0.25	0.41	-0.17	0.12	0.10	0.01	0.36	0.18	0.18
Chandigarh	0.81	1.00	-0.19	0.97	0.41	0.57	1.00	0.85	0.15
Chhatisgarh	0.35	0.69	-0.34	0.48	0.30	0.18	0.92	0.45	0.47
Dadra & Nagar Haveli	0.14	0.03	0.11	0.19	0.00	0.19	0.00	0.21	-0.21
Daman & Diu	0.02	0.00	0.02	0.17	0.02	0.15	0.33	0.23	0.10
Delhi	0.90	0.87	0.03	0.84	0.36	0.49	0.97	1.00	-0.03
Goa	0.62	0.92	-0.29	0.63	0.31	0.32	0.69	0.57	0.12
Gujarat	0.81	0.80	0.00	0.49	0.31	0.19	0.70	0.67	0.02
Haryana	0.90	0.89	0.01	1.00	0.44	0.56	0.75	0.71	0.04
Himachal Pradesh	0.57	0.67	-0.10	0.46	0.31	0.15	0.74	0.44	0.29
Jammu & Kashmir	0.10	0.29	-0.19	0.24	0.25	-0.01	0.06	0.26	-0.20
Jharkhand	0.45	0.55	-0.11	0.50	0.33	0.17	0.71	0.36	0.36
Karnataka	0.71	0.84	-0.14	0.89	0.71	0.18	0.93	0.77	0.16
Kerala	0.67	0.86	-0.19	0.95	0.66	0.28	0.74	0.79	-0.04
Lakshadweep	0.20	0.28	-0.08	0.51	0.42	0.09	0.13	0.36	-0.23
Madhya Pradesh	0.40	0.54	-0.15	0.50	0.41	0.09	0.48	0.30	0.17
Maharashtra	0.76	0.98	-0.23	0.56	0.62	-0.06	0.79	0.59	0.20
Manipur	0.24	0.23	0.01	0.17	0.12	0.06	0.18	0.22	-0.04
Meghalaya	0.27	0.59	-0.32	0.43	0.18	0.25	0.59	0.41	0.18
Mizoram	0.51	0.54	-0.03	0.20	0.12	0.09	0.76	0.58	0.18
Nagaland	0.36	0.31	0.06	0.30	0.06	0.24	0.34	0.00	0.34
Orissa	0.40	0.56	-0.16	0.52	0.38	0.13	0.52	0.32	0.20
Puducherry	0.59	0.78	-0.18	0.56	0.21	0.35	0.22	0.54	-0.32
Punjab	1.00	0.94	0.06	0.60	0.64	-0.03	0.79	0.63	0.16
Rajasthan	0.57	0.65	-0.08	0.45	0.38	0.07	0.86	0.50	0.35
Sikkim	0.30	0.70	-0.40	0.47	0.18	0.29	0.60	0.43	0.17
Tamil Nadu	0.69	0.97	-0.28	0.79	0.74	0.05	0.86	0.69	0.17
Tripura	0.26	0.21	0.05	0.00	0.06	-0.06	0.35	0.14	0.22
Uttar Pradesh	0.61	0.73	-0.12	0.69	0.51	0.18	0.67	0.39	0.28
Uttarakhand	0.28	0.62	-0.34	0.50	0.38	0.12	0.48	0.39	0.09
West Bengal	0.61	0.65	-0.04	0.53	0.33	0.20	0.70	0.53	0.17

Note: RE: Range equalized

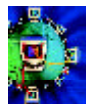
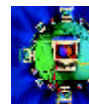


Table A 4.7: Comparison of Range Equalised Indices of e-Readiness 2006 and 2005

States	Range Equalised e-Readiness Index 2006	Range Equalised e-Readiness Index 2005	Difference
Andaman & Nicobar	0.27	0.11	0.16
Andhra Pradesh	0.83	1.00	-0.17
Arunachal Pradesh	0.00	0.12	-0.12
Assam	0.34	0.38	-0.04
Bihar	0.17	0.25	-0.08
Chandigarh	1.00	0.93	0.07
Chhatisgarh	0.58	0.58	0.00
Dadra & Nagar Haveli	0.01	0.00	0.01
Daman & Diu	0.08	0.00	0.08
Delhi	0.97	0.89	0.08
Goa	0.66	0.75	-0.09
Gujarat	0.69	0.72	-0.04
Haryana	0.95	0.84	0.12
Himachal Pradesh	0.59	0.57	0.02
Jammu & Kashmir	0.04	0.27	-0.22
Jharkhand	0.54	0.48	0.06
Karnataka	0.90	0.94	-0.04
Kerala	0.83	0.93	-0.10
Lakshadweep	0.22	0.36	-0.14
Madhya Pradesh	0.43	0.48	-0.05
Maharashtra	0.73	0.92	-0.19
Manipur	0.12	0.16	-0.05
Meghalaya	0.39	0.46	-0.07
Mizoram	0.47	0.47	0.00
Nagaland	0.28	0.11	0.17
Orissa	0.46	0.49	-0.03
Puducherry	0.44	0.62	-0.18
Punjab	0.85	0.91	-0.06
Rajasthan	0.63	0.60	0.03
Sikkim	0.42	0.53	-0.10
Tamil Nadu	0.82	0.99	-0.17
Tripura	0.12	0.10	0.02
Uttar Pradesh	0.68	0.66	0.01
Uttarakhand	0.39	0.55	-0.16
West Bengal	0.62	0.60	0.03



ANNEXURE VII

Profile of Select Central Ministries/ Departments

Table A 5.1: Ministry of Corporate Affairs

	Ministry of Corporate Affairs
Major Activities	<ul style="list-style-type: none"> • Administers the Companies Act of 1956 to ensure the efficient delivery of services to the corporate sector as well as the effective regulation and enforcement of the provisions of the Act.. • provides a sound legal framework for all the related subjects on an on-going basis through legislative changes • Provides an enabling framework for the administration of these laws.
Thrust Areas	<ul style="list-style-type: none"> • Meet stakeholder expectations in delivery of services; • Monitoring of compliance management; • Regulation and enforcement of legal provisions; • Investor Education and Protection; • Legislative initiatives responsive to the changing business environment
Aims of e-governance	<ul style="list-style-type: none"> • To bring about a fine balance between business facilitation on the one hand and effective regulation enforcement on the other. • Adopting international best practices to improve the service standards to all the stakeholders as follows: <ul style="list-style-type: none"> - Business: enable the start of a business with the incorporation of a company and file statutory documents at any time from anywhere and in a manner convenient to the stakeholders; - Public: to get easy online access to relevant records and get a quicker redress of their grievances; - Professionals: enable them to offer efficient services to their client companies; - Financial Institutions: enable them to procure relevant information quickly; - MCA: to deliver services in an efficient manner and ensure proactive & effective compliance of relevant laws and corporate governance - Employees: enabled to deliver services to the companies in a productive and near paperless environment.

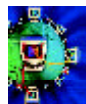


Table A 5.2: Ministry of External Affairs

	Ministry of External Affairs
Major Activities	Manage all relations between India and the world
Thrust Areas	<ul style="list-style-type: none">• War Against Terror• Disarmament• Human Rights• Jammu & Kashmir• India-US high technology cooperation group
Aims of e-Governance	<ul style="list-style-type: none">• To provide appropriate information to decision-makers for effective and efficient policy making.• To provide information to employees to enable them to harness their fullest potential in the information age.• To streamline processes of the government and avoid duplication of effort.• Information System Management for effectively processing, recording and retrieving information.• To disseminate information about functions, tasks, policy, programmes and services of the ministry.• To provide speedy services like Passport, Visa etc to citizens, Non-Nationals

Table A 5.3: Council of Passports and Visas, Ministry of External Affairs

	Council of Passports and Visas, Ministry of External Affairs
Major Activities	Responsible for the functioning of all Passport Offices and Collection Centers.
Thrust Areas	<ul style="list-style-type: none">• Finalize the design of a model passport office, which would issue passports expeditiously by using the latest information technology coupled with greater workflow efficiency.• Issuance of Machine Readable Passports by all Indian Missions/Posts abroad.• Introduction of e-Passports
Aims of e-Governance	To deliver all Passport-related services to the citizens in a timely, transparent, more accessible, reliable manner & in a comfortable environment through streamlined processes and committed, trained & motivated workforce.

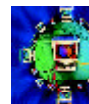


Table A 5.4: Central Board of Excise and Customs, Ministry of Finance

	Central Board of Excise and Customs, Ministry of Finance
Major Activities	<ul style="list-style-type: none"> • Design, Development, Programming, Testing, Implementation and Maintenance of Customs and Central Excise/Service Tax automated systems, and for overseeing and managing the projects sanctioned by CBEC related to IT. • Management of all Centrally deployed Customs and Central Excise/Service Tax computer facilities, hardware, software, data communications. • Point of reference and validation concerning procedural changes in Customs, Central Excise and Service Tax, in addition to being a resource centre on business process issues. • Identifying and evaluating new technologies for application to automated systems within the department. • Developing and maintaining all policy and subsequently, on the implementation of centralized systems, the operational aspects of the Department's Computer Security. • Establishing and overseeing computer-to-computer interfaces between the department and various trading partners and government agencies
Thrust Areas	<ul style="list-style-type: none"> • Strengthening of IT capability for e-Governance. • Developing workflow based automated processes for serving business needs • Providing e-Interface for taxpayers and providing a platform for seamless taxpayer services • Promoting transparency, accountability and ensuring optimal service delivery standards
Aims of e-Governance	<ul style="list-style-type: none"> • I.T. as a key enabler for serving business need • Developing workflow based process systems • Promoting transparency and accountability • Reducing transaction costs for the taxpayers • Providing improved taxpayer services • Putting in place a robust and secure I.T. infrastructure for ensuring efficiency in business operations. • Improved and effective Data Management

Table A 5.5: Central Board of Direct Tax, Ministry of Finance

	Central Board of Direct Tax, Ministry of Finance
Major Activities	The management of direct tax collections and levy
Thrust Areas	<ul style="list-style-type: none"> • Revenue collections • Improved tax administration • Services to tax payers • Voluntary compliance by the tax payers • Combat tax evasion
Aims of e-Governance	<ul style="list-style-type: none"> • To enable the tax payers to meet their normal tax obligations in a convenient manner without visiting the Income Tax office • To simplify tax laws and procedures

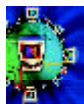
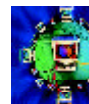


Table A 5.6: Directorate General of Supply Division, Department of Commerce, Ministry of Commerce and Industry

	Directorate General of Foreign Trade, Ministry of Commerce and Industry
Major Activities	<ul style="list-style-type: none"> • Formulation and implementation of the Foreign Trade Policy, • Multilateral and bilateral commercial relations, • State trading, • Export promotion measures and • Development and regulation of certain export oriented industries and commodities.
Thrust Areas	<ul style="list-style-type: none"> • Focus Product and Focus Market Schemes • Vishesh Krishi and Gram Udyog Yojana • Export of Services • Gems and Jewellery Exports • Duty Free Import Authorisation and Advance Authorization Schemes • Special Economic Zones • Export Oriented Units/ Electronic Technology park/ Software Technology Park/ Biotechnology Park • e-Trade Project • e-Procurement • International Trade Negotiations and Agreements
Aims of e-Governance	<ul style="list-style-type: none"> • Development and implementation of modern tools of ICT for the delivery of government services and information to the public. • An efficient, speedy, cost effective and transparent process for disseminating information to the public and other agencies, and for performing government administration activities.

Table A 5.7: Directorate General of Supply Division, Department of Commerce, Ministry of Commerce and Industry

	Directorate General of Supply Division, Department of Commerce, Ministry of Commerce and Industry
Major Activities	<ul style="list-style-type: none"> • Responsible for providing supply & inspection services to the Central Govt. Departments through the system of rate contract, adhoc contract, consultancy & training on supply management. • Works as a nodal agency for e-Procurement • Beneficiaries of DGS&D services include State Govts. and PSUs, apart from Central Govt. Deptts. for all of whom there is substantial savings in terms of time and money by cutting down lead time.
Thrust Areas	<ul style="list-style-type: none"> • Conclusion of Rate Contract for common user items for use by Central Govt./ State Govt./ PSU etc. The users place supply order directly on the Rate Contract holder, without the need to go through tendering process. • Provide training/ technical advice as a nodal agency for Mission Mode Project of e- Govt. Procurement. • Formulate policies and procedures on procurement. • Providing consultancy on procurement to State Govt./ PSUs/ State Education Boards.



	<ul style="list-style-type: none"> • Carrying out inspection of stores against contract placed against it own contracts and also contracts placed by various departments under Central/ State Govt. PSUs etc. • Provide technical advice on quality related issues.
Aims of e-Governance	<ul style="list-style-type: none"> • Transparency in procurement • Facilitate easy availability of infrastructure and accessibility to documents/RC in the four corners of the country on 24 X 7 basis. • Economy in procurement • Speed up procurement, quality assurance and payment • Quick redressal of grievances. • Minimum interaction between suppliers, officials and paying authority

Table A 5.8: Department of Pension & Pensioners Welfare, Ministry of Personnel, Public Grievance & Pensions

	Department of Pension & Pensioners Welfare, Ministry of Personnel, Public Grievance & Pensions
Major Activities	Policy formulation relating to Pension of Central (civil) pensioners and framing of rules thereunder
Thrust Areas	<ul style="list-style-type: none"> • DOP&PW which was set up in 1985 as a part of the Ministry of Personnel, Public Grievances & Pensions being the nodal agency in the Central Government functions for formulation of pension policy, redressal of grievances on retirement benefits, and rendering service for the welfare of pensioners • Formulation and implementation of pension related policy • Framing the rules for pension • Rendering advice on references received from various quarters • Providing information and guidance to pensioners and retirement related matters.
Aims of e-Governance	<ul style="list-style-type: none"> • Formulation and implementation of policies covered under CCS(Pension) Rules 1972. • Interpretation of various Rules viz. CCS (Pension) Rules, CCS(Commutation of Pension) Rules, CCS(Extraordinary Pension) Rules, GPF Rules and CPF Rules, to remove doubts on receipt of references received from concerned ministries/departments. • Concurrence to a proposal seeking relaxation of Rules which cause undue hardship in any particular case. • Issuance of orders relating to grant of Dearness Relief to pensioners from time to time. • Issuance of instructions governing payment of Fixed Medical Allowance (FMA) to pensioners residing in non CGHS areas. • Coordination with the Ministry of Health & FW (Department of Health) for medical assistance to pensioners on the basis of schemes administered by the Department of Health. • Convening meetings of SCOVA for getting suggestions and feedback from representatives of pensioners on their problems/suggestions. • Redressal of grievances by forwarding communication in this regard to the respective ministries/departments and monitoring thereof.

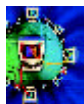
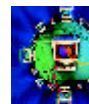


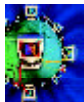
Table A 5.9: e-Committee, Department of Law and Justice, Ministry of Law and Justice

	E-committee, Department of Law and Justice, Ministry of Law and Justice
Major Activities	<ul style="list-style-type: none">• Formulation of a National Policy on computerisation of the justice delivery system• Designing an IT network, along with NIC and other knowledge and service providers and creation of an IT grid linking the Apex Court to all courts in the country• Drawing up an action plan, with appropriate phasing, for time-bound implementation within an overall period of three years; stipulation of physical and financial targets, monitoring and evaluation of the action plan on a periodic basis.• Providing support systems to create training for judges and administrative staff in the courts• Creation of a cadre of trainers and trouble-shooters for each court complex• Suggesting ways and means to ensure the smooth running of the computer systems, including therein availability of power supply peripherals, stationery, etc.• Suggesting methods to make access to justice and availability of information more litigants friendly.
Thrust Areas	Implementation of ICT in the Indian Judiciary with the objective of providing speedy, cost effective, transparent and accountable justice
Aims of e-Governance	Implementation of ICT in the Indian Judiciary with the objective of providing speedy, cost effective, transparent and accountable justice



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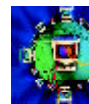

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