THE ATTRACTIVENESS OF STATES

RATINGS FROM A BUSINESS PERSPECTIVE

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BY

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Abstract

This study ranks the States on the basis of attractiveness from a business perspective. The study is based on data that was collected through a survey conducted by the Confederation of Indian Industry among business and the corporate sector held in mid 2001, in which, 148 respondents spread over 16 states were asked to respond to queries related to their perception of the state in which their unit was located. The findings are perceptional and are based on questionnaires. Perceptions are extremely dependent upon individual experiences, but if we incorporate the perceptions of a large enough number of individuals, their central tendency (mean/median/mode) does reflect the general perception of the state in the eyes of the business community.

Key Words: State, Attractiveness, Rating, Business, CII, Perception, Community, India, category, Survey, Respondents, Infrastructure, Government, Industrial, Corporate, Law, Market, Communication, Finance, Policy, Urban, Size, Growth, RGICS, Laveesh Bhandari, Bibek Debroy, Indicus Analytics.

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SECTION 1: INTRODUCTION

This is a study done by Indicus Analytics for the Confederation of Indian Industry (CII). Bibek Debroy (Director, Rajiv Gandhi Institute for Contemporary Studies) and Laveesh Bhandari (Indicus Analytics) are the authors of this report. This study is based on data that was collected through a survey conducted by the Confederation of Indian Industry among business and the corporate sector. That is, the findings are perceptional and are based on questionnaires.

The business community's perception of doing business in the major states is an important indicator of the attractiveness of the states from the perspective of ease of doing business. Many factors determine the ease with which business can be done, though some differ across the type of business, some across the type of individual, etc. We have attempted to include *most* of the factors that are important for most business activities. This is discussed in greater detail later.

The data for the study were collected by CII through a primary survey held in mid 2001, in which, 148 respondents spread over 16 states were asked to respond to queries related to their perception of the state in which their unit was located. These queries were under the following categories:

Figure 1: List of categories on which states have been ranked

Categories
1. Availability and Cost of Communications
2. Availability and Cost of Personnel and Industrial relations
3. Availability and Quality of Business Services
4. Ease, Transparency and Efficiency of the Government
5. Law and Justice related to Corporate Requirements
6. Quality and Accessibility of Transport Infrastructure
7. Quality of Life in Urban Areas
8. Size and Growth of Markets
9. Stability and Quality of State Government Finances and Policy

Issues of availability, costs, prices, growth, government efficiency, lifestyles, are all included in the ratings. Unlike other work done by the authors for the Confederation of Indian Industry, namely, "How are the States Doing?", this study is based purely on perceptions of a large number of respondents. Perceptions are extremely dependent upon individual experiences, but if we incorporate the perceptions of a large

enough number of individuals, their central tendency (mean/median/mode) does reflect the general perception of the state in the eyes of the business community.

It should also be noted that such perceptions are as reflected by average business, and perceptions across different activities might be different. For instance, though Karnataka may not be very high in the general rating, if an Information Technology Industry specific rating were done, it would not be surprising if it is rated as one of the topmost states in the country. The states included were:

Figure 2: List of States included in the ranking

No.	State	No.	State
1	AP	9	MP
2	Bihar	10	Maharashtra
3	Goa	11	Orissa
4	Gujarat	12	Punjab
5	HP	13	Rajasthan
6	Haryana	14	TN
7	Karnataka	15	UP
8	Kerala	16	West Bengal

Note: MP, Bihar, and UP include Jharkhand, Chhatisgarh, and Uttaranchal respectively

SECTION 2: DATA

Each of the nine categories mentioned in Figure 1 above contained many variables (64 in all). The respondents had to rate the state for each of the 64 issues on a scale of 1 (lowest – implying very poor) to 5 (highest – implying very good). Each variable was calculated as the median value of the responses from each of the 16 states in the survey. The 64 variables were divided between the 9 categories in the following manner:

Figure 3: Details of Categories and variables used for Rating State Perceptions

Category	Variables
1. Availability and Quality of Business Services	▪ Availability of consumer finance ▪ Availability of media for marketing ▪ Quality of distribution networks ▪ Availability/costs of unorganized capital markets ▪ Availability of working capital ▪ Availability of term lending ▪ Availability of non-public sector banks ▪ Depth/breadth of stock markets
2. Ease, transparency and efficiency of the government	▪ Ease in obtaining/converting land ▪ Ease in obtaining environmental clearances ▪ Ease in obtaining permissions for layoffs, retrenchments, closure ▪ Transparency in State government procedures ▪ Investor friendliness of bureaucracy ▪ Investor friendliness of political class ▪ IT usage in government ▪ Corruption at ministerial or higher bureaucracy levels ▪ Corruption at petty functionary levels ▪ Redressal / appeal against arbitrary government decisions ▪ Time wasted because of Inter-State checks like Octroi ▪ Inter-State restrictions because of Essential Commodities Act ▪ Inspector *raj* associated with labour laws
3. Size and growth of markets	▪ Size of market in rural areas ▪ Growth of market in rural areas ▪ Size of market in urban areas ▪ Growth of market in urban areas
4. Availability and cost of communications	▪ Ease in obtaining MTNL/BSNL connections ▪ Mobile phone rates ▪ IT penetration ▪ Ease in obtaining power connections/ setting up captive power plants ▪ Costs of commercial/industrial power ▪ Quality of power supply
5. Law and Justice Issues related to Corporate Requirements	▪ Quality/speed of court system ▪ Availability of alternative channels of dispute resolution ▪ Law and order problems ▪ Instances of extortion
6. Stability and Quality of State Government finances and Policy	▪ Quality of State government finances ▪ Populist pressures in the State government ▪ Stability of State government ▪ State-level fiscal incentives ▪ Quality of policy

Category	Variables
7. **Availability and costs of personnel and industrial relations**	▪ Availability/costs of skilled labour ▪ Availability/costs of unskilled labour ▪ Availability/costs of managerial staff ▪ Severity of lockouts, strikes ▪ Union problems ▪ Ease in using contract labour ▪ Interference in hiring labour
8. **Quality and Accessibility of Transport Infrastructure**	▪ Access to airports (passenger) ▪ Access to airports (freight) ▪ Access to ports/container depots ▪ Access to railway networks ▪ Availability of railway wagons ▪ Quality of expressways/highways ▪ Quality of other roads ▪ Road freight rates
9. **Quality of Life in Urban Areas**	▪ Real estate availability/rentals ▪ Quality of urban municipal services ▪ Quality of restaurants ▪ Availability/costs of hotels ▪ Access to recreational facilities in urban areas ▪ Quality of schools in urban areas ▪ Quality of higher education ▪ Availability/quality of medical services

SECTION 3: THE METHODOLOGY

Many factors or variables affect the rating of a State. It is necessary to form a composite or aggregate index that incorporates all these diverse variables into a single or summary measure. The problem in developing a composite index is that related to the process of integrating various variables into a single measure. The identification of weights to be assigned to different variables is one such issue in the creation of a composite index. There are different methods available to form a composite index. One way to do this, is to use subjective preferences to identify the magnitude of weights to be assigned to each factor or variable.

Another method, which minimizes subjectivity, is to use a type of Factor Analytic Model called Principal Components Analysis (henceforth PCA). PCA is one of the better methods of computing composite indices, where

the analysis involves relatively low levels of subjectivity on the part of the researcher. This well used econometric tool assigns weights to variables based on relationships among them and therefore minimizes subjectivity. This is the main departure with similar exercises conducted to rank States or even countries. There is no subjective or perceptional element in our exercise of obtaining rankings. The details of this methodology are presented now.

Principal Component Analysis is a part of the Factor Analytic Model. To derive the composite index for States, the following steps were followed:
Step 1: Identification of appropriate categories
Step 2: Identification of appropriate variables under each category
Step 3: Normalizing the data
Step 4: Creating a rating for a category
Step 5: Calculating a composite/overall rating across all categories.

Since the main objective was the determination of the perception rankings of the States, and as mentioned before, the following criteria were judged important:

Categories

- Availability and Quality of Business Services
- Ease, transparency and efficiency of the government
- Size and growth of markets
- Availability and cost of communications
- Law and Justice Issues related to Corporate Requirements
- Stability and Quality of State Government finances and Policy
- Availability and costs of personnel and industrial relations
- Quality and Accessibility of Transport Infrastructure
- Quality of Life in Urban Areas

On an average, seven variables were used for each of these categories. To recapitulate briefly, PCA undertakes the following steps:

1. First, the analysis involves standardization of data in question. This is done for many reasons. One such reason is that standardization (that involves subtraction of the mean value and division by the standard deviation) eliminates unnecessary weights given to some measures on account of their high unit values.

2. Following the standardization, PCA involves finding that relationship between the variables that explains the maximum possible variation in the total data. This is done by generating various factors.

3. Each factor is nothing but a linear weighted combination of the various variables used. The factors are ranked according to their ability to explain the maximum possible variation among all the variables. The factors are ranked according to their ability to explain the total variance. In all the indices calculated, we used the first factor only. The first factor in all the cases, explained more than 70 per cent of the variation.

4. Such analysis sometimes involves giving negative weights to some of variables. However, no negative weights are observed in any of the indices generated by our exercise.

5. Once the weights for each measure are obtained (also sometimes referred to as factor loading), then the index was calculated as the weighted average. The rankings for each category were done on this basis.

6. The indices calculated for each of the categories were then used to calculate the composite index. The methodology for the composite index was the same as the above (starting from step 1).

The indices calculated for each of the categories were then used to calculate the overall index. This was done by calculating the equi-weighted average of all the indices.

SECTION 4: THE FINDINGS

We first give the rankings for the 16 states in accordance with the categories.

Figure 4: State Ranks in 9 Categories

States	Availability Quality of Business Services	Ease, transparency efficiency of the govt.	Size and growth of markets	Availability, cost of commun-ications
AP	2	3	1	9
Punjab	5	1	4	5
Mahar.	1	10	7	2
TN	3	11	5	7
Karnataka	4	7	9	10
Goa	9	2	5	3
W. Bengal	7	8	2	4
Kerala	6	9	3	11
Haryana	16	5	9	12
HP	11	4	11	1
Gujarat	10	12	12	8
MP	8	14	14	15
Bihar	12	13	13	13
Rajasthan	13	6	15	14
Orissa	14	16	16	6
UP	15	15	8	16

States	Corporate Law and Justice Issues	Government finances and Policy	Personnel and industrial relations
AP	1	1	3
Punjab	3	2	11
Mahar.	4	5	8
TN	4	6	9
Karnataka	4	3	12
Goa	4	13	5
W. Bengal	11	8	15
Kerala	2	12	14
Haryana	4	7	6
HP	4	4	1
Gujarat	13	15	7
MP	4	14	4
Bihar	12	9	10
Rajasthan	16	10	2
Orissa	15	11	16
UP	14	16	13

States sorted by composite/overall ranking

The next table gives rankings in terms of the overall index, and the values of the index as a test of the robustness of the rankings.

Figure 5: Overall Ranking

State	Ranking	Index value
AP	1	1.60
Punjab	2	1.24
Maharashtra	3	1.09
TN	4	0.80
Karnataka	5	0.71
Goa	6	0.66
West Bengal	7	0.41
Kerala	8	0.33
Haryana	9	-0.26
HP	10	-0.31
Gujarat	11	-0.51
MP	12	-0.65
Bihar	13	-0.85
Rajasthan	14	-1.15
Orissa	15	-1.49
UP	16	-1.61

The next table lists the strengths and weaknesses of the States. Strengths and weaknesses are interpreted in the following way. A State has an overall ranking. If its ranks in the nine categories are higher than the overall rank, those categories constitute the State's strengths. Conversely, if its ranks in the categories are lower than the overall rank, those categories constitute its weaknesses.

Figure 6: Strengths and Weaknesses – Top 5 States

State	Perceived Weaknesses	Perceived Strengths
AP	Availability and cost of communications, is one of its major weaknesses. Availability, quality, and costs of personnel, and industrial relations in general, as well as government efficiency could do with some improvements	Tops in size and growth of markets, government finances and policy, and Corporate law and justice issues
Punjab	Scores relatively low in personnel and industrial relations, communications could do with some improvements. Surprisingly, does not rate as high in market size as may be expected.	Tops in perceived transparency and efficiency of government, and stability of government policy and perceived stability of finances
Maharashtra	Scores poorly in government related measures – both efficiency/transparency, as well as stability of finances and policy. Personnel and industrial relations also relatively low. Growth and size of markets also relatively lower than may be expected.	Tops in business service availability and quality, good communications for its overall rank.

State	Perceived Weaknesses	Perceived Strengths
TN	Scores relatively low in government related measures – both efficiency/transparency, as well as stability of finances and policy. Communications also lower than would be expected for its rank. Personnel and industrial relations also relatively low.	High in business service availability and quality, moderately good in law and justice issues related to business.
Karnataka	Relatively poor perceptions in government efficiency/transparency. Communications also lower than would be expected for its rank. Personnel and industrial relations also relatively low.	Relatively better in availability and quality of business services, law and justice issues, as well as stability of government finances and policy.

SECTION 5: CONCLUSION

The state perception ratings are based on the perceptions of the business/corporate community. As such, they also implicitly capture many details that hard facts and hard data cannot capture. In that sense, these ratings are complementary to the state ratings entitled "How are the States doing?". We find however that the rankings do differ significantly across the two different ratings.

Why are they different? That is because in the earlier exercise, we were rating the economic, social, environment, and other factors that reflect the lifestyle of an average state resident. Here, we have been more specific to the factors that affect business. Another issue that plays a role here is related to faulty perceptions. In some cases, many people have perceptions that are determined by media reports. And those are subjective in nature. Consequently, perception based ratings also suffer from such biases. In other words, we believe that the two sets of state ratings that we have conducted should be read keeping these factors in mind. The objective cannot be directly linked to the subjective.

These ratings are based on a total sample size of 148 responses. Not a very representative sample, but the ratings are strongly indicative of how the general corporate community feels the various states rate. Increasing the sample would have increased the robustness of the results. However, we do not expect that they would have been very different.

Nevertheless, a larger sample would have helped, and a much larger sample would also have allowed us to conduct sector specific ratings – we believe, that in the coming years it may not be surprising to see states specialize in various economic activities. And a state that has natural advantages in a particular activity may put in extra efforts to smoothen the business climate in that or related activities. However, that is just a conjecture. A larger sample size is essential before such theses can be tested.

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Methodology Appendix

Principal Components Analysis develops a composite index by defining a real valued function over the relevant variables, which would permit defining the performance of States objectively. A set of assumptions behind our method of construction of a composite index is given below:

1. The condition of weak Pareto rule demands that when a State registers values of indicators uniformly higher than those of the other States - the former should have a higher ranking than the latter ones;
2. The condition of non-dictatorship implies that no single indicator should be considered so significant as to determine the final ordering all by itself;
3. The condition of unrestricted domain implies that the method should be capable of giving the final ranking for all possible data matrices;
4. The final condition is that of independence from irrelevant alternatives, which demands that while ranking two States, the decision must be guided by the values of the indicators for these units under study alone, and not by any other irrelevant phenomenon.

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

$$C_i = W_1x_{11} + W_2x_{12} + W_3x_{13} + \ldots\ldots\ldots\ldots + W_nx_{1n}$$

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

From the above formula of the composite index, it is evident that to compute the composite index, two major components need to be known, - the weights assigned to the indicators and the observation values after elimination of the scale bias for available indicators. These two issues are now discussed.

Variables chosen for any analysis are usually measured in different units and are generally not additive. Hence, it is necessary to convert them into some standard comparable units such that the initial scales chosen for measuring them do not bias the results. The method that was adopted to achieve this is standardizing the variables in the following way:

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

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

The transformed series now will be scale free and will have a mean of zero and a standard deviation of unity.

Once the bias of measurements is removed from the observations, the crucial problem that remains is that of assigning appropriate weights to the selected indicators or variables. If one has sufficient insight into the nature and magnitude of interrelationships among the variables and their implications, one might choose to determine the weights on the basis of independent judgment. 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 performance, which would hardly be a realistic approach in this case. Therefore, in this analysis, the weights for individual variables or indicators have been assigned on the basis of the factor analytic model.

Factor analysis is a tool used to construct a composite index in such a way that the weights given maximize the sum of the squares of correlation (of the indicators with the composite index). The application of Factor Analysis or Principal Component Analysis in this specific case has been accepted as an 'objective ranking' of States. This method enables one to determine a vector known as the first Principal Component or Factor, which is linearly dependent on the variables, and also has the maximum sum of squared correlation with the variables.

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

a) The number of principal components is equal to the number of indicators and principal components are un-correlated or orthogonal in nature.

b). The first principal component or P_1 absorbs or accounts for the maximum possible proportion of variation in the set of indicators. This is the reason why it serves as the ideal measure for constructing a composite index.

Accordingly, here are the steps followed.

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-correlation, that is, the correlation of each X_i with itself ($r_{xi\ xi} = 1$ for all the i's). The correlation matrix is symmetrical, that is, 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	$\Sigma^k_i\, r_{xi\ xj}$
X_1	$r_{x1\ x1}$	$r_{x1\ x2}$	..	$r_{x1\ xk}$	$\Sigma^k_i\, r_{x1\ xi}$
X_2	$r_{x2\ x1}$	$r_{x2\ x2}$	..	$r_{x2\ xk}$	
"	..	..	..	..	
"	..	..	..	..	
X_k	..	..	..	..	
"	$r_{xk\ x1}$	..	..	$r_{xk\ xk}$	
$\Sigma^k_i\, r_{x1\ xj}$	$\Sigma^k_I\, r_{xi\ x1}$	$\Sigma^k_i\, r_{xi\ x2}$	$\Sigma^k_i\, r_{xi\ x3}$	$\Sigma^k_i\, r_{xi\ xk}$	$\Sigma^k_i\, \Sigma^k_i\, r_{xi\ xj}$

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

$$\Sigma^k_i\, r_{xi\ xj} = \Sigma^k_i\, r_{xi\ xj}$$

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

$$\Sigma^k_i\, \Sigma^k_j\, r_{xi\ xj}$$

and we take its square root.

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.

$$a_{ij} = (\Sigma^k_i\, r_{xi\ xj}) \,/\, (\sqrt{\Sigma^k_i\, \Sigma^k_i\, r_{xi\ xj}})$$

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.

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

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 is 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

$$\lambda_1 = [\text{latent root of } P_1]$$

$$= \Sigma^k_i\, \lambda^2_I$$

$$= \lambda^2_1 + \lambda^2_2 + \ldots + \lambda^2_k$$

The sum of the latent roots of all the Principal Components will be equal to the number of indicators -

$$\Sigma^k_i\, \lambda_i = k$$

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 that the Principal Component explains. If for example, λ_1 = 2.797 and the number of variables are 8, then P_1 expresses -

$\lambda_1 / k = (2.797/8)*100 = 35\ \%$ of the variation in 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 Pearson Correlation coefficients.

In this particular exercise, we have attempted a method of normal or single stage Principal Component Analysis, as well as Multi-Stage Principal Component analysis. For performing the single stage Principal Component Analysis, all the indicators are taken together and the earlier discussed procedure is followed. The Multi-Stage Principal Component Analysis is to divide the selected variables into well defined subgroups depending on the nature of the indicators. Within a subgroup, they have a high degree of inter-correlation, while the canonical correlation between pairs of subgroups 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 subgroups 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 is generally high and consequently, the first Principal Component explains an 'adequate' proportion of variation in the data matrix.