CHAPTER 2
REVIEW OF LITERATURE


2.1. Role of public sector

The study begins with a selective review of literature dealing with the role of public sector and their short-comings in the performance. Such a review is attempted with a view to put in sharp focus specific issues for research on State Level Public Enterprises (SLPES) in the context of Kerala.

It is a fact that the public enterprises have not been able to generate adequate surplus for sustaining public investments while some of them are subsidised by the rest of the economy. Similarly, some of the infrastructural facilities provided by the public enterprises have been found to be inefficient and costly. However, it can be claimed on the positive side that public enterprises have enabled the country to achieve a large degree of industrial diversification, to reduce import dependence, to stimulate private investment and to create a large pool of skilled manpower, all of which have helped the country to
achieve a high level of self-reliance, and promote a more balanced regional development of the country. Yet, the suboptimal performance of the public sector enterprises in relation to the generation of adequate surplus has accentuated the "fiscal crisis" (deficit in the government's budgetal and caused a lot of disenchantment with the role of the public sector in India).

The public sector holds a dominant position in the Indian economy. Approximately 1,000 Central and State Public Sector Units account for about 17% of Gross Domestic Product and about 23% employment in the organised sector. (20.69 lakhs persons in Central Public Enterprises during 1993-94). The investment in the Central Public Sector Enterprises was Rs. 1,64,332 crores in 246 enterprises as on 31-3-1994 with a percentage of net profit to capital employed of 2.78.

The performance of these units has been a matter of concern for the Government. Several units suffer from chronic problems of inefficiency, low productivity, poor management, budget deficit, absence of contribution to the national exchequer, etc., contrary to what has been envisaged in successive five year plans. The various surveys and studies of central public enterprises, financial performance have identified the following as the constraints in the way of efficient performance: (a) poor choice of location, (b) non-availability of inputs like raw materials and fuel, © choice of wrong technology, (d) overmanning at the executive/worker level, (e) poor internal management of the enterprise, and (f) inefficiency in the marketing of products.
The expansion of the central public enterprises sector to occupy the commanding heights of the economy was an integral part of the industrial development strategy commencing from the second five year plan (1955-’60), which laid emphasis on the development of basic industries and infrastructure through planned public investments. The strategy has paid some dividends. Central public enterprises stimulated the growth of a large diversified industrial sector which reduced dependence on imports, stimulated the growth of private enterprise and created a large pool of trained industrial skilled man power.

The 246 central public enterprises can be broadly divided into 166 enterprises producing goods and 74 enterprises rendering services. Six enterprises are under construction.

Central public enterprises do not form a homogenous set of enterprises performing at the same level of efficiency. There is wide variation in their performance both in terms of efficiency of service to the consumer and profitability of the operations, as indicated in Table 2.1.

<table>
<thead>
<tr>
<th>Sector</th>
<th>Enterprises</th>
<th>Capital Employed</th>
<th>Gross Profit</th>
<th>Profitability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Consumer Goods</td>
<td>19</td>
<td>66.84</td>
<td>-357.67</td>
<td>-309.96</td>
</tr>
<tr>
<td>Agro Based Industries</td>
<td>4</td>
<td>99.64</td>
<td>6.81</td>
<td>1.24</td>
</tr>
<tr>
<td>Textiles</td>
<td>14</td>
<td>297.71</td>
<td>131.72</td>
<td>-827.49</td>
</tr>
<tr>
<td>Total (A)</td>
<td>166</td>
<td>104120.61</td>
<td>12109.87</td>
<td>32832.87</td>
</tr>
</tbody>
</table>

Table 2.1
TABLE -2.1.
Performance of central public enterprises (1993-94)

<table>
<thead>
<tr>
<th>Sl:No:</th>
<th>Cognate groups</th>
<th>No.</th>
<th>Capital employed</th>
<th>Gross profit</th>
<th>Net Profit</th>
</tr>
</thead>
<tbody>
<tr>
<td>(A) Enterprises Manufacturing goods</td>
<td>12</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Steel</td>
<td>9</td>
<td>18025.28</td>
<td>1023.67</td>
<td>-116.73</td>
</tr>
<tr>
<td>2</td>
<td>Minerals &amp; Metals</td>
<td>13</td>
<td>7110.13</td>
<td>542.71</td>
<td>231.04</td>
</tr>
<tr>
<td>3</td>
<td>Coal &amp; Lignite</td>
<td>9</td>
<td>11986.96</td>
<td>1391.75</td>
<td>511.45</td>
</tr>
<tr>
<td>4</td>
<td>Power</td>
<td>4</td>
<td>22340.86</td>
<td>1754.60</td>
<td>1013.56</td>
</tr>
<tr>
<td>5</td>
<td>Petroleum</td>
<td>14</td>
<td>30201.49</td>
<td>5757.22</td>
<td>3947.48</td>
</tr>
<tr>
<td>6</td>
<td>Fertilisers</td>
<td>8</td>
<td>2057.65</td>
<td>394.33</td>
<td>-401.08</td>
</tr>
<tr>
<td>7</td>
<td>Chemicals &amp; Pharmaceuticals</td>
<td>21</td>
<td>3181.68</td>
<td>303.27</td>
<td>-15.88</td>
</tr>
<tr>
<td>8</td>
<td>Heavy Engineering</td>
<td>15</td>
<td>2046.38</td>
<td>181.38</td>
<td>-369.91</td>
</tr>
<tr>
<td>9</td>
<td>Medium &amp; Light Engg.</td>
<td>24</td>
<td>3976.72</td>
<td>564.37</td>
<td>-49.02</td>
</tr>
<tr>
<td>10</td>
<td>Transportation Equipment</td>
<td>12</td>
<td>2729.27</td>
<td>415.71</td>
<td>-157.67</td>
</tr>
<tr>
<td>11</td>
<td>Consumer Goods</td>
<td>19</td>
<td>66.84</td>
<td>-357.67</td>
<td>-699.26</td>
</tr>
<tr>
<td>12</td>
<td>Agro Based Industries</td>
<td>4</td>
<td>99.64</td>
<td>6.81</td>
<td>-3.73</td>
</tr>
<tr>
<td>13</td>
<td>Textiles</td>
<td>14</td>
<td>297.71</td>
<td>131.72</td>
<td>-637.48</td>
</tr>
<tr>
<td>Total (A)</td>
<td>166</td>
<td>104120.61</td>
<td>12109.87</td>
<td>3252.77</td>
<td></td>
</tr>
<tr>
<td>(B) Enterprises Rendering Service</td>
<td>1 Trading &amp; Marketing Services</td>
<td>2 Transportation services</td>
<td>3 Construct and Construction Services</td>
<td>4 Industrial Development and Tech. Consultancy Services</td>
<td>5 Tourist Services</td>
</tr>
<tr>
<td>-----------------------------------</td>
<td>-------------------------------</td>
<td>---------------------------</td>
<td>-------------------------------------</td>
<td>---------------------------------------------</td>
<td>-----------------</td>
</tr>
<tr>
<td>1</td>
<td>18</td>
<td>12572.73</td>
<td>1660.23</td>
<td>129.00</td>
<td>9</td>
</tr>
<tr>
<td>2</td>
<td>11</td>
<td>9833.46</td>
<td>679.44</td>
<td>-31.57</td>
<td>4</td>
</tr>
<tr>
<td>3</td>
<td>10</td>
<td>426.56</td>
<td>-32.92</td>
<td>-234.45</td>
<td>12</td>
</tr>
<tr>
<td>4</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total (B)</td>
<td>74</td>
<td>55186.79</td>
<td>6327.88</td>
<td>1182.01</td>
<td></td>
</tr>
<tr>
<td>Grand Total</td>
<td>240</td>
<td>159307.40</td>
<td>17437.75</td>
<td>4434.78</td>
<td></td>
</tr>
</tbody>
</table>

Source: Public Enterprises Survey 1993-94, Government of India

Note: Section 25 companies are those incorporated under Section 25 of the Companies Act to serve a social/promotional purpose. They are not profit oriented and are not required to declare any dividend.
2.2. State Level Public Enterprises (SLPES)

Thus far, we have been discussing the role of the public sector in general. In a federal country like India, enterprises are also set by the state governments to undertake certain economic activities under their ownership/management and control. These enterprises are generally called, the State Level Public Enterprises (SLPES) so as to distinguish them from the enterprises set by the Central Government in the state regions.

In the case of State Level Public Enterprises, the published data available is rather scanty. There are varying estimates of their number. The variations are due to the definitions assumed in different states for SLPEs. In some states, electricity boards and road transport corporations, which are statutory corporations are added, while in others they are not. Some states have got enterprises registered under the Companies Act functioning in the power and transport sector. In some states enterprises registered under the Co-operatives Act are also added to the list of SLPEs. In a recent study, the Institute of Public Enterprise, Hyderabad has identified 954 SLPEs of which those which are registered under the Companies Act and Statutory Corporations, other than electricity boards and road transport corporations add up to 875. Of the 875 enterprises, 671 were government companies, 38 statutory corporations, 128 co-operative enterprises and 38 public authorities. Of these, 436 enterprises came under the commercial category and 312 under commercial-cum-promotional and 127 were purely promotional. The total investments in these enterprises at the end of 1991-92 was computed to be Rs. 38,283 crores. During that year the total loss was Rs. 863 crores.
The State of Kerala has the largest number of SLPEs in the country. The investment in these 106 SLPEs works out to Rs. 4810 crores, of which almost one-third is in the form of share capital and remaining as term loans. Until 1993-94, these units had accumulated losses to the tune of Rs. 1220 crores. 43 SLPEs have their net worth fully eroded. The SLPEs directly employ 1,61,000 persons and provide indirect employment to at least 8,00,000 persons.

It is significant to note that state level public sector enterprises still constitute proportionately a significant component of the large and medium enterprises in Kerala (see table 2.2) These enterprises constitute around 23% of units, 11% of gross fixed assets, and 12% of direct employment accounted by the large and medium industries in 1989 in the state of Kerala. Given the significant size of state level public sector investment in Kerala, an understanding of the relative efficiency and financial performance of these enterprises vis-a-vis their counterparts in the private sector is of critical importance to public policy.

A recent study, which examined the financial accounts of 250 state level public sector enterprises in the manufacturing sector in the country has documented their poor performance: more than 50% of the enterprises studied were found to be loss making ones. The picture was depressing particularly in Kerala where 25 out of 47 enterprises studied were found to be loss making ones and their accumulated losses accounted for 240 percent of paid up capital (see table 2.3). Evidently, investment in the state sector
enterprises has not been yielding adequate returns with a number of enterprises continuing to incur losses beyond the value of paid up capital in Kerala.

### TABLE - 2.2

Sector-wise distribution of large and medium industries in Kerala (1988-1989)

<table>
<thead>
<tr>
<th></th>
<th>Central Sector</th>
<th>State Co-operative Sector</th>
<th>Joint Sector</th>
<th>Private Sector</th>
<th>Total Satr</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. Units in Production</td>
<td>18 (8.5)</td>
<td>42 (19.90)</td>
<td>14 (6.6)</td>
<td>28 (13.27)</td>
<td>109 (51.65)</td>
</tr>
<tr>
<td>B. Gross fixed Assets (Rs. Crores)</td>
<td>782 (46.29)</td>
<td>360 (21.31)</td>
<td>26 (1.5)</td>
<td>67 (3.97)</td>
<td>453 (26.82)</td>
</tr>
<tr>
<td>C. Estimated Annual turnover (Rs. Crores)</td>
<td>1239 (49.93)</td>
<td>313 (12.61)</td>
<td>106 (4.3)</td>
<td>82 (3.3)</td>
<td>741 (29.86)</td>
</tr>
<tr>
<td>D. Direct employment</td>
<td>26143 (26.96)</td>
<td>21416 (22.09)</td>
<td>3925 (4.04)</td>
<td>3388 (3.49)</td>
<td>41589 (42.90)</td>
</tr>
</tbody>
</table>

(Figures in bracket show percentage to total)

**Source:** State Planning Board, “Large and Medium Industries including Public Sector Industries”, Formulation of Eighth Five Year Plan (1990-95), Background Paper, Government of Kerala, Trivandrum.
TABLE 2.3

State-wise performance of Public Sector Undertakings

<table>
<thead>
<tr>
<th>State</th>
<th>Profit Making Enterprises</th>
<th>Mixed Performance Enterprises</th>
<th>Loss Making Enterprises</th>
<th>Accumulated Losses to Paid up capital (In per cent)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assam</td>
<td>0</td>
<td>7 7</td>
<td>85</td>
<td></td>
</tr>
<tr>
<td>Andhra Pradesh</td>
<td>2</td>
<td>3 3</td>
<td>73</td>
<td></td>
</tr>
<tr>
<td>Bihar</td>
<td>0</td>
<td>2 8</td>
<td>70</td>
<td></td>
</tr>
<tr>
<td>Goa</td>
<td>3</td>
<td>0 1</td>
<td>20</td>
<td></td>
</tr>
<tr>
<td>Gujarat</td>
<td>2</td>
<td>8 7</td>
<td>32</td>
<td></td>
</tr>
<tr>
<td>Haryana</td>
<td>1</td>
<td>2 2</td>
<td>72</td>
<td></td>
</tr>
<tr>
<td>Himachal Pradesh</td>
<td>0</td>
<td>1 5</td>
<td>656</td>
<td></td>
</tr>
<tr>
<td>Jammu &amp; Kashmir</td>
<td>0</td>
<td>2 4</td>
<td>43</td>
<td></td>
</tr>
<tr>
<td>Karnataka</td>
<td>5</td>
<td>9 7</td>
<td>72</td>
<td></td>
</tr>
<tr>
<td>Kerala</td>
<td>5</td>
<td>17 25</td>
<td>240</td>
<td></td>
</tr>
<tr>
<td>Madhya Pradesh</td>
<td>0</td>
<td>3 5</td>
<td>14</td>
<td></td>
</tr>
<tr>
<td>Maharashtra</td>
<td>0</td>
<td>3 3</td>
<td>142</td>
<td></td>
</tr>
<tr>
<td>Manipur</td>
<td>0</td>
<td>3 3</td>
<td>56</td>
<td></td>
</tr>
<tr>
<td>Meghalaya</td>
<td>0</td>
<td>1 3</td>
<td>40</td>
<td></td>
</tr>
<tr>
<td>Nagaland</td>
<td>0</td>
<td>0 1</td>
<td>85</td>
<td></td>
</tr>
<tr>
<td>Orissa</td>
<td>1</td>
<td>2 2</td>
<td>120</td>
<td></td>
</tr>
<tr>
<td>Punjab</td>
<td>0</td>
<td>0 1</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>Rajasthan</td>
<td>2</td>
<td>5 8</td>
<td>75</td>
<td></td>
</tr>
<tr>
<td>Tamilnadu</td>
<td>4</td>
<td>5 6</td>
<td>18</td>
<td></td>
</tr>
<tr>
<td>Tripura</td>
<td>0</td>
<td>0 1</td>
<td>240</td>
<td></td>
</tr>
<tr>
<td>Uttar Pradesh</td>
<td>6</td>
<td>4 4</td>
<td>95</td>
<td></td>
</tr>
<tr>
<td>West Bengal</td>
<td>2</td>
<td>3 22</td>
<td>201</td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>33</strong></td>
<td><strong>80</strong></td>
<td><strong>137</strong></td>
<td></td>
</tr>
</tbody>
</table>

2.3. Literature survey

In accordance with the mixed economy plan advocated and initiated during the Nehruvian era, Kerala too had promoted the public sector concept. This was obviously done by building and operating a wide range of industries, over a considerable period of time. These industries 14 in number are classified under different sectors. The sectors are Development and Infrastructural agencies, Ceramics and refractories, Chemical industries, Electrical equipment, Electronics, Engineering, Plantation and Agro based units, Textiles, Wood based industries, Traditional industries, Trading units, Welfare agencies, Public Utilities and others. Today the state fully owns 74 of the 108 state enterprises. Ten enterprises are jointly owned by the state and central governments. Another 10 enterprises are jointly owned by the Government of Kerala and the public. The rest of the 14 companies have by other forms of ownership.

The establishment of public sector undertakings in Kerala was a natural outcome of the Industrial (Development & Regulations) Act, 1951 and the development strategy followed since the beginning of the planned development process in the country. The need for public sector investment was all the more felt during the initial five year plans since private capital was acutely limited and was also least interested in entering the industrial scenario in the State. However, it was a period of national urgency to grow at a rate faster than what would have been possible otherwise relying on private initiative and enterprise. The few public sector industries formed during the fifties and also early sixties along with
the few Government owned industries started before independence formed the industrial base for Kerala. All further industrial development evolved from this industrial base. The primary objective of these industries was outlined in the National Policy as well. It was to "bring about socio-economic growth to the masses" and thereby help eradicate poverty, improve quality of life, promote social security, etc. Thus the public sector was a major instrument of the Government in the development plans and has well established itself in all spheres of life. This is obvious, since it has made significant contributions to the society, economy and industry. The monetary viability of public sector undertakings was initially intentionally ignored. This was because social profitability was then the need of the hour and not financial profits. The focus on social profitability has resulted in public benefits such as employment to a substantial number of people. The massive losses on the financial front, however, still continue to incur in a large number of State owned industries. Huge financial support has been provided by the Government in operating many public sector industrial units over a number of years. However, the inability to generate surpluses for reinvestment and further growth has put considerable pressure on the National Economy. This has forced the Government to find solutions alternative to financial support. Some very positive steps have been undertaken by the Government in this regard. Standing committees and conferences were initiated and they have made very specific recommendations and suggestions. Another attempt of the Government in reforming the public sector may be seen in the formation of L.K. Jha Commission. This Commission made very constructive recommendations which were agreed to and accepted in principle by the Government.
The Economic Survey 1992-93 reports that the financial performance of public enterprises has been a matter of wide concern. The rate of returns by the public enterprises was only 2.23% on capital employed in 1990-91 and the same declined to 2.09% in 1991-92. The profitability of the public sector undertakings in terms of gross profits were also lower. The Board of Industrial and Financial Reconstruction (BIFR) set up under the Sick Industrial Companies (Special Provisions) Act, 1985 had received 1772 applications since its inception and one-third of the same was for liquidation.

The fate of public sector units in the neighbouring countries is also not different. A conference on Management of Public Enterprises organised at New Delhi (April 17-20, 1995) by National Productivity Council with participants from various Asian countries came to the conclusion that “many of the public sector enterprises are incurring huge losses year after year inspite of various efforts at improving their performance by further investment for their diversification, rehabilitation or modernisation”.

Today the public sector in Kerala is in the threshold of a transition period. This is obvious from the fact that the loss making companies have come under severe criticism both by the Government and the society. This has led to radical changes in the policy regarding public sector. The transition process is, however, not yet fully formulated and accepted. The new roles and opinions of the Government, world bodies, trade unions and the society in the field of social justice, development and economic growth have helped continually in reviewing and promoting newer ways of public sector reforms, so that
financial profitability along with social profitability becomes the usual norm in public sector enterprises.

It was the Industrial Policy Statement of the State Government in 1991 which paved the way for initiating several measures for bringing out the structural changes in the state’s industrial scene. The policy reforms if pursued singlemindedly could positively transform the performance of public sector enterprises.

Business competitiveness has been for quite some time the hallmark for performance and has been aggressively pursued by organisations in general worldwide. The reasons for sharpening business competitiveness has been many; the predominant cause being fierce competition for the market. Other reasons include constraints in the availability of natural resources, energy, etc. Also better service and customer support became vital in order to stay in business. Furthermore the erosion of the concept of socialist economy throughout the world has led to focusing attention on financial viability, self generated surpluses for reinvestment, diversification plans, newer marketing strategies, etc. With the Government suggesting that it would no longer bear the burden solely, the challenge for public sector reforms and growth has been phenomenal. Such a challenge has resulted in productivity improvement studies in all the factors and processes of production and new management skills and “mantras” have been devised by many organisations and “management gurus”. It may be noted that newer technologies along with newer and effective management practices have yielded results in many organisations world wide.
This invariably suggests that the challenge in improving the performance of the public sector in Kerala can be well met, if the right course of action is followed.

The study is also carried out, considering the prospects for a positive industrial growth due to the existence of certain favourable factors such as availability of skilled and educated man power, plentiful water supply, good network of roads, existence of water ways and seaports, etc. Furthermore, Kerala is rich in a number of natural resources and also has a favourable climate.

The causes for the historical lack-luster performance has almost always been put on labour militancy. The objective of this study is however to explore other causes, including mismanagement on the part of the top level management and government. The study involves the building of relationships between various parameters responsible for the performance of public sector enterprises. In order to improve on the scope of this study, senior managers and departmental heads have been discussed with and truer judgement regarding performance enhancement is made. Their suggestions and opinions, apart from the conclusions made from the data analysis provide ample scope and challenges for organisational change, management development, etc.
2.4 Criteria for performance evaluation

One major problem encountered in performance evaluation is the selection of criteria. Bennett\(^4\) says that the performance criteria can be selected if there is a corporate plan for performance improvement programme. Bennett speaks of five principles that should be followed while selecting indicators for the evaluation of public enterprises management. The most relevant indicators are those whose variation from period to period has the greatest impact on national objectives. Another principle in determining the criterion for performance evaluation is that it should represent those which have a significant bearing on managerial performance and those whose variation depend on managerial skill and performance. The other three principles are that the performance indicators should be conveniently and cheaply measurable, as also comprehensible and objectively measurable.

In order to evaluate the performance of public enterprises, one must first examine the goals of the public enterprise. Public enterprise goals are difficult to specify due to the problems of multiple objectives including commercial and non-commercial ones. If goals cannot be specified, then good performance cannot be distinguished from bad, and the manager cannot be rewarded on the basis of performance. The result will be inefficiency since non-commercial goals of public enterprises are difficult to quantify. Quantified performance indicators should be introduced to serve as an approximation of their performance. In the common measure of commercial goals is profitability, which is the same indicator as for private enterprises. Profits separates the difference between revenues and costs. Therefore, if a public enterprise is profitable that means it generates
additional resources, which can be used to finance its activities or even to expand its operations. Various ratios may be used for assessing the profitability of public enterprises such as return on capital employed, return on assets employed, profit on percentage of sales, percentage of costs, etc.

In evaluating the performance of public enterprises the questions of economy, efficiency and effectiveness are to be considered. It is necessary to enquire as to how public enterprises acquire human and material resources. In other words, whether an appropriate quality and quantity of such resources is acquired at the lowest cost. Special attention is drawn to the efficiency of public enterprises, to the relationship between goods and services produced and resources used to produce them. It is necessary to pay greater attention to the productive efficiency of public enterprises. All factors of production should be used efficiently and for that reason many criteria and indicators are to be developed in order to make a proper evaluation of public enterprises efficiency. Such indicators are capacity utilisation, inventory levels, consumption co-efficient, labour standards, etc. In other words various inputs/outputs ratios should be developed. Such ratios would depend on the character and specifics of the public enterprise.

2.5. Systems of Performance Evaluation.

Trivedi explores the applicability of introducing the French system of contracts in less developed countries for better performance. The main thrust of these contracts in France
was to re-orient the management of public enterprises from a system of “priori” control to a system of “posteriori” controls. Two ways of controlling the performance of public enterprises are through management by objectives or management by results, the other approach attempts to control individual processes which convert inputs into outputs. Most Governments are either not organised to control by results or find difficult to do so. Therefore, they try to compensate for it by controlling a variety of internal processes. The result is a high “quantity” but “low quality” of government control over public enterprises. By moving toward “a posteriori” controls, the contracts were expected to raise the quality of control while lowering the quantity. It was hoped that by doing so, they would raise both managerial autonomy and managerial accountability, thereby overcoming the unpleasant trade off between accountability and autonomy. In other words, these contracts were expected to clarify objectives and reconcile priorities “ex-ante” so that public enterprise managers could be held ambiguously accountable ex-post for achieving these objectives uninhibited by rigid, bureaucratic rules and regulations and “ad hoc” government interventions. Trivedi focuses attention on the implementation and the outcome of French model for managing government - public enterprise relationships in various countries. They are thereby classified into various categories such as the signaling system practiced in Pakistan, Korea and Venezuela and the performance contract approach of Bangladesh. Under the signaling system adopted in Pakistan and Korea, the performance evaluation system tries to measure performance on three fronts, viz., the level of static efficiency or the fact that if the firm is making the best use of given stock of resources, the level of dynamic efficiency or to ensure that the firm is making optimum
decision and achievement of non-commercial objectives. In this context, Trivedi also analyses the Indian version of contract system namely the Memorandum of Understanding. It was found that the system had not yielded the desired benefits. According to Trivedi, the exercise has remained a non-starter if viewed in terms of providing a new direction to public enterprises. It is said that most of the public enterprises were lacking in independent information to negotiate MOUs. In most cases, it is found that the Government has to reply on information supplied by the enterprises. It is also noticed that nonguidance was given about the importance of various criteria, in addition, there was a conspicuous absence of explicit incentives and this incentive associate with the fulfilment of objectives. Trivedi concludes that high level political commitment is necessary for the success of the contractual approach, but it is by no means a sufficient one. One important pre-requisite that is laid down by Trivedi is that there should be co-ordination between designers, implementers and policy makers so that consensus can be generated on the key aspects of the system.

A comparative evaluation of the various types of performance evaluation systems which are in vogue in public enterprises in India such as MOU, MBO, Zero Base Budgeting, (ZBB) Performance Budgeting and Production and Profit Improvement Management System (PPIMS) and conventional Budgeting Systems is made by Trivedi and Gopal. Although performance improvement of public enterprise is the aim of all these systems, they follow different paths to achieve the common objective.
The MOU system is currently an agreement between a public enterprise and the Government, represented by the administrative ministry in which both parties clearly specify their commitments and responsibilities. MOUs have concentrated both on static and dynamic operational efficiency. Under static efficiency, it is the efficiency of the use of the resources at the disposal of the enterprise at a given point of time. Dynamic efficiency peters to the areas where the cost is incurred today, but benefits accrue in the future. Items included in this category are Preventive Maintenance, Corporate Planning, Human resource Development, etc. Weights are assigned to different criteria for assessing performance. The conventional budgetary system deals with the task of preparing annual budget documents. The budget is an elaborate document which contains detailed plans of the enterprises in both physical and financial terms. The first draft of the budget is submitted to the administrative ministry, which in turn, consults the other relevant ministries such as finance, planning, etc. After a series of negotiations, the final budget is approved by the administrative ministry in a joint meeting normally presided by Minister in charge. At the year end, the actual achievements are measured against targets. The concerned administrative ministry evaluates the public enterprise, which provides the ministry to facilitate monitoring. They also list similarities between the conventional budgeting system and the MOU system. In both MOU and budget, the indicators and performance targets are clearly defined. The targets are fixed after negotiations between the administrative ministry and the enterprise. Another similarity is that since both the enterprise and administrative ministry are signatories of budget documents, they share the responsibility for achieving performance targets.
It is also found that there are many dis-similarities between the MOU systems and conventional budgeting. Conventional budgets are detail-oriented while the MOU document is with aggregates. When compared to the conventional budgeting system where the evaluation is done by the administrative ministry, in the case of MOU system, this is done by the high power committee and this makes it possible for a more objective assessment. Another difference is that the relative importance of various criteria is not indicated in the budgets. The MOU takes care of this by giving weights to various criteria. In conventional budgets, targets are primarily quantitative in nature, while the target of MOU, could be either quantitative or qualitative in nature. While conventional budgets aim at control by comparing the expenses incurred in a period or year with targeted expenses. In the case of dynamic indicators, the MOUs have other measures as a percentage of project completed.

The Performance Budgeting System was developed in response to the need to budget for those departments where the traditional budgeting system of setting limits on allowable expenditure was proving counter productive. This is especially true in the case of those departments where there was no way of relating outputs to inputs, e.g., irrigation, public works, hospitals, etc. The performance budget is a structured document and provides a descriptive account of the tasks and a work plan for each agency. As in the case of MOUs, this system has a high degree of clarity of objectives. Another similarity is that there is an evaluation at the end of the time horizon which normally is one year. Both the MOU and performance budgeting system provide for static and dynamic indicators and
both require a good information base if they are to succeed. There are also many dis-similarities between MOU and performance budgeting system. One relates to the fact that where there are financial and physical parameters in both cases the emphasis in performance budgeting is still on physical targets. Another point of difference is that performance budgets have only one value for each of the targets and unlike the MOU there is no prioritization amongst the various activities as well as no third party evaluation at the end of the year.

Another performance evaluation system in vogue in India is Management By Objectives (MBO) which involves three stages: Setting of objectives, action planning and performance review. There are six basic steps in the design and implementation of the MBO process. They are definition of the mission statement or purpose or what the organisation stand for, determination of key result areas (KRA) derived from SWOT (Strengths, Weaknesses, Opportunities, Threats) analysis. Fixing of objectives such as time measured cost and quality dimensions, developing an action plan for each objective, control information for feedback and limits given to the subordinate for achieving the objectives. When MBO is implemented, the first step is that determination of KRA for the individual managers. These are decided between the manager concerned and his immediate superior - right up the hierarchy to the Chief Executive. In the case of private enterprise the Chief Executives KRA are decided in consultation with the Board of Directors. In the case of public enterprises this may be done in consultation with the administrative ministry. The objectives are determined from KRAs. This is followed by
action planning and this deals with the strategies for the achievement of the objectives. This is followed by drawing up the Key Result Improvement Matrix (KRIM). In the KRIM, the primary responsibility for achievement of an objective always vests with one person. The superior and the subordinate then decide on control information that need to be provided for periodic monitoring. The last stage in the MBO process is the performance review at the end of the time horizon, normally an year.

The system has also many similarities with the MOU. The mission statement in both the systems are clearly defined at the beginning of the exercise. Targets are determined jointly by both the parties to the agreement. In both these cases, authority limits are specified and performance incentives are linked with the achievement of targets. Both the systems also try to improve performance by clarification of objectives at the initial stages. As far as differences are concerned, in the case of MBO system, it concentrates on internal management to achieve results while the MOU system deals with Government public enterprises inter-face. In the MBO approach the target are set for the enterprise as a whole. Another difference is that in the case of MBO as in many other systems only one value is attached for any performance indicator, whereas in MOU, each parameter has a range of targets which facilitates evaluation of deviation of achievement from targets. The MOUs have weights attached to each of the objectives, so that their relative importance is measured. This is, however, absent in MBO system.
In the case of Zero Base Budgeting (ZBB) system, the first step is to determine the decision package. The decision package is the basic building block of ZBB. It is normally a project or an activity for which a clear cost benefit analysis can be made. All activities are grouped into various decision packages and detailed cost benefit analysis is carried out for each of the package. Then they are ranked in order of their net benefits.

The objectives in introducing ZBB in India are identification and sharpening of objectives, examination of various alternate ways of achieving these objectives, selection of best alternative through a detailed cost benefit analysis, prioritization of objectives and programmes, switching off resources from low priority areas to high priority areas and identification and elimination of activities which have outlined their utility. Design packages under ZBB deals with the objectives, programme to realise the objectives, benefits accrued from achievement of objectives, increments for additions to be made to decision activities as well as fixing alternatives to achieve objectives and determining the mode of funding various activities.

As in the case of MOU, ZBB prioritizes the various objectives by ranking the various “decision packages”. The evaluation of the various activities is made in both cases, but in ZBB it is made by the enterprise manager. Both require a good information base for successful implementation.

There are also many dis-similarities between ZBB and MOU. The primary objective of ZBB is optional resource allocation, while the thrust of MOU is performance
improvement through increased autonomy and accountability. Unlike the MOU, ZBB is not a system of agreements or contracts and hence there are no two parties. There is no formal incentive scheme attached to ZBB, while a good performance incentive scheme is an integral part of a good MOU system. Another difference is that ZBB tries to improve performance by adopting the best alternative and by eliminating items that have outlived their utility while the MOU tries to improve performance by clarifying the performance criteria and targets. In the MOU system the focus is on organisation as a whole, i.e., how the organisation achieves the objectives is primarily left to the Chief Executive while the ZBB methodology is activity oriented.

Project planning and analysis is another area that requires attention. Experience has shown that there have been many deficiencies in the planning and execution of projects. In fact, lack of attention at the formulation stage of the projects has been the main reason for the project failure. Efficient management of working capital is a pre-requisite for the success of an enterprise. It is observed that in the case of public enterprises in India that half of the inventories are excessive compared to their production requirements and they need to be checked. The implementation of some of the basic and simple inventory control techniques would go a long way in improving the managerial efficiency of public enterprises. It is believed that public enterprises in India can reduce their level of inventory to a considerable degree ranging from 10 to 20% without any adverse effect on production and sales by resorting to simple inventory control techniques like EOQ, ABC analysis and standardisation of items.
On the basis of the experiences of selected developing countries, is it possible to work out the criteria for public enterprise efficiency? Performance of public enterprises, in the ultimate analysis, is the ability of the enterprises to meet and fulfil the various national and state level objectives for which they are set up. Prahlad Kumar Basu says that “it is, therefore, necessary to identify, classify and rank the objectives into physical, financial, economic and social objectives”. He further states that the ability of an enterprise to meet these objectives effectively is the final performance indicator of an enterprise.

However, the problem of proper evaluation of the performance of public enterprises both at the Central and State levels, has remained unsolved to a large extent. For improving the efficiency of public enterprises, it is necessary to have continuous monitoring of their performance. This function is almost absent in the state level public enterprises. Hence it is essential to evolve a framework for performance evaluation.

2.6. Financial criteria

In the literature, more often than not, it is the financial profitability that is used as an important criterion for the evaluation of public sector performance despite the widely accepted conceptual problems with this approach. Perhaps, as Sen argues, the tendency to judge the success or failure of public enterprises based on this criteria might not be fully justified, but it is fairly inescapable in the absence of a different system or well formulated alternative criterion for performance evaluation.
The Committee on Public Undertakings and the Comptroller and Auditor General of India have indicated some broad criteria of efficiency measurement in public sector in resource allocation, resource utilisation, etc. The Arjun Sen Gupta Committee (while agreeing with the difficulties to specify a single measure of efficiency in the case of public enterprises) has suggested an operating efficiency criterion, which includes gross margin on assets for an enterprise, net profit to net worth for core sectors and profit making enterprises, and gross margin on sales for service enterprises. The Committee also suggested a simple monitoring of productivity and costs by examining the direction of change in indicators like capacity utilisation, raw materials cost per unit of output, value added per rupee of wages etc. According to that report, the overall indicator measuring dynamic efficiency is the growth of total factor productivity, which takes into account the contribution of all inputs in the total growth of output.

A number of studies assessing the relative performance of public and private enterprises in India have appeared over the last decades essentially emphasising on the financial criteria. The important studies judging performance in terms of financial profitability include those by Das (1967), Sri Ram and others (1976), Dubashi and Lahiri (1967) and Bhalla and Mehta (1970). Given the fact that financial profitability is far from perfect as an indicator of overall performances, the utility of these studies is rather limited. We must, therefore, look for a set of yardsticks which remain relatively unaffected by market imperfections, the vagaries of price policy, monopolistic or other constraining marketing postures and which in this sense can be treated as more objective. These yardsticks can
be found within the physical characteristics of the productive process. A disaggregation into such elements as financial efficiency and productive efficiency should capture the firm’s financial viability. At the same time, it is necessary to temper the financial judgement with an assessment of productivity levels.

One of the major problems in the evaluation of performance of public enterprises is the absence of proper financial management and control in these organisations. Finance departments are not managed by suitably qualified and experienced professionals. No proper account is being maintained by many enterprises. In many cases, the accounts are in arrears varying from 1 to 8 years. One can very well imagine what the plight of these organisations will be. Many a time these enterprises gives only provisional working results to the Government and legislature committees which is expected to monitor the performance of the public enterprises. However, with only provisional accounts not much controls are possible to be exercised. The provisional accounts, when finally audited after a lapse of 2 or 3 years, substantially vary from the final accounts. To cite an example, one of the enterprises selected for the study showed a loss of Rs. 7.02 lakhs in a year. But when accounts were published after 1 year, it resulted in a loss of Rs. 350.25 lakhs. Thus the lack of proper and up to date accounts in public enterprises is a major impediment in any system of performance evaluation.

Prior to the development of quantitative measures of company performance, several agencies were established to supply qualitative information, assessing the compliance of loan agreements, bankruptcy, etc.
2.7. Ratio Analysis

The analysis and interpretation of financial statements are generally aimed at determining the financial position of a firm. Ratio analysis is a part of the total analysis of the financial statements. Financial ratio is used as an analytical technique for assessing the performance of the concern.

Financial analysts have been using ratios since as early as the 1890's but it is only recently that researchers have applied rigorous empirical techniques for enhancing the quality of the ratio analysis. Traditionally, current ratio was popularly used to evaluate the credit worthiness of the business enterprise. Today, ratio analysis involves the use of several ratios by a variety of users including credit lending, credit rating agencies, investors and management professional for judging the position of the firm. Recently, researchers have applied sophisticated statistical techniques to ratio analysis and proved that the statistically derived ratio functions are more accurate and efficient for providing guidelines to the analysis.

It is revealed from studies that ratios are a better measure of prediction of events. The events chosen for prediction in recent studies were concerned with the failure of the firm, non-compliance of loan agreements, bankruptcy, etc.

Prior to the development of quantitative measures of company performance, several agencies were established to supply qualitative information, assessing the
creditworthiness of particular firms. Some studies were made in the 1930's to understand how ratios of a failing business enterprise are significantly different from the ratios of a continuing enterprise. In addition, another study was concerned with ratios of large-asset size corporations that experienced difficulties in meeting their fixed indebtedness obligations.13 A recent study done in 1966 indicates how the ratios of failed firms individually differ from the ratios of non-failed firms.14 This study revealed that ratio analysis is useful in the prediction of failure for a period up to five years before the failure. Additional widespread interest was created by the publication of Edward Altman's article, which suggested that corporate bankruptcy could be predicted reliably by applying a sophisticated statistical technique called multiple discriminant analysis to financial ratio analysis.15 Since then several other researchers have conducted research in this area. These studies have concluded that the ratios can be used as predictors of events like failure, bankruptcy, etc. Similarly, the ratios commonly used for measuring liquidity, profitability, solvency, etc., are found to be better indicators of events. It is worth examining in this context, findings of previous studies to search the areas for further research. The development of ratio prediction model and the implication of such model are discussed in the following studies.
2.8. W. H. Beaver

Beaver for the first time in 1966 attempted to demonstrate that the failure of an enterprise can be predicted reliably through the combined utilisation of sophisticated quantitative techniques and financial ratio analysis.\(^{16}\) Beaver defined failure as a business defaulting on interest payments of its debt, overdrawing its bank accounts or declaring bankruptcy. His sample consisted of 79 failed firms and 79 non-failed firms. He selected the failed firms on the basis of the industry and asset size of the firms. The non-failed firms were selected keeping in mind industry and size of failed firms. He adopted a paired sample designed, i.e. for each failed firm in the sample of a non-failed firm of the same industry and asset size was selected. The data in the form of financial statements were collected for 1954-64. Beaver employed 30 ratios which were divided into 6 ratio groups, viz., cash-flow ratios, net income ratios, debt to total asset ratios, liquid asset to total asset ratios, liquid asset to current debt ratios, and turnover ratios. Beaver used a dichotomous classification test and the per cent age error of each ratio for the classification of firm was ascertained. Only one ratio from each of the group was selected in such a way that the ratio selected had the lowest percentage error within the concerned group. Beaver developed a cash-flow model or liquid asset flow model. According to him the firm is viewed as a reservoir of liquid assets which is supplied by inflows and drained by outflows. The reservoir serves as a cushion or a buffer against the variation in the flows. Therefore the solvency of the firms can be defined in terms of profitability that the reservoirs are exhausted, at which point the firm becomes unable to pay its debts.
A comparative study of mean values of the ratios for the failed and non failed groups indicate whether the mean values of the ratios differ from failed to non failed groups. But the comparative study of the ratios does not indicate the predictive ability of the ratios. Beaver used the dichotomous classification test for prediction and therefore the values of the ratios are arranged separately in an ascending order. In that case each ratio has an optimal cut off point which minimises the per cent age of incorrect prediction. If the value of a ratio falls below the cut off point, the ratio assigns the firm to the failed group and vice versa. After each firm has been classified, the observed prediction is compared with expected classification and the per cent age of error is ascertained. This procedure was followed for each of the 30 ratios. Beaver found six ratios significant from the comparative study of the mean values. He ascertained the per cent age error of these six ratios from the dichotomous classification tests. He concluded that the ratio of cashflow/total debt had an excellent discriminating ability throughout the period of 5 years. The ratio of cash flow/total debt mis classified only 13% of the sample for one year before bankruptcy and 22% of the sample for 5 years before bankruptcy. The ratios did not predict the failed and non failed firms with the same degree of success. Non failed firms can be correctly classified to a greater extent than the failed firms. His findings are based on the univariate model which has several limitations. Yet Beaver’s study made a good beginning for assessing the quality of ratios by employing quantitative techniques. Thus, his study warrants its distinction as a land mark for further research in ratio analysis.
Beaver in another paper attempted to emphasise the need for empirical verification of a priori beliefs, by citing one area where widely held beliefs were found to be erroneous when examined by empirical evidence. He had evaluated empirically the alternative accounting measures in terms of their ability to predict events on the basis of accounting data. This study is extension of an earlier effort based upon the same body of data.

Liquid asset ratios played the major roll in the traditional ratio analysis. A liquid asset measure, current assets, determined the test of solvency. In this regard, Foulke states, "The classification of current assets is undoubtedly the most important classification in the balance sheet, as current asset largely determined the going solvency of a business concern." The hypothesis in the literature with respect to the predictive ability of liquid asset measures is of two types:

1. Liquid asset measures vis-a-vis non liquid asset measures, and 2. liquid asset measures vis-a-vis each other. It is believed in the literature that the liquid asset ratios predict the failure better than the non liquid ratios. Similarly it is believed that the liquid asset ratios are more useful for short term production and the non liquid ratios are useful to the long term prediction. Beaver attempted to test these two hypothesis which are held good in the literature. He studies 14 ratios which were divided in to non liquid asset ratios and liquid asset ratios. Three non liquid ratios were studied; cashflow to total debt, net income to total asset and total debt to total asset. Cash flow was defined as net income plus depreciation, depletion, and amortization. Total debt includes all liabilities plus preferred stock. Eleven liquid asset ratios were studies. These ratios were divided
into three common denominator groups: a total asset group, a current debt group, a net sales or turnover group. Within each denominator group, four liquid asset measures were studied: current assets, quick assets, net working capital and cash. Although the current asset was the first liquid asset measure used in solvency determination, it has been severely criticised. One criticism is that the inclusion of inventory impairs the measure’s usefulness. This is found more so in the case of failed firms. Another criticism is that the item of current assets, when analysed in the form of current ratio, is subject to manipulation through a practice known as window dressing which involves the temporary payment (or incurrence) of current debt just prior to the financial statement data and results in a spurious improvement in the current ratio.

Beaver used these eleven ratios for the data as utilised in the previous study. The data were analysed at three levels. (1) the dichotomous classification test, (2) the comparison of mean values of ratio components, and (3) the likelihood ratio analysis. Beaver ascertained the percentage error of each ratio by conducting the dichotomous test. The findings of the study are quite interesting. The most striking feature of the data is the consistently superior performance of the non-liquid asset ratios. The cash flow and net income ratios have a lower percentage error than other liquid asset ratios in all five years before failure. The debt asset ratio predicts better than those eleven ratios for a period of one, four and five years before failure. Surprisingly, the superior predictive power exists not only in long-term but also in the years shortly before failure. The superior predictive ability of the non-liquid asset ratios in the short term is contrary to what the literature
asserts and warrants explanation. Beaver has drawn another inference from his analysis. It was believed that the net working capital would predict better than current assets. Quick asset also, on balance, is a better predictor than current assets although its margin of superiority over current assets is not as large as the that of net working capital. An unexpected finding was the performance of cash, which predicted better than both current assets and quick assets.

Beaver has made a comparative study of the mean values of the ratios for the failed and non-failed firms. He finds that failed firms generate less sales and have poor cash flow and net income position. They incur heavy debt. This combination of causes leads to a marked deterioration in their solvency position. He admits that the comparative mean value study could not be an alternative to the dichotomous test because it relates solely on the comparison of means. Differences in mean values are difficult to interpret without additional knowledge about the ratio distribution. A likelihood ratio analysis is another test which was conducted by Beaver. This test is similar to the classification test. He has emphasised the classification test because it is a more convenient and accurate measure.

Thus, Beaver showed that the a priori feelings in the literature did not hold good. He concludes that the financial ratios could be useful in the prediction of failure for at least five years prior to the event. “The user cannot choose among ratios indiscriminately. Persistent differences in predictive ability were found, many of which were not correctly anticipated by priori arguments in the literature”24.
In the previous study, the methodology was essentially univariate in nature and emphasis was placed on individual signals of impending problem. This type of study, based on the univariate model, is susceptible to faulty interpretation and is potentially confusing. To overcome the limitations of the univariate model, Altman suggested the multivariate model, consisting of a few important variables. It was also necessary to attach some weights to the variables in the model on the basis of their significance in defining the events. Altman adopted the multiple discriminant analysis as an appropriate statistical technique. The multiple discriminant analysis was first used in the study, conducted by R.A. Fischer in 1930s. In the earlier years the discriminant analysis was used mainly in the biological and behavioral sciences. More recently, Durand used this method to solve financial problems such as consumer credit evaluation and investment classification.

Walter utilised the model to classify high and low price earning ratios of firms and Smith applied the technique for the classification of firms into standard investment categories.

Altman had developed the model by collecting necessary data relating to the objects in the groups and thereby deriving their linear combination which becomes a discriminant function between the groups. Based on the financial ratios of certain selected companies, he has evolved a set of discriminant coefficients, which when applied to actual ratios formed mutually exclusive groupings. The conceptual part of the model is discussed later.
The model developed by Altman formulates only two groups of firms, namely, bankrupt and non-bankrupt firms. The sample selected for one group consisted of bankrupt firms which filed bankruptcy petitions during 1946-65. The other group included firms in existence during 1966. After the two groups were selected, necessary data were collected from the financial statements relating to the periods preceding the filing of bankruptcy petitions by the first group of firms. Altman used 22 ratios for evaluation and these ratios were broadly classified into five categories, viz. Liquidity, profitability, leverage, solvency and activity ratios. Out of 22 ratios, 5 ratios were finally selected on their relevance in prediction of corporate bankruptcy. These 5 variables were introduced in the model and the discriminant scores or Z values were obtained with the help of the discriminant function in the form:

\[ Z = V_1X_1 + V_2X_2 + \ldots + V_nX_n \]

Where \( V_1, V_2, \ldots, V_n \) are the discriminant coefficients

\( X_1, X_2, \ldots, X_n \) are independent variables (ratios)

The Z score of each firm was used for classifying the firms. The final profile of variables was arrived at; first, by determining the relative contribution of each independent variable and, secondly, by evaluating the correlations between the relevant variables. The relative accuracy of various profiles in the context of prediction was also tested. The variable profile selected finally did not include the most significant variables out of the 22 original ones. Judging from the contribution of the entire variable profile, the one which was doing the job best was selected. The final discriminant function included the following ratios:
Altman performed the ‘F’ test to find out the individual discriminating ability of the variables. The test related the difference between the average values of the ratios in each group to the variability of values of the ratios within each group. He found that variables $X_1$ through $X_4$ were all significant at the 0.0001 level indicating extremely significant differences in these variables between the groups. Variable $X_5$ did not show a significant difference between groups, yet it was included in the model. Altman employed one more technique, namely, the scaled vector to determine the relative contribution of each variable to the total discriminating power of the function and the interaction between them. The scaled vector is computed by multiplying corresponding element by the square root of the diagonal elements of variance-covariance matrix. In his study, the large contributors to group separation of the discriminant functions are $X_3$, $X_4$ and $X$ respectively. Altman has shown that Sales/Total assets ratio has larger contribution in the group separation and this ratio was significant in the univariate study. His study indicates that bankrupt firms suffer from losses, poor sales and lack of working capital funds.
Having established the model, he conducted several tests to ascertain the accuracy of the model. His model classified correctly 94 per cent of the firms in the initial sample for one year prior to the bankruptcy. When this model was used for the two years before the event date of the units in the initial sample, the percentage of the accuracy in the classification was reduced to 72.00. He tried a similar model on the secondary sample for one year prior to the date of event. Surprisingly, the accuracy of the model for the secondary sample data was higher than the accuracy of the model-based on the initial sample data-by 2 per cent. He developed another secondary sample wherein the firms were not bankrupt but they did suffer from heavy losses in the last two years or so. The model classified 79.00 per cent of the firms thus, the discriminant model indicated encouraging results. Altman had tried to find out the long range accuracy of the model. He tested the model on the initial sample for three years, four years and five years before the event. The percentage of accuracy was reduced to 48.00, 29.00 and 36.00 respectively. This is logically true as the lead time increases the relative creditive ability of the model would decease.

Altman concluded that the Z score of 2.675 was the best cut off point which maintained minimum mis-classification. He ascertained this cut off point by preparing several frequency tables. He pointed out that this model could be used in loan application evaluation. This model can save time and cost in the evaluation of loan applications. He further suggests that the discriminant model is used correctly and periodically has the ability to predict corporate problems early enough so as to enable management to realise
the gravity of situation in time to avoid failure. If failure is unavoidable the firm’s
creditors and stock holders would be better off if a merger with the stronger enterprise is
negotiated before bankruptcy. One more use of the model would be to the analyst who
can use the model to predict failure and such prediction can help him to recommend an
appropriate investment policy.

Altman created interest in the minds of academicians and the management people by
publishing one more paper on the implication and suggestion for commercial loan
evaluation²⁹. He extended the implications of his model to the area of commercial loan
evaluation based on the information gathered in his previous study.³⁰ He investigated the
results of the previous study and attempted to find out how best the discriminant model
would help loan officers of commercial banks and other business lending institutions to
develop loan evaluation techniques. He found that most of the variables which are
relevant in the context of bankruptcy are also potentiality important to the prediction of
loan defaults. This model, like any other credit scoring model would reduce the time of
loan officers in evaluating loan applications. The time saved by doing this exercise can
be utilised for examining in detail the applicants whose scores are much below cut off
point. It would be applied quickly and cheaply in the initial stages of negotiation and
conceivably diminish follow up investigation. He referred to the small banks, which
might not have the resources to develop such a time saving computerised model and
suggested that there could be an outright transfer of technology from the larger to the
small institutions. He indicated that this model is to be updated in the light of experience.
Finally, he concludes that this type of model would help the bank, provided care is taken in developing the model.

2.10. David Ewert

Ewert investigated in 1968 on the basis of information supplied in the Dun and Bradstreet credit reports that ratios can predict non-repayment of receivables, keeping 82 per cent accuracy. His sample consisted of 300 trade accounts of a California manufacturing concern. His 17 variables included only two ratios and the other 16 variables were non-ratios like trade credit payment reports, legal form of organisation, ownership of premises, etc. His sample consisted of small as well as large business concern. By using multiple discriminant analysis, he found that non-ratio variables can do equally well in the prediction of non repayments. Ewert found that the ratios included in the list of 17 variables did predict equally well the non repayments and his model correctly classified 82% of the trade accounts.

2.11. Marc P Blum

In 1969, Blum constructed a theoretical model based on accounting and financial market data, which was designed to discriminate between failing and non-failing firms. He defined failure as “entrance into a bankruptcy proceeding or an explicit agreement with creditors which reduced the debts of the company.” His sample consists of 115 industrial firms which failed during 1954-68 (with liabilities greater than 1 million dollars) and a
paired sample of 115 non-failing firms being similar with respect to industry, annual sales, number of employees and fiscal year. Data up to eight years prior to failure were collected when available; however, five years of data prior to failure were found optimal. Based upon validation sample test, Blum concluded that his model had an accuracy of 93 to 95 per cent when failure occurred within one year of the statement date. The accuracy declined to 80 per cent for prediction three years prior to failure. Blum’s primary contribution was the inclusion of ratio trends and variance (stability over time) as predictors. His best overall function contained twelve ratio variables of which five were measures of ratio trend or variance.

2.12. Paul A Meyer and Howard W Pifer

Meyer and Pifer attempted to build up a model for prediction of bank failure. Their study indicated the factors affecting bank failure. Such factors were divided into four groups: (1) local economic conditions, (2) general economic conditions, (3) quality of management, and (4) integrity of employees. The sample consisted of 30 solvent banks. The data were collected in the form of financial statements and from the report of the Federal Deposit Insurance Corporation. The financial information was used to work out 28 operating ratios and 4 balance sheet ratios. The data were gathered for a period of six years. They used multi-regression analysis to find out the predictive ability of the ratios. Their model correctly classified 80 per cent of the banks in the initial sample and 72 per cent of the banks in the hold-out sample for one year and two years before the failures.
When the lead time is three years or more, financial variables are unable to discriminate between viable and failing banks. This study suggests that along with financial ratios the report of the Federal Deposit Insurance Corporation should be studied to make a better prediction of bank failures. Having ascertained the failing banks well in advance, proper action may be taken to avoid the failure. Thus, this study emphasizes that a study of ratios alone cannot predict the failure of banks.

2.13. Craig Johnson

In 1970 several criticisms were made by Craig Johnson on ratio prediction as stated below.35

(1) The models built up for predicting failure have not enabled the analyst to differentiate between firms which will fail and firms which will almost fail. Any exercise on the prediction of alternatives to failure would be more meaningful.

(2) Although the ratios are usually compared with similar ratios for the same firm over time or with ratios of like firms, neither the absolute levels of ratios nor their relative magnitudes can be evaluated in isolation. Hence, ratios have a meaning only if they are related to some standard.

(3) Ratios by themselves cannot describe a dynamic system. The variables in the ratio analysis are defined as fixed over a period of time and, therefore, they lack an explicit dependence upon time. As a result, ratios are limited to a comparative static analysis but the failure of a firm is a dynamic process.
He further states, “The Altman’s model demonstrates that failed and non-failed firms have dissimilar ratios, not that ratios have predictive power. The crucial problem is to make an inference in the reverse direction, i.e. From ratios to failure.” It must be demonstrated that stratified random sample of ratio values can imply failure and non-failure. Such a demonstration requires a decision model to logically link the given ratio values to groups of failed and non-failed firms. Unfortunately, no model has been provided not has any statistical evidence been presented.

He concluded that Altman did not provide any evidence of the ability of ratios to predict failure. He has not established any logical link between the given values of ratios and groupings of failed and non-failed firms. Merely measuring the degree to which the state of failure is related to the current status of the firms does not differentiate between near-failure and outright failure. Without additional evidence or a decision model, the practical value of ratio analysis to the failure issue is still an open question.

Altman replies to the queries made by Prof. Johnson who urged that the multiple discriminant analysis does not distinguish between failure and alternatives to failure like mergers, etc. Johnson states that Altman’s study does not provide any model on the strategic random sampling of the ratios selected and their linkage with the grouping of failed and non-failed firms.
Altman replies that the question is not whether a firm should be bankrupt if it displays certain ratio measures but whether its symptoms are similar to other firms which have continued to deteriorate towards bankruptcy. The discriminant bankruptcy model is a form of stochastic analysis specifying a general model for predictive purposes. More specific models can be developed for predicting results of individual firms. Ratio models dealing exclusively with firms in a particular industry or product line will yield more representative parameters which can be used for future predictions of other firms in the same line of business. Replying to Johnson’s query, Altman states that models utilising ratios can be predictors of failure but this should not preclude complementary opportunistic analysis. It is obviously true that alternative strategies, e.g. mergers, may avert a formal bankruptcy situation. This aspect does not diminish the overall usefulness of the ratio model.

Johnson argues further that alternatives to bankruptcy, like merger, may present themselves and thereby cause predicting errors of the Type II variety. Altman replies that financial ratios cannot trace the causes of failure but can attempt to measure the extent to which a firm’s policies and problems have resulted in poor performance. In many cases, the serious deterioration of the firm as measured by the ratios could have been detected even three years prior to bankruptcy.

Johnson’s major concern is as regards the ‘definitional’ nature of ratios with respect to bankruptcy. He states that Altman has failed to establish a logical relationship between
the ratios and the prediction of bankruptcy. Altman counter argued that bankruptcy arises due to negative working capital and negative financial status. Negative working capital is measured by the ratio of negative working capital to total assets and negative net worth is measured by the ratio of negative net worth to total assets. Altman has empirically tested these hypotheses and found that these two ratios were significant in predicting the bankruptcy with 82 percent accuracy.

Johnson argues that the ratio-discriminant model is not dynamic in nature and therefore cannot capture whatever time series contribution is relevant towards failure contributions. Altman admits that more work needs to be done in this area. Some new work of combining information theory and ratio analysis is perhaps potential with a view to add dynamics to failure prediction.

2.14. Robert Edminster

In an investigation of ratio analysis of business firms borrowing or receiving loan guarantees from the Small Business Administration (SBA), Edminster found that good predictions could be made by using a ratio function. A business was defined as a failure if its SBA loan was written off as a loss: otherwise, the business was considered a success. He drew a sample of 21 borrowers who failed to repay and 21 borrowers who had not failed to repay loans, granted under the SBA programme. The data were collected for a period of three years. The borrowers were selected on the basis of industry and size.
Edminister considered all the ratios that were found significant in the studies conducted by Beaver, Altman, Ewert and Blum, except the net operating margin. Thus, Edminister considered in all 19 ratios.

Edminister sets the following hypotheses.

1) A ratio level is a predictor of small business failure. The hypotheses represented the use of ratios in their crudest form: no adjustment is made for variations between industries nor are the ratios compared with one another. It is based upon the theory that there are standards which are applicable to all firms. The relative level of borrower’s, ratio to the average ratio of other small business in the same industry is hypothesized to be a predictor of small business failure. To test this hypotheses the ratio level of certain industries, based on the RMA and SBA published annual statements, was considered and compared with the ratio level of the borrowers in this study.

2) A three years’ trend of each ratio is a predictor of small business failure. A weighage may be given for an upward trend and a downward trend. Edminister assigns a value ‘1’ for the upward trend and ‘0’ for the downward trend.

3) The three years’ average ratio is a predictor of small business failure. Averaging is expected to smooth the ratios and to result in more representative figures than that calculated from only the most recent statement. Edminister works out the averages for RMA and SBA relative ratios to provide an index of the relative firm to industry position over 3 years.
4) The combination of the industry relative trend and the industry relative level for each ratio is a predictor of small business failure. This hypothesis has not been presented in previous empirical results, but is an explicit representation of the conditional nature of ratios, recognized by the ratio analysis. To establish an interaction between the trend and the level of ratios Edminster formed four types of interactions, namely, trend up high level, trend up low level, trend down high level and trend down low level for each of RMA and SBA relatives.39

After financial statements were compiled and ratios calculated for the borrower and the industry, the next step was to relate the ratios to failure. He adopted four methods of analysis.

1) The borrower's ratio was divided by the respective industry ratio (RMA or SBA) to form an industry relative.

2) The trend of the industry relative was noted as up-down or non-existent.

3) The three years average ratio was calculated, and

4) The trend and the recent level were considered together as a joint condition

The trend and level were believed to be variables which might 'interact' or act in regard to predict failure. To determine the ability of these ratios to predict failure, it was attempted to use the multiple discriminant analysis.
He adopted the following steps to measure the discriminant function of the ratios:

1) Comparative figures of the financial statement of the sample units with RMA and SBA averages figures,

2) Comparative ratios of the sample units,

3) Appropriate industry relative ratios,

4) Comparison of sample units' ratio with standards to determine values of each of the seven variable,

5) Substituting the value of each variable into the credit function and working out capital Z values, and

6) Comparison of the sample unit’s Z values with predetermined cut off points defining ‘accept’, ‘grey’ and ‘reject’ areas.

Edminister found that the discriminant model developed for small business demonstrated 92% accuracy in the initial sample and 80 per cent accuracy in the validation sample. The preliminary results indicate that ratio analysis may benefit by comparing industry averages with borrowers’ ratios and by using a small number of ratios representing different borrowers’ characteristic rather than one or a few ratios describing very similar borrower’s conditions.

The discriminant function demonstrates an ability as great as those functions recently estimated for much larger firms. However, the small business function fails to discriminate when only one statement is available whereas Altman and Beaver show that
one financial statement is sufficient for a highly discriminent function for large business. This leads to the conclusion that at least 3 consecutive financial statements are necessary for analysis for a small business.

While the ratio analysis may be specifically described in terms of present conditions and future events, the algorithms appear highly complex. Corresponding to each ratio is an optimum analytical method such as averaging or division by industry standards. Multiple discriminent analysis offers one mean of selecting an optional set of ratios and offers of assigning weights to obtain a relatively simple function. Analyst interested in predicting small business failure may find this function not only more accurate method but also a more efficient technique than the subjective process currently practiced. Thus, Edminister attempted to improve the quality of the ratio analysis by considering average ratios, ratio trend, ratio level and the interaction of trend and the level. He conclude that the linear combination of these variables can produce better prediction.

All the above methods of performance evaluation were developed taking into account the conditions obtaining in the private sector companies in the developed countries. It may not be therefore possible to apply any of those methods in toto to public enterprises either at the central or state level. However, having some of the approaches of ratio analysis whether a system can be developed for the performance evaluation of public enterprises in India is a possible area of research that should be considered seriously.
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