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Chapter II

Conceptual Perspective of Financial Distress

2.1 Introduction

With globalization, financial distress has assumed greater consequences in almost all the developed and developing economies throughout the world, and India, being a developing one, is not an exception to its ill effects. In India, industrial sickness has assumed a greater proportion in recent times. The worst hit sector in India is the Small-Scale-Industrial (SSI) sector and industries like cotton, jute, textile, sugar, cement etc., which belong to this category mainly, are the worst sufferers of industrial sickness. As for example, going by a note on jute sector issued by the Jute Section, Ministry of Textiles, Government of India, available at www.texmin.nic.in, there are 93 composite jute mills in India at present, out of which 26 mills have been closed down as of 31st August, 2015. The enquiry as to why nearly 28% of jute mills have closed down requires a brief conceptual discussion on financial distress, which is done below.

An industrial unit is generally considered sick when its financial position becomes unstable and yields dissatisfactory results, and which gets worse year after year. In such a situation, an organization starts incurring losses and its accumulated losses get stretched out in course of time and its current liabilities exceed its current assets, and the organization becomes unable to pay off its liabilities partially or fully. There may be several factors responsible for such failure, some of which may be internal, while others may be external depending upon their source and nature. External factors are hard to remove due to their uncontrollable nature, and internal factors can be overcome fully or partially since they are inherent to an industry. But, besides these reasons, there exists another problem from which the SSI sector in India suffers and that is lack of proper strategies for timely identification of the symptoms of sickness. It means that had there been a proper predictive model for identification of the timing and degree of industrial sickness for this sector, the situation could have been averted because such prediction would have made it easier for the SSI unit to take preventive measures against financial distress. Though the ultimate financial failure or corporate bankruptcy does not grow overnight, but rather slowly and in several stages and even sometimes it takes several years, the dearth of appropriate strategies to identify the initial symptoms of sickness, in most of the cases, brings in corporate insolvency faster and quicker. Experiences suggest
that if no treatment is made in the initial stage of sickness, it may go beyond control to an advanced stage, and as a result, the business may have to be closed down.

An increasing trend in industrial sickness touching all types of units including small, medium and large-scale industrial sectors is of considerable concern in India at present. Many companies, both from private and public sector, are going into financial distress in today's complex and competitive business environment regularly and are contributing largely for the downfall of industrial scenario of India. Moreover, their economic consequences are invariably affecting not only the owners, employees and creditors, but are causing huge wastage of national resources and social unrest too. So the need of the hour is to find out some protective measures to alleviate the chances of entering into financial distress for an industrial unit and that can only be possible if a particular company can be anticipated to be heading towards sickness, well in advance. Accordingly, the present chapter makes a modest attempt to build up a conceptual understanding of financial distress by examining the symptoms, causes and legal framework of financial distress, and reviewing the existing predictive models and rehabilitation practices for financial distress.

2.2 Concept of Financial Distress

The concept of financial distress is age old and its literature has been growing rapidly, both nationally and internationally, with time. Financial distress generally means a situation when a company faces trouble with its creditors or is suffering from debt obligations. It does not necessarily mean that all the undergoing projects of the firm concerned are worthless, rather it can just be a negative or poor cash flow situation which brings in financial crisis. Sometimes it may be a result of low capital base and low level of technological and managerial know-how etc. Very often the term “financial distress” is used interchangeably with terms like “insolvency”, ‘bankruptcy’, ‘illiquidity’, ‘ruin’ etc. However, these terms have been properly defined by Altman and Hotchkiss (2006), according to whom ‘bankruptcy’ is equivalent to making a formal petition of bankruptcy with the courts under the National Bankruptcy Act, USA. ‘Failure’ arises out of the situation where the realized rate of return on invested capital, with allowances for risk consideration, is significantly and continually lower than the prevailing rates of similar investment. ‘Insolvency’ represents negative performance due to liquidity problems. It is of two types- one is ‘technical insolvency’, and the other is in the sense of ‘bankruptcy’ and the latter one is more critical and chronic in nature. Lastly, ‘default’ is a situation
where a firm violates terms and conditions of an agreement with a creditor and calls for legal actions. An organization enters into this phase when its power to generate earnings is less, and the amount of debt exceeds the value of the company’s total assets. Turetsky and McEwen (2001) explained that financial distress arises from a number of unfavourable financial incidents thereby leading to subsequent changes in the financial position of the distressed firm. These changes may well be considered as the different stages of financial distress. An organization becomes technically insolvent or financially distressed when it becomes unable to meet its liabilities, and when the terminal value of its assets falls below the face value of its liabilities.

2.3 Stages and Symptoms of Financial Distress

An industrial unit does not become financially sick overnight, rather it may show symptoms of sickness much before, and therefore, if proper measures are undertaken from the beginning, it can be avoided. An industrial unit passes generally through various stages before it becomes ultimately sick and gets liquidated. In some cases, the sick unit may recover and go into a healthy stage slowly over time. The sickness may start with short term liquidity crisis, revenue losses, operating hurdles and over usage of external financing until it reaches a stage where it is overstrained with debt obligations, and on being unable to generate enough funds to meet its commitments, it becomes financially sick. So, timely action is required for identification of such symptoms of sickness well in advance. Such symptoms are often called as the signals of financial distress. The existence of these signals provides a ground for suspecting that the industrial unit concerned is prone to sickness. The following discussion summarises the different stages along with the various symptoms of financial distress of an industrial unit in a more simplistic manner.

Stage I: Healthy Stage

This is the stage when all the functional areas of an industrial unit namely, production, operation and administration are working properly and efficiently, and the business is making its presence felt in the market with all its good name and reputation. The indicators of this stage are:

- Value addition in respect of shares and debentures.
- Increase in market reputation.
- Regular payment of dues.
- Making sufficient profit.
Stage II: *Initial Sickness*  
This is the stage when some factors are working against the firm’s expectation and, as a result, some regular activities or major operations are getting hampered, and the firm cannot make proper utilization of the available resources. The symptoms of this stage are:

- Declining sales.
- Loss for the current period.
- Declining profit.
- Increasing cost.

Stage III: *Potential Sickness*  
Now, the problem is growing severe and appropriate remedial measures need to be taken. The symptoms of this stage are:

- Cash loss during the last financial period.
- Future cash loss is strongly foreseen.
- Increasing failure to meet debt obligation.

Stage IV: *Ultimate Sickness*  
This is the stage when the situation gets worse. The future of the firm is in high danger and uncertainty. The symptoms of this stage are:

- Delayed payment to suppliers resulting into withdrawal of credit facilities by them.
- Large accumulation of inventories.
- High labour turnover.
- Declining market reputation.
- Default in payment of statutory dues.
- Declining capacity utilization.
- Default in repayment of interest and principal to financial institutions, bondholders etc.
- Overdrawing of the credit limits sanctioned by banks resulting into suspension or withdrawal of facilities by banks.

Stage V: *Liquidation*  
This represents an irrecoverable financial condition for an industrial unit suffering from financial distress over a long period. If left unchecked, the distress can eventually reach a point at which the business may become completely unable to meet its obligations. At that point, the company is likely to take several different measures to relieve the stress,
including selling off assets, or even declaring bankruptcy. Liquidation may be partial or complete. With a partial liquidation, the business sells off assets, including divisions of the business, which are not needed for the continued operation of the core businesses. A complete liquidation means selling of all assets and the eventual dismantling of the company as a business entity. As another alternative, the firm may go through bankruptcy proceedings which may be necessary to protect the business from creditors, while the company gets reorganized under the directions of the court thereby allowing the organization to at least have a chance of getting back on a stable financial foundation. Thus it is clear from the above discussions that financial distress is a sequential process. The ultimate sickness i.e. bankruptcy or liquidation comes after several stages of failure and every one of these stages has their own symptoms. The symptoms of each stage are visible in an organization, if watched, analyzed and monitored regularly and carefully, but at the same time it is also true that the stages discussed above are not exhaustive and it is also not necessary that each industrial unit suffering from financial crisis should pass through each of the above mentioned stages. In some cases, financial sickness may arise even in the very watershed phase of an organization due to some extraneous situations, or in the second or third stage as mentioned above during the life span of the organization.

### 2.4 Causes of Financial Distress

Financial distress can be colossal and can cause long term injury to a firm’s financial health. It may result in restriction of investments activities, capital flows and regular operations of the firm thereby leading to business failure. Thus it is vital for an organization to identify the causes of financial distress and take appropriate measures so as to prevent such a condition from occurring.

There are a number of reasons behind financial distress. In some cases, the problem is poor management of assets leading to situations where the revenue generated by the business ultimately fails to serve the organizational needs. At other times, the distress is caused by an overestimation of income from operations and functioning with an unrealistic operating budget. Financial distress may also occur due to some unforeseen events like an unfavorable outcome of some political issues or the occurrence of a natural disaster which may ruin the value of the business. This effectively reduces the revenue generative power on which the organization may have depended to meet its expenses. When situations of this type arise, a company may have two options i.e. either it can bring down its expenses as much as possible or sell-off the distressed assets to overcome such
unhealthy situation and avoid bankruptcy. Thus a company moves to distress condition due to a number of reasons. Broadly these reasons can be classified into internal causes and external causes as explained below.

**Internal Causes**
Internal reasons are the factors that arise within the industry and are controllable in nature. Internal problems may generate in the operation process or due to some defects in managerial and administrative environment of an organization. These are discussed below:

**Operational Problems**
It highlights the inefficiencies in the operation of the daily activities of an organization thereby having a negative impact on the company’s overall performance. It includes:

- Problem of high production cost. Production cost increases due to some internal and external reasons. Internal reasons include inefficiency in inventory or store management, or even with the production process.
- Traditional process and old machineries often work as hindrances for a company’s performance. Proper technical upgradation and modernization of old process are necessities for survival of any industrial unit.
- Lack of working capital may sometimes restrict the smooth flow of production process by causing unnecessary delays in supply of important factors of production.
- Wastages are normal to an industrial unit but its volume, both in terms of quantity and value, should always be within legitimate limits.

**Managerial or Administrative Problems**
This includes the following issues on the part of the management.

- Incompetent and inefficient management decisions.
- Unfavourable working environment leading to labour dissatisfaction and causing hindrances in the production process. Therefore, proper and strong leadership should be exercised within the organization to encourage healthy working atmosphere.
- Manufacturing units often suffer from idle capacity of resources. Scientific resource allocation is therefore, needed to avoid such wastages to the extent possible by engaging right resource for right task at right time.
Lack of supervision and control results in poor outcomes. Supervision should always be there in every nook and corner of the organization as good control can come from effective supervision, which would ultimately derive the desired result.

**External Causes**

External reasons are the causes that arise outside the industry and are uncontrollable in nature. These are not firm specific and hence government’s intervention in most of the cases is needed to tackle these issues. These are categorized as below:

**Financial Problems**

Industrial firms are to conduct business in a highly complex and competitive business environment. Financial problems persist and will always be there, and industrial firms are to move on with it, but what matters most is how an industrial unit prepares itself to tackle such issues and maintain its sustainability. Its different types are:

- Improper policies of the term lending institutions or some financial market related constraints resulting into fund constraints for the business.
- Cost of borrowings always puts some extra load on the company’s financial health. A proper balance between own and loan capital is necessary for a business.
- Inflation sometimes causes great difficulties in the smooth flow of production, marketing and distribution processes of an organization.

**Infrastructural Problems**

Good infrastructure is a basic requirement for an industry to achieve its goals. It includes transportation, power and water supply facilities and of-course well connected business network. Thus, infrastructural problems may arise from the following:

- Interrupted supply of raw material often disruptions the smooth and continuous flow of the production process thereby creating an imbalance between the production and supply of a particular product.
- Manufacturing units are generally set up in remote areas and thus sometimes suffer from poor supply of energy resources.
- Improper communication channels often fail to serve the customers at the right time. So proper communication channels and distribution networks
are required to be set up and maintained to distribute the products in a
timely manner among the customers.

**Governmental Issues**
Government forms regulation, makes facilities available and restricts unhealthy trade
practices. Therefore, any lack of vigilance on the part of government may bring in a
number of difficulties for an industrial unit.

- Sometimes industrial units suffer from legal restrictions in its start-up
  phase. A little flexibility and relaxation may be a great help to a new
  entrepreneur.
- Government matters and permissions often suffer from procedural delays
  which may sometime cause a potential loss in respect of market demand
  and feasibility of any upcoming project.
- Sudden changes in norms and regulations not only work against the new
  entrepreneurs but cause unrest to existing market players too.

**Economical Factors**
It mainly associates with market related factors and can be summed up as follows:

- Modern society is changing rapidly and to cope with such changes
  technical up gradation at every stage becomes inevitable. Dependence on
  traditional processes and technologies keep a firm away from market
  competition slowly and ultimately ruin its sustainability.
- Marketing, distribution procedures are no longer product oriented today,
  instead they have become customer oriented and hence organizations need
  to be sensitive regarding societal issues, and tune its marketing policies in
  line with customer preferences.

**Additional Problems**

- Sometimes political instability or any sudden change in the political
  atmosphere of the country may create financial instability for an industrial
  unit.
- Natural disaster like earthquake, flood etc. can cause serious damage to life
  and prosperity thereby causing negative impact on the organization.
Thus, the above are the reasons which compel an industrial unit to suffer from financial anomalies and therefore, seek serious attention on the part of management, and may sometimes need government’s intervention to overcome such struggles.

2.5 Financial Distress Framework

In this segment, the provisions governing corporate bankruptcy in industrial sector in India are examined. Also, this part discusses the corporate bankruptcy provisions prevailing in U.S.A and U.K. in order to make a comparison between these countries. The problem of industrial sickness is nothing new to the developing economies, and India is one of such sufferers. Industrial sickness has also made its presence felt in the developed economies like U.S.A. and U.K., but what differs between them and India is the manner in which sick industrial units are treated. For example, closing down a sick unit is generally considered prudent in U.S.A, restructuring is preferred in U.K, while, in India, these steps are not that much easier as it may either create huge burden of unemployment, or substantial loss to the national capital, while unemployment remains a crucial problem here. Therefore, a comparative analysis of corporate bankruptcy provisions between these countries is expected to throw some light on the loopholes, if any, in the existing regulatory framework relating to the corporate bankruptcy norms in India.

Accordingly, this section has been divided into two main parts; Part (A) and Part (B). Part (A) is further divided into four segments. Segments I, II and III discuss the legal provisions of corporate bankruptcy in India, U.S.A. and U.K. respectively, while Segment IV depicts a comparative study of the same between these three countries. Part (B) gives an overview of the various bankruptcy prediction models evolved and developed overtime, both nationally and internationally.


I] Framework in India

Before independence, Indian economy was basically dependent upon agriculture. It shifted its focus from agriculture to industrialization mainly in the post independence period. The Industrial Policy Regulation (1948) brought the basic changes in Indian economy and it got further boost in 1991 with the introduction of New Economic Policy (NEP). But the depressing story is that, since its inception, industrialization in India has suffered from varying degrees of sickness in public and private sector both, and the situation is really alarming in case of SSI sector upon which a developing economy like India mainly
depends. In fact, it is the worst hit sector in India. Experience suggests that industries like jute, cotton, cement, textile etc. in India often suffered from huge financial losses which either resulted in their closure or led to huge loss of Government revenue and national employment. Thus sickness among industrial undertakings has been regarded as a matter of grave concern in Indian economy from long ago, and in order to curb the problem of industrial sickness and its impact on the economy of the country, the Government of India has enacted a number of legislations to ensure healthy and conducive industrial climate. The legal framework for corporate insolvency in India has seen a series of enactments, along with a number of legislative and administrative changes and judicial decisions, but surprisingly did not have a single comprehensive and integrated law governing corporate insolvency until the enactment of the Insolvency and Bankruptcy Code, 2016 on 28th May, 2016. Instead, the existing framework has comprised of several statutes and administrative authorities, along with some overlapping provisions which got amended several times over the past few decades. Nevertheless, the historical journey of the corporate insolvency framework in India may broadly be divided into two phases - (a) 1947 to 1990 i.e. pre-liberalization phase, and (b) 1991 onwards i.e. post-liberalization phase.

The pre-liberalization phase witnessed establishment of several institutions and enactment of a number of legislations to deal with the issues relating to corporate financial distress in India. The journey started with setting up of the Industrial Finance Corporation of India (IFCI) in 1948 to provide medium and long term credit facility to the public limited companies. To supplement the works and activities of IFCI, another institution was set up in the name of State Financial Corporation (SFC) in the year 1951 for promoting financial institutions in the States with an objective to provide financial assistance at concessional rates of interest to industrial units. In the same year, the Industrial Development and Regulation Act (IDRA) was passed which contained provisions preventing industrial undertakings from falling sick. The year 1956 witnessed the passing of the Companies Act, 1956, which enacted the routine corporate legal provisions along with the insolvency process for corporate entities in India. The procedure for “winding up” of “sick companies” in India have been dealt across 135 sections in Part VII of this Act. The salient provisions are:
- Section 433 deals with the situation where a company becomes unable to pay its debt, and discretionary power of the Court to wind up the company becomes exercisable.

- Section 391(4) of Companies Act 1956 deals with the norms relating to compromise and arrangement with creditors and members. Apart from the lengthy and time consuming winding up procedure, all the companies liable to be wound up under the Companies Act, may resort to the alternative of compromise or arrangement. The Court may make orders to enforce these remedies.

- Reduction of capital of the company is dealt with in Section 100.

- Norms relating to striking off the name of a defunct company are mentioned in Section 560.

These provisions of the Companies Act 1956 worked as the basis of corporate bankruptcy norms in India until the enactment of the Insolvency and Bankruptcy Code, 2016. Further, in pre-liberalization phase Industrial Reconstruction Corporation of India (IRCI) was set up in 1971 with some specific objectives like revival of sick industrial units, assurance of any sort of financial, managerial assistance etc. to the industrial units in need of such help mainly. In the same year, the IDRA was amended further to empower the Central Government to take over the industrial units which have become completely sick. In 1972, the Sick Textile Undertaking Ordinance was introduced, which was later enacted as the Sick Textile Undertaking Nationalization Act in 1974 to reorganize and rehabilitate sick textile companies in India. In 1975, the Reserve Bank of India (RBI) had set up Tandon Committee to recommend and implement the provisions on participation of the commercial banks in the management of various sick industrial units in India. In 1979, the RBI took some revolutionary steps for revival of the sick industrial units in India. The Soft-Loan Scheme (1976), Merger Policy (1977), Policy Guidelines on Sick Units (1978), and setting up of various legal and advisory committees etc. are a few such steps. The Soft-Loan Scheme (1976) was introduced to facilitate financial assistance to the small scale industries like jute, cotton, cement, sugar, fertilizer etc. mainly, but in 1984, the RBI modified the scheme further and unlocked it for all kind of industries in India on concessional terms for modernization and restructuring of their old machineries. Merger Policy in 1977 added some extra mileage to it by allowing sick units to be merged with healthy ones. The Policy Guidelines on Sick Units (1978) recommended the respective
State Government and its State Financial Corporation (SFC) to work jointly for the revival and rehabilitation of the sick industrial units belonging to the state concerned. The Industrial Reconstruction Bank of India Act, 1984 (IRBI) was another enactment which aimed at providing financial assistance to the sick industrial companies to revive themselves. In this context, it becomes imperative to mention that over the years, the processes of administering corporate bankruptcy in India was vested with the relevant High Court and the provisions of the Companies Act 1956, but experiences suggest that the system often struggled from procedural delays plaguing other judicial actions, thereby leading to major write-downs in value, if not outright write-offs, for creditors etc. In order to deal with such problems of industrial sickness and also to ensure recovery of the dues of banks and Financial Institutions (FIs), the Government appointed Tiwari Committee in 1981, and on the basis of its recommendations, the Government approved Sick Industrial Companies (Special Provisions) Act of 1985 (SICA) to ensure timely detection of sick and potentially viable sick industrial units and for the determination of preventive, ameliorative, remedial and other measures with respect to such units. The main objective behind such enactment was to create a mechanism for the revival of “sick industrial” companies through two dedicated tribunals namely, Board for Industrial and Financial Reconstruction (BIFR) and the Appellate Authorities for Industrial and Financial Reconstruction (AAIFR), thereby reducing the extent of involvement of the High Courts. Some of the salient provisions of SICA are discussed below.

**Important Provisions of SICA**

The powers conferred by SICA mainly rested on the two quasi-judicial authorities i.e. BIFR and AAIFR. In 1991, when Indian economy witnessed economic liberalization, SICA was further amended to bring government companies under its purview. This was the first major step taken in Indian corporate bankruptcy regime soon after the introduction of the New Economic Policy (NEP), and with such an amendment, a new phase of corporate bankruptcy begun in India. The following discussion of SICA’s provisions becomes relevant in the present context.

- **Definition of a Sick Company**

As per Section 3(1)(o) of SICA, a sick industrial company means an industrial company (being a company registered for not less than 5 years) which has at the end of any financial year accumulated losses equal to or exceeding its entire net worth. Further as per Section
23(1) of SICA, if the accumulated losses of an industrial company, as at the end of any financial year, have resulted in erosion of 50%, or more of its peak net worth during the immediately preceding four financial years, then the company shall be considered as a potentially sick industrial company. Section 3(e) defines an industrial company as a company which owns one or more industrial undertakings and Section 3(f) clarifies the meaning of industrial undertaking as any undertaking pertaining to a scheduled industry carried on in one or more factories by any company but does not include:

(a) an ancillary industrial undertaking as defined in clause (aa) of Section 3 of the Industries (Development and Regulation) Act, 1951, and
(b) a small scale industrial undertaking as defined in clause (j) of the aforesaid Section 3.

Net worth for the purpose of SICA means the sum total of paid-up capital and free reserves (all reserves credited out of the profits and securities premium account, but does not include reserves created out of revaluation of assets, write back of depreciation provisions and amalgamation).

❖ Board for Industrial and Financial Reconstruction (BIFR) and Appellate Authority for Industrial and Financial Reconstruction (AAIFR)

SICA provided for the constitution of two quasi-judicial bodies, i.e. Board for Industrial and Financial Reconstruction (BIFR) and Appellate Authority for Industrial and Financial Reconstruction (AAIFR). BIFR was set up in January, 1987. The role of BIFR as envisaged in the SICA are (a) securing the timely detection of sick and potentially sick companies; (b) speedy determination by a group of experts of the various measures to be taken in respect of the sick company, and (c) expeditious enforcement of such measures. BIFR deals with issues like revival and rehabilitation of sick companies, winding up of sick companies, institutional finance to sick companies, amalgamation of companies etc. AAIFR was constituted in April, 1987 to appeal against the orders of BIFR and assumes jurisdictional powers to conduct further enquiry and confirm or modify or set aside BIFR’s order or remand the matter back to BIFR for fresh considerations. The SICA has separate provisions for the smooth operations of BIFR/AAIFR and these are enumerated below:

❖ Referential and Working Status Verification Norms

The SICA provides that where an industrial company becomes a sick industrial company, a reference has to be made to the BIFR for determination of the measures to be adopted with respect to such company as per section 15 of SICA.
Inquiry into the Working of Sick Industrial Company

On registration of the reference of a sick industrial company, a hearing is to be held wherein the BIFR should take into consideration the reference submitted by the company. If the BIFR is not satisfied with the accounts of the company, it can enquire into the matter as per the provisions of Section 16 sub-clauses 1 and 2 of SICA to evaluate whether an industrial company has actually become a sick industrial company, or indulged in manipulation to falsify and pretend sickness. The enquiry can be made by the BIFR itself, or through an operating agency as may be directed by general or special order by the Board.

Preparation and Sanction of Schemes

Where an order is made under sub-section (3) of Section 17 in relation to any sick industrial company, the operating agency is supposed to prepare, as promptly as possible, and normally within a period of ninety days from the date of such order, a rehabilitation scheme with respect to such company.

Financial Assistance

According to Section 19(1) of SICA, where the scheme relates to preventive, ameliorative, remedial and other measures with respect to any sick industrial company, the scheme may provide for financial assistance by way of loans, advances or guarantees or reliefs or concessions or sacrifices from the Central Government, a State Government, any scheduled bank or other bank, a public financial institution or State level institution or any institution or other authority, to the sick industrial unit. According to Section 19(3) on sanctioning of scheme by the BIFR/AAIFR, all the parties including the company and banks and FIs are required to comply with the terms of the scheme.

Winding Up

SICA authorizes BIFR/AAIFR to offer its opinion for winding of sick industrial company after taking into account all the relevant facts and circumstances and providing ample opportunity to the sick company to rehabilitate itself. The opinion is to be submitted to the concerned High Court under the provisions of Section 529(A) of the Companies Act 1956.

Suspension of Legal Proceedings

SICA provides for suspension of legal proceedings against the sick industrial company in Sections 16 and 25.
 Penalty for Certain Offences
If any representative of sick industrial undertaking or the bank/FIs/Government authority infringes the provisions of SICA, or any order of the BIFR or AAIFR, or makes a false statement/evidence to the Board/AAIFR, the BIFR/AAIFR is authorized to punish the concerned person. BIFR Regulations 1987 have been formulated in this regard and are followed as policy guidelines while dealing with a sick industrial company in India. These are the basic provisions with which SICA has been working since 1985 to administer and control the incidence of industrial sickness in India, but, since its inception, SICA has also been facing criticisms regarding its workings and procedural delays.

Several attempts have been made by the government soon after liberalization of the Indian economy with the introduction of New Economic Policy (NEP) in 1991. Establishment of the Company Law Board was one such major steps. The Central Government in terms of Section 10(E) of the Companies Act, 1956 constituted an independent Company Law Board (CLB), with effect from the 31st May, 1991, to work as a quasi-judicial body, exercising equitable jurisdiction as regards corporate sickness in India, which was earlier being exercised by the High Court or the Central Government. The Company Law Board has framed “Company Law Board Regulations, 1991” prescribing the procedure for filing the insolvency applications/petitions before it. As per Section 10F of the Companies Act, 1956, any person, aggrieved by any decision or order of the Company Law Board, can file an appeal to the High Court within sixty days from the date of communication of the decision or order of the Company Law Board to him, on any question of law arising out of such order. In 1993, again certain changes have been made to SICA for the determination of industrial sickness and meeting the expectations with which SICA was enacted, but it did not actually so happen. The real maladies with SICA are as follows.

- Exclusion of the industries or the industrial activities, not covered under Schedule I of the IDRA, 1951, from the purview of SICA has deprived such industries to enjoy the benefits of this benign provision.
- Cases of terminal sickness of industrial units have attained more importance and relevance under SICA, while industrial units suffering from potential sickness are hardly taken care of and BIFR is not empowered to take any remedial measure except winding up such a unit.
- **BIFR** was set up under SICA for smooth and expeditious revival and rehabilitation of sick industrial units, but in actual practice the entire procedure became very sluggish and did not work effectively in favour of the genuine stakeholders. This lengthy process, unwanted procedural delays and poor enforcement system crushed the basic purpose of the Act.

- The term ‘sickness’, as defined under this Act, relies upon historic data as it considers the book value of a firm’s assets while evaluating its net worth thereby leading to wrong estimation of the difference between the book value of a firm’s assets and its current financial obligations.

Due to these inherent flaws, SICA was not successful in combating industrial sickness in India, and a need was felt to revoke the Act over a long time, and this need actually materialized during the post-liberalization phase of Indian economy. Two major committees were formed in this regard and they made a number of recommendations. The first committee, headed by V.B.Eradi in 1999, made some recommendations in the form of (a) creation of a tribunal for a centralized winding up process with professional liquidators; (b) harmonization of Indian corporate bankruptcy norms with international law. The second committee, headed by N.L.Mitra, recommended in 2001 the disbanding of the BIFR/AAIFR, and the consolidation of insolvency laws into a separate comprehensive bankruptcy code to govern corporate insolvencies in India. Next, the Government of India, on the basis of recommendations of the Eradi Committee, amended the Companies Act by the Companies (Second Amendment) Act, 2002 (hereinafter termed as the ‘Amendment Act’) and inserted Part VIA comprising of Sections 424A to 424L dealing with revival and rehabilitation of sick industrial companies. Subsequently, Sick Industrial Companies (Special Provisions) Repeal Act, 2003 was enacted to repeal Sick Industrial Companies (Special Provisions) Act, 1985. The new Act diluted some provisions and removed certain limitations of the earlier Act. It mainly aimed at reducing the instances of industrial sickness by ensuring that companies now onwards cannot take an escapist route from the legal provisions of the new Act and access various financial benefits or assistance, on occurrence of financial failure. Under it, the Board for Industrial and Financial Reconstruction (BIFR) and Appellate Authority for Industrial and Financial Reconstruction (AAIFR) were to be dissolved and replaced by National Company Law Tribunal (NCLT) and National Law Appellate Tribunal (NCLAT) respectively. In this context, it should be mentioned that the Companies (Second Amendment) Act, 2002.
resembled the same objective. However, the constitutionality of the Tribunal started facing a lot of difficulties and was challenged in various courts leading to the detainment of constitution of the Tribunal by the Supreme Court. As a result, the Companies Act, 1956 continued to prevail until recently, as had been the SICA, 1985. Consequently, the BIFR/AAIRFR also continued to function. Other reforms that took place during this time were the enactment of the Securitization and Reconstruction of Financial Assets and Enforcement of Security Interest (SARFAESI) Act, 2002, and introduction of the guidelines on Corporate Debt Restructuring by the RBI. Thereafter in 2008, on the basis of the recommendations made by the J.J.Irani Committee (2005), Companies Bill, 2008 was introduced on 23rd October, 2008 with the expectation to bring in some changes in the then existing Companies Act, 1956 regarding rehabilitation and revival of the sick industrial units, but the Companies Bill, 2008 lapsed due to dissolution of Lok Sabha and was reintroduced on 3rd August, 2009 again as Companies Bill, 2009. The Standing Committee on Finance (SCF) forwarded its report on Companies Bill, 2009 to the Parliament and finally the bill has become the Companies Act, 2013 after two subsequent revisions in Lok Sabha on 14th December, 2011 and 18th December, 2012. The main revolutionary change that Companies Act, 2013 has brought in is that it clearly mentions about the structure and judiciary powers of the National Company Law Tribunal and Appellate Tribunal in Chapter XXVII. Moreover, the Companies Act, 2013 suggests abatement of all the matters pertaining to the sick industrial companies before the Board for Industrial and Financial Reconstruction (BIFR) and Appellate Authority for Industrial and Financial Reconstruction (AAIFR) by registering the matter before the National Company Law Tribunal (NCLT). It further states that other matters pertaining to corporate disputes pending before the Company Law Board (CLB) and scheme of arrangements and winding up before the High Court shall stand transferred to the NCLT. However, surprisingly, the 2013 Act does not specify any date on and from which the two judiciary bodies- NCLT and Appellate Tribunal would start functioning and therefore, the provisions of the Companies Act, 2013 on corporate insolvency could not be enforced. Thereafter, on 28th May, 2016, India has ultimately become successful in implementing the long awaited Insolvency and Bankruptcy Code, 2016. With this a new era of corporate bankruptcy regulation has begun as the Insolvency and Bankruptcy Code overrides all other existing laws on matters pertaining to insolvency and bankruptcy in India. Immediately, on 1st June, 2016, the Ministry of Corporate Affairs (MCA), Government of India has published
a notification regarding the constitution of the National Company Law Tribunal (NCLT) and National Company Law Appellate Tribunal (NCLAT) with effect from the 1st June, 2016. The NCLT has got the power to adjudicate the following proceedings:

- Initiated before the Company Law Board under the previous Act (the Companies Act 1956);
- Pending before the Board for Industrial and Financial Reconstruction, including those pending under the Sick Industrial Companies (Special Provisions) Act, 1985;
- Pending before the Appellate Authority for Industrial and Financial Reconstruction, and
- Pertaining to claims of oppression and mismanagement of a company, winding up of companies and all other powers prescribed under the Companies Act.

Nevertheless, the decisions of National Company Law Tribunal may be appealed against in the National Company Law Appellate Tribunal. There is no denying the fact that setting up of the NCLT and NCLAT is a part of the efforts to move to a regime of faster resolution of corporate disputes, thereby improving the legal environment of doing business in India. Now in this context, it becomes imperative to mention some basic features of the Insolvency and Bankruptcy Code, 2016, which is basically an Act to consolidate and amend the laws relating to reorganization and insolvency resolution of corporate persons, partnership firms and individuals (other than financial firms) in a time bound manner for maximization of value of assets of such persons, to promote entrepreneurship, availability of credit and balance the interests of all the stakeholders including alteration in the order of priority of payment of Government dues and to establish an Insolvency and Bankruptcy Board of India, and for matters connected therewith or incidental thereto. Some salient features regarding corporate bankruptcy provisions mentioned under the 2016 Code are enumerated below.

- Matters relating to insolvency resolution and liquidation for corporate persons are dealt with in Chapter I of Part II of the said Code, and shall apply to the matters relating to the insolvency and liquidation of corporate debtors where the minimum amount of default is one lakh rupees, unless the Central Government may, by notification, specify the minimum amount of default of higher value, not being more than one crore rupees.
• Matters relating to corporate insolvency resolution process are dealt with in Chapter II of Part II of the said Code, which states that where any corporate debtor commits a default, a financial creditor, an operational creditor or the corporate debtor, itself, may initiate corporate insolvency resolution process in respect of such corporate debtor. Besides, a financial creditor, either by itself, or jointly with other financial creditors, may file an application for initiating corporate insolvency resolution process against a corporate debtor before the Adjudicating Authority when a default has occurred.

• Matters relating to liquidation process are dealt with in Chapter III of Part II of the said Code, where it is mentioned that before the expiry of the insolvency resolution process period or the maximum period permitted for completion of the corporate insolvency resolution process under Section 12 or the fast track corporate insolvency resolution process under Section 56, as the case may be, if the adjudicating authority does not receive a resolution plan under sub-section (6) of Section 30 or (b) rejects the resolution plan under Section 31 for the non-compliance of the requirements specified therein, it shall— (i) pass an order requiring the corporate debtor to be liquidated in the manner as laid down in this Chapter, (ii) issue a public announcement stating that the corporate debtor is in liquidation, and (iii) require such order to be sent to the authority with which the corporate debtor is registered.

• Fast track corporate insolvency resolution process is described under Chapter IV of Part II of the Code, and it may be made in respect of the following corporate debtors namely, (a) a corporate debtor with assets and income below a level as may be notified by the Central Government, or (b) a corporate debtor with such class of creditors or such amount of debt as may be notified by the Central Government, or (c) such other category of corporate persons as may be notified by the Central Government.

• Matters pertaining to voluntary liquidation of corporate persons are explained under Chapter V, wherein it is stated that a corporate person, who intends to liquidate itself voluntarily and has not committed any default, may initiate voluntary liquidation proceedings under the provisions of this Chapter.
Chapter VI deals with the provisions relating to the identity of the adjudicating authority for corporate persons, and clarifies that the adjudicating authority, in relation to insolvency resolution and liquidation for corporate persons including corporate debtors and personal guarantors thereof shall be the National Company Law Tribunal having territorial jurisdiction over the place where the registered office of the corporate person is located.

Chapter VII of Part II of the Insolvency and Bankruptcy Code, 2016, speaks of the punishment for concealment of property, for transactions defrauding creditor, misconduct in the course of corporate insolvency resolution process, falsification of books of corporate debtor, willful and material omissions from statements relating to affairs of corporate debtor, false representations to creditors, contravention of moratorium or the resolution plan, false information furnished in application made by corporate debtors, and nondisclosure of dispute or repayment of debt by operational creditor.

II] Framework in U.S.A.
Bankruptcy in United States is governed by the United States Constitution (Article 1, Section 8, and Clause 4) which emphasizes on “uniform Laws on the subject of Bankruptcies throughout the United States”. The Bankruptcy Code, notified in Title 11 of the United States Code was introduced with the enactment of Bankruptcy Reform Act in 1978. Since then, the Code has been amended several times, and more recently in 2005, the Bankruptcy Abuse Prevention and Consumer Protection Act of 2005 or BAPCPA was passed. Some laws relevant to bankruptcy are found in some other segments of the United States Code. For example, bankruptcy crimes are dealt with in Title 18 of the United States Code, tax implications of bankruptcy, known as Internal Revenue Code, can be found in Title 26 of the United States Code, and the creation and jurisdiction of bankruptcy courts are found in Title 28 of the same as Judiciary and Judicial procedure. In U.S., bankruptcy cases are filed in United States Bankruptcy Court and the cases are then governed by the federal laws.

Relevant chapters in Bankruptcy Code
Entities seeking relief under the Bankruptcy Code may file a petition for relief under a number of different chapters of the Code, depending on circumstances. Title 11 contains nine chapters, six of which provide for the filing of a petition whereas the other three
chapters provide rules to govern those petitions. Bankruptcy cases are typically referred to by the chapter under which the petition is filed.

In U.S., the petition for bankruptcy can be filed under six different chapters namely, chapters 7, 9, 11, 12, 13 and 15. Chapter 7 bankruptcy petitions are most common, and very often used by both individual and corporate bodies for filing liquidation petition. Chapters 11 and 13 dealt with reconstruction. Chapter 9 is applicable to municipalities, while chapter 12 is used by family farmers and fishers. Chapter 15 is related with cross border bankruptcy. The provisions of Chapter 7 and 11 are related to corporate bankruptcy in U.S.A and thus demand a little discussion in the present context.

**Chapter 7 and its Provisions**

Chapter 7 of the United States Bankruptcy Code administers the liquidation procedures under the bankruptcy laws of United States. Chapter 7 relating to liquidation is very much similar to winding up provisions under the Indian law. Chapter 7 is the most important form of bankruptcy code in the United States, the important provisions of which are explained below.

- When a troubled business is unable to pay its creditors, it may file (or be forced by its creditors to file) for bankruptcy in a federal court under Chapter 7. A Chapter 7 filing means that the business ceases operations unless continued by the Chapter 7 Trustee. A Chapter 7 Trustee is appointed almost immediately after such filing with broad powers to examine the business's financial affairs. The Trustee generally liquidates all the assets and distributes the proceeds to the creditors.

- Under a particular provision of Chapter 7, a corporation or partnership does not receive a bankruptcy discharge; instead, the entity is dissolved. Once all assets of the corporate or partnership debtor have been fully administered, the case is closed. The debts of the corporation or partnership theoretically continue to exist until applicable statutory periods of limitation expire.

**Chapter 11 and its Provisions**

Chapter 11 is a chapter of the United States Bankruptcy Code, which permits reorganization under the bankruptcy laws of the United States. Chapter 11 is available to every business, whether organized as a corporation or sole proprietorship and to individuals also, although it is most prominently used by corporate entities. The important provisions of this Chapter are:
When a business is unable to service its debt or pay its creditors, the business or its creditors can file with a federal bankruptcy court for protection under either Chapter 7 or Chapter 11.

In Chapter 7, the business ceases operations, a trustee sells all of its assets, and then distributes the proceeds to its creditors. Any residual amount is returned to the owners of the company. In Chapter 11, in most instances the debtor remains in control of its business operations as a debtor in possession, and is subject to the oversight and jurisdiction of the court.

If the business's debts exceed its assets, the bankruptcy restructuring results in the company's owners being left with nothing; instead, the owners' rights and interests are ended and the company's creditors are left with ownership of the newly reorganized company. All creditors are entitled to be heard by the court. The court is ultimately responsible for determining whether the proposed plan of reorganization complies with the bankruptcy law.

Chapter 11 supports reorganization, as opposed to liquidation. The debtor in possession typically has the first opportunity to propose a plan during the period of exclusivity. This period allows the debtor 120 days from the date of filing for chapter 11 to propose a plan of reorganization before any other party in interest may propose a plan. After that time has elapsed, creditors may also propose plans. Plans must satisfy a number of criteria in order to be “confirmed” by the bankruptcy court. If the judge approves the reorganization plan, and if the creditors all agree, the plan can be confirmed. If a plan cannot be confirmed, the court may either convert the case to liquidation under Chapter 7, or, in the best interests of the creditors and the estate, the case may be dismissed resulting in a return to the status quo before bankruptcy. If the case is dismissed, creditors will look to non bankruptcy law in order to satisfy their claims.

III] Framework in U.K.

The history of corporate insolvency law in the UK began with the enactment of the first modern Companies Legislation in 1844. However, many principles of insolvency are rooted in bankruptcy laws that can be traced back to ancient times. The UK law on bankruptcies was historically split into two parts viz; corporate bankruptcy was abided by the winding up provisions of the Companies Act and individual bankruptcy being dealt with by the bankruptcy laws. The Insolvency Law Review Committee, popularly known
as Kenneth Cork Committee, made major recommendations on insolvency law reform in the UK, including the consolidation of both individual and corporate insolvency under a common law. Pursuant to its recommendations, the Insolvency Act 1985 was enacted, which was later replaced by the Insolvency Act 1986, and which is the prevailing law on corporate and individual insolvencies at present in the U.K. The Act is divided into three groups and 14 Schedules. The main features of U.K legislation for corporate insolvency are highlighted below.

- The concept of insolvency is embodied under section 122(1)(f) of the Insolvency Act 1986 which states that a company becomes insolvent if it does not have enough assets to pay off its debts on due dates, and in such a situation it becomes the responsibility of the concerned bodies i.e. banks, creditors, funding institutions, courts or the company itself to appoint a receiver/liquidator/administrator for the smooth flow of bankruptcy procedures.

- Court may grant a petition for a company to be wound-up if “the company is unable to pay its debts” but at first, the “cash flow” test is done for insolvency status verification under section 123(1) (e). It guides a court in granting a winding-up order or appointing an administrator.

- On becoming insolvent under the U.K legislations, there remain only five options open to the insolvent company. The company may opt for Administration/Compulsory Voluntary Arrangements/Administrative Receiverships to rescue itself, or it can go for Voluntary Liquidation and/or Creditors Voluntary Liquidation.

- Under the Administration procedure, the company is momentarily put under the control of an administrator, appointed generally by the court after receiving an application from the company/directors/creditors of the defaulter company, who organizes a plan for revival of the company. Once a company is placed under this process, no creditors can file any claim against its assets. At the end of this process, either all the assets of the company are liquidated to pay off the creditors, or the administrator may move for Company Voluntary Arrangement (CVA) and/or Creditor Voluntary Liquidation (CVL).
Administrative receivership is a process whereby a floating charge holder, in accordance with terms mentioned in the debenture deed, appoints a receiver who takes control of the entire property of the company to initiate receivership to pay off the charge holders and unsecured creditors. Since September, 2003, the appointment of Administrative Receivers is administered by the Enterprise Act 2002 in U.K.

Company Voluntary Arrangement (CVA) permits the directors of a company to convince creditors to accept less refund in the hope of avoiding a more expensive administration or liquidation procedure and less returns. If CVA fails, the company is right away placed into liquidation.

Liquidation is the last, most common, and fundamental insolvency procedure. The crucial purpose of liquidation is to finish off a company’s activities and liquidate its assets to pay creditors, and shareholders if any value remains. The company can either open the process through a “voluntary liquidation”, or the creditors can call for it through a “compulsory liquidation”.

In April 2000, the Insolvency Service published a consultation paper titled “Bankruptcy – A Fresh Start”, which suggested changes to the law relating to personal and corporate insolvency. As a result, a new legislation, named as the Enterprise Act 2002, came into existence and made some significant changes in the existing law in terms of restricting the appointment of administrative receivers to some specific cases and giving some benefits to the unsecured creditors by limiting the powers of floating charge holders. The purpose of these reforms is to give a fair treatment to unsecured creditors, who, in a floating charge system, are left with almost no assets to take care of their interest.

Thus it seems that the legal framework for corporate insolvency in the U.K. is far more organized and regulated than that in India and the U.S.A.


In the light of above discussions, a brief comparison of the corporate bankruptcy provisions in the U.S., U.K., and India is made in the following table.
Table 2.1: Comparison of Corporate Insolvency Framework in U.S.A., U.K., and India

<table>
<thead>
<tr>
<th>Particulars</th>
<th>U.S.A</th>
<th>U.K.</th>
<th>India</th>
</tr>
</thead>
<tbody>
<tr>
<td>Year of emergence</td>
<td>1978</td>
<td>1986</td>
<td>1956</td>
</tr>
<tr>
<td>Source</td>
<td>Bankruptcy in the U.S.A. is governed by Article 1, Section 8, and Clause 4 of its Constitution which initializes uniform laws on the subject of Bankruptcies throughout the United States. The Bankruptcy Code has been amended several times. The most significant change is enacted in 2005 through the Bankruptcy Abuse Prevention and Consumer Protection Act of 2005 (BAPCPA)</td>
<td>The bankruptcy law in the United Kingdom is codified primarily in the Insolvency Act of 1986 as amended by the Insolvency Act of 2000 and the Companies Act of 1985.</td>
<td>In India, the process of reorganization and insolvency resolution of corporate persons, partnership firms and individuals (other than financial firms) is now regulated by the Insolvency and Bankruptcy Code, 2016 (earlier it was regulated by the Companies Act, 1956 and SICA, 1985)</td>
</tr>
<tr>
<td>Code for Bankruptcy</td>
<td>Unified</td>
<td>Unified</td>
<td>Unified</td>
</tr>
<tr>
<td>Nature of Bankruptcy Law</td>
<td>Consolidated</td>
<td>Consolidated</td>
<td>Non-consolidated earlier; but now consolidated</td>
</tr>
<tr>
<td>Main Focus</td>
<td>Reorganization or Restructuring</td>
<td>Liquidation</td>
<td>Save companies, preserve businesses and improve returns</td>
</tr>
<tr>
<td>Main Legislations</td>
<td>Legal framework relating to Corporate Insolvency in U.S.A. is governed by (1) The Bankruptcy Code (2) The Bankruptcy Abuse Prevention and Consumer Protection Act (BAPCPA)</td>
<td>Legal framework relating to Corporate Insolvency in U.K. is guided by (1) The Insolvency Act 1986 (2) The Enterprise Act 2002 (3) The Companies Act of 1985</td>
<td>Legal and procedural framework relating to Corporate Insolvency is dealt in the Insolvency and Bankruptcy Code, 2016; however, several expressions and issues in relation to corporate bankruptcy are laid out by 4 major legislations, namely: Indian Contract Act, 1872, the Securities Contract (Regulation) Act, 1956, the Securities Exchange Board of India Act, 1992, and the Companies Act, 2013</td>
</tr>
<tr>
<td>Special Arrangements</td>
<td>No such arrangement</td>
<td>“Cash Flow” test for Insolvency verification</td>
<td>No such arrangement</td>
</tr>
</tbody>
</table>

The above table clearly shows that there is dearth of provisions relating to specific test for analyzing the actual cause of financial failure of an industrial unit in the U.S.A and India. On the other hand, a unified and comprehensive law relating to corporate bankruptcy has been available in both U.S.A and U.K. over a pretty long time, and which India enacted very recently, in 2016. The loopholes in Indian provisions on corporate bankruptcy norms, therefore, need to be plugged to make it compatible with that of U.S.A and U.K. by simplifying and shortening the bankruptcy procedure and procedural time in the near future.

**Part B: Financial Distress Prediction**

This part presents a review of various bankruptcy prediction models applicable in India and abroad till date. Though such study is not exhaustive, yet it tries to cover most of the important research works from national and international literature to identify the basic features and performance ability of the different bankruptcy prediction models. But before making such a review, a brief discussion on the necessity of bankruptcy prediction and its associate difficulties becomes imperative. Bankruptcy prediction of industrial units is not a
new idea. It has always been a research issue in the corporate world since decades. Prediction of bankruptcy facilitates early detection of distress symptoms to save an industrial unit from falling sick, or at least adoption of some revival measures available for an industrial unit which has already become sick. It assumes great significance both from social and organizational point of views. The social group includes lenders, investors, shareholders, regulatory authorities including the Government itself, and similarly from organizational point of view, the owners and the management remain always interested in knowing the financial health and stability of an industrial unit in which they have interests. Lenders, investors and shareholders are interested only to know whether their hard earned income is safe and fetches some handsome return or not, while the regulatory agencies and the Government have their own objective of protecting the society because bankruptcy often creates unemployment and social unrest. More importantly, the management considers such prediction analysis to take appropriate rehabilitation procedures for a unit suffering from financial distress, after a thorough investigation of the cost and risk associated with such procedures. So these are the basic reasons for which bankruptcy prediction of an industrial unit becomes indispensible, but at the same time it should also be noted that the whole bankruptcy prediction procedure involves huge amount of costs and may sometimes generates misleading results. The misleading results are commonly termed as errors of bankruptcy prediction and are of two types namely, Type I and Type II errors. Type I Error refers to misclassifying/predicting a failing business as a successful one, and conversely Type II Error refers to misclassifying a successful business as a failure. Misclassification of a successful business as a failure (i.e. Type II error) is less harmful than the Type I error which involves huge amount of costs on the part of decision maker in declaring a bankrupt business to be a successful one. According to Koh (1987), Type I errors are more costly than Type II errors for several reasons including loss of business (audit clients), damage to a firm's reputation, and potential lawsuits/court costs etc. thereby maximizing the operational risk of the organization.

Bankruptcy prediction of industrial units through statistical models started long ago, and its literature has been large enough, both in terms of theory and practice, nationally and internationally. Its evolution process started with the univariate analysis, the foundation of which was laid by the researchers- Fitzpatrick, Merwin, and Beaver. Thereafter, Multivariate Discriminant Analysis (MDA) emerged and, till date, it is one of the most recognized methods of bankruptcy prediction. A good number of well known researchers,
both nationally and internationally, have used the MDA technique in predicting bankruptcy of various industrial units. Altman, Edmister, Deakin, Blum, Moyer, Casey and Bartczak were the early researchers who made MDA approach popular through their studies. More recently, some more models have been developed, and Logit/Probit analysis, Recursive Partitioning Algorithm Method and Neural Networks Technique are the outcomes of the latest century. Thus the historical evolution of the bankruptcy prediction may be divided into three categorical segments: (I) statistical models of bankruptcy prediction; (II) development of artificially intelligent expert system, and (III) theoretical models.

The first segment deals with the basic statistical studies involving the use of ratios for probability analysis to predict future bankruptcy. It focuses on Univariate Analysis, Multivariate Analysis, Linier Probability Model, Logit and Probit Method and Cumulative Sum Procedure Method. In the second segment of bankruptcy prediction model development, the basic limitations of artificial intelligence based models like Recursive Partitioning Algorithm Method, Neural Networks Technique, Genetic Algorithms, Case-Based Reasoning and Rough Sets Model etc. are mentioned. In case of theoretical model based prediction, Balance Sheet Decomposition Measure, Gambler’s Ruin theory, Cash Management Theory, Credit Risk Theory etc. are explored to some extent.

I) Statistical Models for Bankruptcy Prediction

Statistical models for bankruptcy prediction can be broadly divided into two categories-univariate models and multivariate models, which are discussed below.

i) Univariate analysis for bankruptcy prediction

Univariate analysis assumes “that a single variable can be used for predictive purposes” (Cook and Nelson 1998). Univariate analysis is a traditional method of interpreting financial statements using firms’ financial ratios. These ratios serve as explanatory variables or the distress predictors which are likely to exhibit significant differences across the failing and non-failing firms. The nature of analysis is, however, univariate in the sense that the variables are observed and examined individually one after another. There is no allowance for an analysis capturing an integrated effect of any two or more variables together on financial health of the firm. After a careful analysis of these ratios on univariate basis, results would provide certain inferences about a firm’s financial health. Fitzpatrick (1932) compared 13 ratios of 19 each of failed and successful firms, and identified Net Worth to Debt and Net Profit to Net Worth as significant in differentiating
failed and non-failed firms. Smith and Winakor (1935) analyzed ratios of 183 failed firms from a variety of industries, and found that Working Capital to Total Assets was a far better predictor of financial problems than both Cash to Total Assets and the Current Ratio. In 1942, Merwin published his study focusing on small manufacturers. He reported that when comparing successful with failing firms, the failing firms displayed signs of weakness as early as four or five years before failure. Also, Merwin found three ratios that were significant indicators of business failure, namely Net Working Capital to Total Assets, Current Ratio, and Net Worth to Total Debt. In 1962, Jackendoff compared the ratios of profitable and unprofitable firms. He reported that Current Ratio and Net Working Capital to Total Assets were higher for profitable firms than for unprofitable firms. Till date, the most documented univariate research work is that of Beaver (1966). He compared the mean values of 30 ratios of 79 failed and 79 non-failed firms in 38 industries. However, Beaver further tested the individual ratios’ predictive abilities in classifying bankrupt and non-bankrupt firms and identified Cash Flow to Total Debt, Net Income to Total Assets, and Total Debt to Total Assets as the best ratios for forecasting financial failure. In his suggestions for future research, Beaver indicated the possibility that multiple ratios may have higher predictive ability than single ratios and so begun the evolution of multivariate bankruptcy prediction models. The main limitations from which univariate analysis suffered were indicated by Altman (1968) and Edmister (1972). Altman (1968) indicated that the univariate model may give inconsistent and confused classification results for different ratios for the same firm, while Edmister (1972) opined that there are various factors that can describe the financial status of a firm and hence a single financial ratio cannot predict them all.

**ii) Multivariate analysis for bankruptcy prediction**

From 1968 onwards, the bankruptcy prediction process has gone through a series of improvements to refurbish the then-existing imperfect and lengthy framework, and resulted into the development of a number of new models on multi-variate basis to overcome the limitations of univariate analysis. The multivariate technique is a discriminant analysis that allows distinguishing between two or more groups of objects with respect to several variables simultaneously or step-wise. MDA classifies firms into groups (failed or non-failed) based on each one’s characteristics (ratios/factors). Based on sample observations, coefficients are determined for each characteristic (ratio). The products of the ratios and their coefficients are summed to find a discriminant score,
allowing classification of the firm. There have been a number of research works based on MDA such as Altman (1968), Deakin (1971), Edmister (1972), Libby (1975), Altman, Haldeman and Narayanan (1977), Betts and Belhoul (1987), Hennawy and Morris (1983), Izan (1984) etc. The models that follow multivariate technique are summarized below.

\textbf{a) Multiple Discriminant Model}

The first multivariate study was published by Altman (1968). Altman used multivariate discriminant analysis to develop a five-factor model to predict bankruptcy of manufacturing firms. It was called as the ‘Z-score model’ which predicts a firm to be bankrupt if the firm’s score falls below a certain optimal cut-off range. Altman’s Z-score model had high predictive ability for the initial sample one year before failure (95% accuracy). However, the model’s predictive ability declined considerably beyond two years before failure. Since Altman’s study, the number and complexity of multivariate bankruptcy prediction models have increased noticeably. Edmister (1972) examined 19 financial ratios and five methods of analysis in his study to conduct multiple discriminant analysis. Deakin (1972), through his study based on MDA, showed that the model was 95% accurate for the first three years prior to bankruptcy. Later, Altman et al (1977) extended Z-score model into ZETA model by using seven ratios. The results of ZETA model exhibited better performance than that of Z-score model. Some other studies that applied MDA were Stein (1981) in Germany, Weibel (1973) in Switzerland, Marais (1979) in England, Bilderbeek (1979) in Netherlands, and Altman and Lavallee (1981) in Canada. In all of these studies, the prediction models had high success rates ranging from 70% to 90%. The two techniques MDA and Ratio Analysis (RA) were compared in a study by Collins (1980) who concluded that both the methods provided good predictive results when they were used on the same data set and MDA performed as well as or better than RA. Green (1978) examined the indicators of corporate health using liquidity, leverage, activity, and profitability ratios to assess a company’s performance. Gibson (1982) stated that financial ratios, when used and interpreted properly, can be effective in assessing the liquidity, profitability and debt position of a company, and Gardiner (1995) confirmed that financial ratio analysis is the versatile tool for predicting financial distress.

Though MDA is recognized as one of the most popular methods of bankruptcy prediction, it has its limitations too. A number of researchers, many a times, identified those limitations. The studies conducted by Ohlson (1980), Taffler (1984), Appetiti (1984), Mensah (1983), Frydman et al (1985), Keasey and Watson (1991) etc. are noteworthy in
this regard. *Keasey and Watson (1991)* showed that discriminant analysis does not practically provide an independent significance of the individual variable. *Mensah (1983)* and *Ohlson (1980)* supported the same through their study. According to *Eisenbeis (1977)*, the method of MDA simply classifies the business and doesn’t provide an estimate of the risk of bankruptcy.

### b) Linear Probability Model

To overcome the limitations of MDA, Linear Probability Model (LPM), Logit and Probit models etc. have been developed. Linear Probability Model (LPM) is a statistical model in which the dependent variable has a probability lying between zero and one. Two types of variables are used in this model. One is independent in nature and the other is dependent. It interprets the conditional relationship between the two variables. In application of LPM to distress or bankruptcy prediction, a boundary value is to be identified to differentiate the sick and non-sick firms in the population. The linear probability model can be presented in the following form:

\[ Y_i = \beta_0 + \beta_1 X_i + U_i \]

where \( Y=1 \) for one category of response and \( Y = 0 \) for other, \( Y \) can be interpreted as conditional probability that the event will occur given the level of \( X_i \) (where in this model, explanatory variable \( X_i \) may be continuous or categorical, but \( Y \) must be dichotomous random variable).

### c) Logit and Probit Model

*Ohlson (1980)* and *Zmijewski (1984)* pioneered the Logit and Probit analysis, respectively. Logit Analysis (LA) generates a score for each business similar to discriminant analysis. LA is based upon the Cumulative Logistic Function (CLF), and due to its non-linear nature, the coefficients are usually estimated using the maximum likelihood method (*Kumar and Tan, 2005*). Logit analysis and probit analysis take into account the probability that the firm will go bankrupt. The general theme of Logit Analysis can be demonstrated as:

\[ P (Z) = 1 / (1 + e^{-Z}) \]

where \( P (Z) \) is the probability of failure and one cut-off value is usually set under this method to separate businesses belonging to failure and success groups.

*Ohlson (1980)* was an influential study in applying logit analysis to predict business failure with a sample of 105 bankrupt firms and 2,058 non-failing firms. However, the
model did not perform as well as MDA, but he showed that LA is statistically more valid and easier to interpret than MDA. In addition, subsequent studies on Logit Analysis have shown that it is usually slightly empirically superior to discriminant analysis in both classification and prediction accuracy (Laitinen and Kankaanpaa, 1999). However, Martin (1977), Collins and Green (1982), and Hamer (1983) stated that the overall classification accuracy of MDA and LA is not significantly different. In addition to Logit Analysis, Probit Analysis has also been applied to predict business failure. The only difference between logit analysis and probit analysis is that the former is based upon the concept of CLF, while the latter uses the cumulative standard normal distribution function (CSNDF).

\textit{d) Cumulative Sums Procedure}

Cumulative sums procedures, developed in 1954, is a set of sequential procedures that are based on probability ratios. It detects the optimal starting point of the shift and then provides a signal of the shift as soon as possible after the shift occurs. Healy (1987) used cumulative sum procedures to detect a shift in a series of variables’ values from a ‘good’ distribution to a ‘bad’ distribution in terms of the shift in mean and covariance matrix of a multivariate normal distribution. Theodossiou (1993) further progressed with Healy’s model and outlined a sequential procedure to detect a firm’s shift from ‘good’ financial performance to ‘bad’ financial performance. However, this model involves greater complexity and hence has not gained too much popularity.

\textit{II) Artificially Intelligent Expert System (AIES) Models}

Having emerged in 1950s Artificial Intelligence (AI) is the exhibited intelligence of computers, and Expert Systems (ES) are computerized programmes that attempt to imitate human intelligence by the system’s capability to render advice to execute intelligent tasks. Over time, research on a variety of supervised machine learning methods proved quite successful in solving problems for different domains, including corporate distress prediction. The models developed under this technique are Recursively Partitioned Decision Trees, Case-Based Reasoning (CBR) model, Artificial Neural Networks (ANN), Genetic Algorithms (GA), and Rough sets models. Out of these models, ANN has gained more popularity than other models in recent times. However, these models involve higher complexities and greater sophistication, and are, therefore, subject to a number of limitations as compared to the other traditional models of bankruptcy prediction. Moreover, these models are heavily dependent on computer technology, and still need a
lot of enhancement and simplification to be implemented and applied in the present context.

III] Theoretical Models
The main distinction between the statistical and theoretical models is that statistical models look for identifying the symptoms of financial failure, while theoretical models aim at discovering the factors responsible for the same. Under this approach, prediction models are constructed based on some theoretical arguments. A good number of attempts have been made in this regard and this section tries to provide a brief understanding of some noteworthy theoretical models.

i) Balance sheet decomposition measure theory
The underlying theme of this theory is that a business firm should be consistent in its approach regarding depicting its financial status through its balance sheet. The theory believes that there should not be frequent changes in disclosing a firm’s stability position and a firm’s financial instability can be traced by merely looking at the frequent changes occurring in the balance sheet.

ii) Gambler’s ruin theory
The basic idea of this theory relates with the concept of gambling where the gambler plays with some probabilities of gain or loss. The game ceases to continue as soon as the gambler loses all his assets. This theory is modeled on two basic assumptions, viz. (a) gambler’s ultimate failure and (b) expected time span of the game. In the context of predicting financial failure, the firm is considered as a gambler and thus continues to operate until its net worth goes to zero or negative. The theory assumes that if a firm incurs cash loss year after year, or faces a series of negative cash inflows over a longer time span, then, after a certain point of time, the firm will go out of cash and its initial liquid resources will cease to exist and the firm will ultimately become financially ruined.

iii) Cash management theory
Cash, as a liquid asset has immense importance for an organization and dearth of it may even cause a disaster for a business firm and thus calls for managerial attention. Cash management theory relates to short-term management of cash balances of a business firm. An imbalance between cash inflows and outflows would mean failure of cash management function of a firm. Such an imbalance, if continues, may cause financial distress to the firm and this is underlying principle of cash management theory.
iv) Credit risk theory

Credit risk theory is relatively a new concept, based on the underlying principles of Basel accords for banking norms, and is of great significance for a financial firm. Credit risk theory systematically reflects three basic norms viz. (1) minimum capital requirements; (2) review of firm’s internal assessment process and capital adequacy, and (3) effective use of public disclosure, while estimating risk of loss, financial or otherwise, arising due to borrowers default in paying dues as agreed in the contractual terms. J.P. Morgan’s Credit Metrics, Moody’s KMV model, Credit Suisse Financial Products’ Credit Risk+ and Mckinsey’s Credit Portfolio View are some of the models developed based on this theory.

Thus from the above discussion it is clear that the motivation that works behind the empirical researches in corporate bankruptcy prediction is the early detection of financial distress symptoms, and that the selection and application of a bankruptcy model varies from industry to industry.

2.6 Preventive Measures to Financial Distress

When a firm reaches the ultimate stage of financial distress, there remains only two solutions for a firm to undertake; either it may go for a private resolution to negotiate its existing claims with the creditors, or a public resolution which demands legal bankruptcy procedures. Bankruptcy is usually settled with a court-approved rehabilitation scheme within specified period after such filing. It opens two further choices to the sick firm- the firm can either go for liquidation of its assets to distribute the sale proceeds to its stakeholders, or emerge as an independent entity, through acquisition by another firm. However, the role of the following agencies is crucial in averting a firm’s sickness.

- Term Lending Institutions and Commercial Banks
- Entrepreneur
- Government

The role of the above mentioned institutions are described below:

Role of Term Lending Institutions and Commercial Banks

Unscientific market survey regarding the financial health of the firm and inappropriate project appraisal may sometimes cause an early failure of an industrial unit. Besides, lending institutions commercial banks can detect early warning signals of sickness of an industrial unit, and take suitable and timely action by way of providing liquid resources to the concerned industrial units to prevent the incidence of sickness. Hence, specific role of
term lending institutions and commercial banks in the prevention of sickness may be discussed as under.

i) *Evaluation and selection of a project*
Proper evaluation regarding the feasibility of a certain project is the basic requisite for a terms lender to allow monetary support to an organization. More importantly, such an evaluation does not only ensure the project’s future success, but also safeguards the banker's interest. A scientific and methodical evaluation of any upcoming project can help the term lenders and commercial banks to anticipate the problems to be faced by the industrial unit, and hence decide on the amount and tenure of the loan, interest to be charged, if at all the loan merits sanction.

ii) *Discouraging unpromising industries*
There are certain industries which may be on the verge of decline. Term lending institutions and commercial banks should not support industrial units to adopt projects involving production of such product which has already lost its market demand, or may be suffering from high market competition from its substitute products.

iii) *Up-gradation of machinery and equipment*
The term lenders and commercial banks should provide financial assistance for modernization of the old machineries only after a satisfactory survey of the existing and future demand of the industrial products to avoid financial anomalies.

**Role of the Entrepreneur**
The role of an entrepreneur in avoiding sickness while selection of a new project or maintaining an existing one is indispensible. He acts as the sailor and the success of a project largely depends on his skills and experiences. However, his main role can be identified as below.

i) *Managerial efficiencies*
To ensure hassle free operation and profitable outcomes, an organization should have a board with skillful persons. It must have a vibrant chief executive to put into practice the policies formulated by the board, and guarantee a proper second line of defense by appointing competent employees. And above all, the management should be competent enough to take the bankers and lenders into confidence in times of hardship.

ii) *Maintaining good business relation*
An entrepreneur should work with his banker and other term lenders in such a way that the
institutions which provide financial support to the industrial unit would automatically become a part of the organization. The entrepreneur must always clear the dues to the term lenders when he has the ability to do so, and take them into confidence regarding the organization’s financial stability.

**Role of the Government**

Government can play a bigger role in alleviating the chances financial distress of an industrial unit. A few of such initiatives can be earmarked as follows.

1) **Flexible norms and regulations**

A little flexibility in various industrial norms and regulations like easy sanctioning of loans, subsidies, tax reliefs etc. can offer a great help to the upcoming industries.

2) **Financial assistance**

The Government can provide financial and technical support to the industries that are in need of such facilities.

3) **Other assistance**

The government can build up strong infrastructural facilities like transportation, electricity, water supply etc. for industries to flourish.

The above measures can go a long way in reducing the chances of financial distress for an industrial unit.

**2.7 Summary**

The pre-requisite in corporate bankruptcy prediction is an early detection of symptoms of financial distress so as to initiate some corrective measures within the purview of the bankruptcy law prevailing in a particular country. The current chapter has, therefore, laid down the conceptual aspects of financial distress, including its legal framework in the U.S.A, U.K. and India. Furthermore, this chapter has highlighted the differences between the legal framework in these countries regarding corporate bankruptcy, and outlined the utility of the bankruptcy prediction models and preventive measures of sickness.

In an overview of different bankruptcy prediction models under statistical, AIES and theoretical models, the chapter has found that discriminant analysis has been the primary method to develop prediction models in the time span of 1960 to 1975, while the modern methods of bankruptcy prediction like logit analysis and neural networks have started emerging from the year 1980 and onwards. The chapter has revealed that multivariate discriminant analysis (MDA) is the widely used method for bankruptcy prediction till date,
and the AIES approach is relatively new, while the theoretical models have lesser practical implications. On the other hand, the consistently high predictive accuracy of MDA and Logit models i.e. their low Type I and II error rates have been identified in a large number of studies suggesting that these models have been considered as the most reliable methods of bankruptcy prediction over the years. It also appears from the evolution process of bankruptcy prediction models that there still lies some disagreement over the most suitable methodology for bankruptcy prediction, and ample opportunity is there for improvements over the traditional models. Presently, researches are being conducted based on new parameters like corporate governance structure, in addition to financial ratios. New researches are being conducted to develop industry specific failure prediction models. History suggests that Altman (1968) developed his model for manufacturing entities, while Edmister (1972) developed a model specifically for prediction of small business failure. Sinkey (1975) model aimed at prediction of bank failure, and more recently, Wang et al (2004) developed a model for Internet firms. Based on the above conceptual understanding of financial distress, an attempt is made in the next chapter to assess the present scenario of West Bengal jute industry, and thereafter develop a bankruptcy prediction model in its context in the chapter that follows.