CHAPTER - VI

PROBLEMS OF CAPITAL INTENSITY IN ALIGARH
LOCK INDUSTRY - A SYNOPTIC VIEW
'Capital intensity' denotes efficient combination of capital and labour. Obviously, there are two parameters of firm's behaviour - the cost and the revenue. In terms of 'value', they are both comparable with each other since 'money' is used as the measure of 'value', the comparable 'money' value over time gets disparate and 'non-comparable'. The cost is incurred in the beginning of the project or at the time of its inception. In other words, the 'cost' has the 'present value'. The 'revenue' from the operation is only realised in the future. To put it in a few words, it has got 'future value'. The two parameters, in the sense of 'Time value of money' have got to be made comparable by computing 'present value' of revenue to be realised in the future.

Computation of 'time value' of revenue in the present study has been adapted to time series. Though it is hypothetically feasible to work out the time-series' of 'present value' of the income from the operations of a project by applying the following mathematical formula, it is
Beyond the scope of the present study to undertake such an exercise.

\[ pv = \frac{A^t}{(I-K)^t_n} \]

The mathematical formula cited above is well accepted even by the investors to find out the 'present value' (pv) by discounting anticipated income \((A^t)\) during the life-time of the project at a specific rate \((I-K)\) raised by the years \((t^*_n)\). It poses two main difficulties, first, the problem to anticipate income from a project; and secondly, to determine the discount rate for computing the present value. In practice, the management anticipates income on the basis of experience with similar on-going projects and the historical facts about income realised from investments in the industry. The anticipated income, however, is not free from an element of risk. There are many exogenous factors interacting with numerous endogenous factors. The exogenous factors lie outside the ambit of an industry, peculiarities and its features. They are the general influences affecting the business environment alike. It also incorporate the socio-politico-economic milieu apart from institutional framework. The endogenous factors, of course, are specific to the industry and its constituents. Its spread-affects are
confined to the industry and its constituents. Nevertheless, the risk will have to be defined and the factors identified for our analytical study of the problem. For our purpose, the deviation of anticipated income from the actual realisation will always be a subject for financial management to decide. It would reflect the management's attitude towards risk.

Degree of risk-bearing is, indeed, the function of entrepreneurs who, in the corporate business, entrust the management to undertake the task for them. On the basis of 'risk-bearing', there are three approaches quite distinct and separate; first, the aggressive investment policy which is not averse to risk for highest return; secondly, the moderate policy which does not approve of unnecessary risk for higher return; and lastly, the conservative policy of investment which is totally averse to risk. The diverse investment policies are reflected by the funds committed to projects, viz., modernization, diversification, innovation or renovation.

Apart from the attitude of the management to 'risk-return', there are certain exponents to ascertain the return after discounting 'risk'. It is given below:

\[ nA = \frac{A}{(I - K)} \]
The mathematical formula expresses a negative relationship between the degree of risk (p) and the risk free income (na). The 'p' is supposed to range from '0' to '1'. It is obvious that assumption of higher risk is justified by anticipated higher return.

The management is finally presented with two parameters for its decision to commit funds to a project, i.e. 'nA' and 'cost'. The management should normally favour a project if the 'nA' is either more than the cost or at least equal to it.

The management has to be careful about the composition of the capital, besides its utilization. The important issue in raising the funds from different sources is its cost. The main objective of an optimum capital structure is the minimum overall cost. In fact, there are two types of cost of capital for perusal by the management, viz., the specific cost which is related to specific component of the capital and, secondly, the overall weighted cost of capital. The specific cost is calculated separately as a ratio of the pay-out to price of the scrips. For instance, the cost of equity is computed as follows:

\[ K_c = \frac{D}{P} + g \]
It explains that the cost of equity is the dividend as a ratio of its price which goes up by the amount of growth in dividend by the year-end.

Likewise, the cost of debt is the rate of interest which need not be calculated due to the contractual commitment. In terms of mathematical formula, it is expressed as follows:

\[ K_d = \frac{\text{Interest}}{\text{Principal}} \]

The question of weighted average cost of capital is, however, interesting. It is computed by multiplying the proportion of each component with its cost. Finally, the average is taken out of the aggregate cost of all the components. In terms of mathematical formula, it may be specified as follows:

\[ K_w = \frac{(Ke \times P_r) + K_d \times P_r}{n} \]

The approaches cited above are appropriate to find out the suitability of a given capital structure. However, the management does not find the needed insight into the incremental or new funds to be raised for new projects. The central issue to new funds (incremental capital) is its impact on a firm's net-worth. For such decisions, it is worth
trying the basic tools of marginal revenue and marginal cost of capital.

The marginal revenue, for the purpose of our study, may be defined as rate of return on new investments. The marginal rate of return tends to decline with increase in the funds to finance new projects.

On the other hand, the marginal cost is perceived to have three distinct trends, the constant, the declining and the rising trends. The average cost is less than the marginal cost of capital when the rising trend in the marginal cost is perceptible. In case of declining marginal cost, the average cost is more than the marginal cost. Of course, the average cost coincides with the marginal cost when the cost of capital is constant. Graphically, the behaviour of the average cost and the marginal cost curves is as follows: Diagram No.1

In the above diagram, it is depicted that the capital structure is optimum at the point of equality (T) between MR and MC. At this point, the management can maximize its income by investing OM capital in new projects. The firm's net-worth would go up by OHTM. Any other amount of capital, either less or more than OM, cannot maximize the net-worth of the firm.
Diagram No. 1

Cost and Return

Capital

Diagram No. 1

Cost and Return

Diagram No. 1

Cost and Return

Diagram No. 1

Cost and Return
There are divergent views about the behaviour of the average cost and that of the marginal cost. According to the traditional view, the average cost of capital should normally move up with the induction of larger dozes of borrowed capital. The increase in the equity-debt ratio is traditionally regarded as an element of risk. Therefore, the equity-holders ask for a higher dividend by way of compensation for greater risk after induction of excessively borrowed capital.

Contrary to the traditional view is the modern view that the average cost of capital tends to decline with the application of borrowed capital. The modern approach derives its strength from the difference in the cost of debt and that of the equity. Normally, the rate of interest (cost of the debt) less than that of the dividend (cost of equity). It is true that the rate of dividend generally rules higher than that of the interest. It is so because the equity holders are residual claimants, and, as such, they assume the risk of business operations. The higher rate of dividend is, in a way, the compensation for the risk assumed by equity-holders.

By way of slight diversion from the main theme of the hypothesis under review, it may be pointed out that the rate of interest has profound impact on the market value of equity. The market value of equity and the rate of interest
are inversely related. It is premised on the following equation:

\[ V_e = \frac{(N_{01} - 1)}{E}. \]

In other words, the residue available to equity holders gets reduced by the amount of interest payable to debenture-holders. Hence, the market value of the equity \((V_e)\) will tend to decline as the interest goes up.

The foregoing equation further supports the contention that there will be increase in the risk to be assumed by the equity-holders, which should be compensated with higher dividend (cost of capital). Therefore, the cost of capital will rise as more of the borrowed capital is combined with equity.

Both the views (the traditional and the modern) reach the divergent conclusions. The traditional view proves that the cost of capital moves up as more of the borrowed capital is combined with equity. On the other hand, the modern view substantiates that the lower rate of interest payable on borrowings tends to reduce cost if it is combined with equity.

In fact, on the basis of the hard facts, the corporations do not eschew from borrowings. In contravention
of the traditional view, they borrow capital to finance projects. Also, it does not conform to the modern view which plead for infinite application of the borrowed capital. They borrow the funds within limits set by risk and return.

Taking the behaviour of corporations into considerations, there has emerged a moderate view. According to the moderate view, the rate of interest and the dividend may not change initially. So long as there is no change in the specific costs, the average cost of capital (and with that the marginal cost) rules constant. The initial phase of constant cost of capital passes off with equity-holders getting apprehensive of the large borrowings. The equity-holders put up the cost of equity. The moderate view holds that the rise in the cost of equity is off-set by the low rate of interest. Hence, the declining trend in the cost of capital persists till the rate of interest rules lower than the dividend. In the second stage the average and the marginal cost of capital both would according to moderate view, tend to decline.

The third stage (and the last stage) sets in when the debenture holders begin to put up the rate of interest - due to relatively scarce supply of funds and also due to higher efficiency of capital (increasing net operating income of the
borrowers). The moderate exponents attribute it to greater increase in the dividend which the equity-holders demand when borrowings exceed a reasonable limit. It wipes out the advantage of low rate of interest and, instead, raises the cost of capital.

In other words, the moderate theory concludes by pointing out the fact that there is an optimum structure of capital. It obtains at the minimum point of the average and the marginal cost of capital.

Besides the fixed investment, the working capital is also the crucial aspect of 'capital intensity'. Theoretically, it is taken as a part of the capital used to finance the operations of the business. In accounting it signifies the liquid assets which remains in circulation during the operating year. From the point of view of management, it is viewed as the funds leaking out of productive stream, hence a need to keep it to the bare minimum. No business can be supposedly run without a judicious amount of the working capital. In taking a decision about the working capital, the management is caught in the vortex of the cost of 'excessive' and deficient working capital. The excessive working capital depresses 'profit' and the 'profitability' of a business concern. It is inferred from the logic that the working capital does not contribute
to a firm's earning. Its deficiency acts as a crippling restraint on the working of the business. It is true because the business concern must have a 'fair amount of the working capital'.

Now the question for our inquiry is as to how to define a 'fair working capital'. The riddle of the 'optimum' working capital can be resolved if 'excess' is regarded as an element which costs the enterprise in terms of falling 'profit' and 'profitability'. Similarly, the 'deficient working capital' involves risk of losing 'profitable' business opportunities. Looking at the working capital from the point of view of risk and cost, I can hazard the opinion that the risk should tend to decline when the size of working capital increases, and vice-versa will be the tendency of the cost which would increase with the increasing size of the working capital. Diagramatically, the 'risk' and the 'cost' of the working capital should approximate the shape of the curve depicted below Diagram No.2.

The management will commit working capital as much as 'oB' in the above case. At the point, the cost is equal to risk. It is referred to as 'optimum' working capital.

The management is also seized upon with the question of the sources of working capital. In working out sources of the
working capital, it is usually related to the 'operation cycle'. The operation cycle is computed in terms of weeks required for the realisation of cash from sales proceeds. Again, it is the experience of business units with 'working capital' to reveal varying tendency over the year with quite conspicuous troughs and peaks. It shows the periods of minimum-and-maximum requirement for the working capital.

The management makes a deliberate financial plan for making the maximum requirements from permanent capital. When the working capital becomes surplus during the lean period, the idle working capital is utilized for investments in other projects. However in my opinion, the permanent capital of business concern will be profitably used if put to fulfilling that part of the working capital which a concern needs during the entire operating period. In other words, it is the irreducible part of the working capital. However, the temporary deficits caused by spurt in demand should normally be fulfilled from temporary sources of the capital. It means that funds should be borrowed to meet temporary deficits. It may be well understood with the help of the following diagram: No.3.

The sound management can of course help business concern minimize the adverse effects of the working capital on profitability of the business concern.
Operating period

Diagram No. 3

Working capital

Permanent working capital

Temporary working capital

0

x

y
Besides the complex problem of the size of the working capital, it is also necessary to make a careful approach to the components of the working capital. It comprises, in general, a few important components, viz., the inventory, the book debts, the Bills receivable and the cash balances. Normally, it is said that the business policy is reflected by the size of the different components of the working capital. Though it is difficult to generalise policy to manage the working capital. Nature of the business, among other things, is a crucial element in the management of the working capital. I may, however, add, other things being the same, the working capital would be determined by the management in tune with factors underlying different components of the working capital.

The 'inventory' usually is recommended not to exceed 4 weeks of production as 'a norm'. A business unit saddled with excessive inventories are most likely to experience adverse effect on profit and profitability. In the private sector business organisations operating in 'sellers market' are discredited with trading policy to raise prices by creating artificial scarcity; there are several subtle ways to achieve this 'anti-social' objective, and one of them is to carry large inventories. However, yet another reason of excessive
inventory, though rather unconventional in tenor, is the 'window display' by accounting techniques employed to impress investors with financial indicators, e.g. the ratio of 'sales' to 'cost of sales', 'sales to capital' and so on. Though these ratios are much helpful in financial analysis by investors, the real state of affairs are seldom truly revealed. In my opinion, it would be a sound practice to manage inventories and other components of the working capital on the basis of dynamic concept of 'optimum working capital', as explained earlier.

It would not be sufficient for a business enterprise to take case of capital and 'fund flows' it is equally necessary to find a judicious combination of capital and workers for the significant reason of its being an indispensable factor input. The basic questions before an employer about 'labour' is the cost of labour and the level of labour to be maintained.

Management takes a long-term view in respect of the workers combinations. It decides, in short-term, to employ workers with reference to the 'capacity to be utilized' immediately. Even the 'short-term level of workers' has to attain the 'break-even' points. Below the 'break-even' point, it is irrelevant to the management to undertake
operations. As a logical decision, the management finds out the 'break-even' point by means of the formula given below:

\[ \frac{F}{I - V} \]

\[ \frac{P}{\text{p}} \]

It gives the volume of sales to break even by a business concern. And to find out the units of products (volume of output), the following mathematical formula is useful:

\[ \frac{F}{P - V} \]

In both the formulae, the abbreviations stand as follows:

- **F** = Fixed cost
- **P** = Price
- **V** = The variable cost

It conforms to the economic analysis which suggests that the unit would not cease its operations in the short run if 'fixed cost' is covered. As such, the 'break-even' point is taken as the demarcation line between profitability and loss. It must strive for sales above the break-even point for growth.
Turning to workers to be combined with capital, the management would employ the workers as many as required by the installed capacity to produce output more than the 'break-even' unit for minimum sales volume.

However, the economic theory explains the approach within the basic parameters of 'marginal revenue productivity' of workers and the cost. The cost of workers, in economics, signifies the wages and the productivity is the amount of revenue realised from the sales of the product produced by the marginal workers. In a few words the economic approach singles out that equality between the marginal cost and the 'marginal revenue productivity' is the only ideal point to attain for optimum level of employment under all market conditions.

The economic approach is based on the assumption that the workers' marginal revenue product can be computed by taking out the revenue accredited to other factor inputs. According to economists, the revenue contributed by factors of production other than the workers are either 'nominal' or they are 'fully known' sums of money. In practice it is difficult to compute accurately.

Turning to accounting practice, one can hopefully think of two ways to adopt. In the first instance, the workers'
share in income of a business concern vis-a-vis the 'sales' can be compared with the 'cost of labour' (wages). Secondly, it can be determined by taking out from the sales the 'profit' and the 'fixed cost' for comparison with wages. Economic indicators can be worked out to determine the 'level of optimum' employment which presumably, should approximate 1. In other words if the S - F - P -------- is equal to one, I can venture to add that the wages employment in the business concern is 'optimum'. If the ratio is <1, it is the wages which have got to be pruned either by retrenching workers or lowering the wage rate. However, a better result can be realised by raising the productivity of workers for larger sales volume. It would add to greater profit and profitability, if the higher productivity is coupled with reduction in the fixed cost. It reiterates the need for optimum capital structure and for economy in other forms of fixed expenditure. It is not at all advisable to push the 'price' to the detriment of consumers.

The foregoing suggestion can hardly be expected to deal with the technical aspect of the supply (production) effectively in the short-run. It needs a longer span of time for the formulation of projects to either upgrade technology
for modernization or for innovations. The technology’s problem stems from the comparative cost of labour and the capital on the one hand and its impact on the 'return'. In economics, the rate of interest is taken as yardstick of the capital cost. In this way, the explicit or 'objective' denominator is applied for computation of the cost of capital. That's why the fluctuations in the interest rate set in motion the investment activities. The leeway between high cost of capital and low cost of labour tends to narrow down. The reduced margin is apt to dissuade investors to undertake new projects. To reiterate the view, the price movement can serve as an overriding factor in the consideration of substitution of capital for labour. For instance, price moving up by 5 per cent, capital cost by 3 per cent and the wages (labour cost) by 1 per cent still promises to improve the return by 1 per cent.

Economics 'applies certain basic assumptions; in articulating the cost ratio of labour to capital. It assumes that labour can be used with capital in a combination, or there is a specific combination of labour and capital. The indifferent curves, indicate the level of productivity. The increase in the level of technology is assumed to result in higher productivity. A decision is taken by firms in the
light of the funds which they are able to commit to the projects. It is illustrated below Diagram No.4.

According to the above diagram, a firm is shown to travel up the T.S. which joins the points of equality between cost and the productivity.

In accounting, the same conclusions can be drawn by comparing the incremental interest cost and the wage bills in the wake of new projects.

For my purpose, the parameters are quite specific, viz., the productivity of labour and capital and their respective costs. In the ultimate analysis, the impact on profit and profitability has to be worked out for comparison with the present standards. The statement can be hypothesised with the help of the following mathematical formula:

\[
\frac{\text{Technical Rate of Substitution}}{\text{Sales} - \text{Cost of Sales}} = \frac{\text{Cost of Capital} + \text{Cost of Labour}}{}
\]

In case of \( > 1 \), rate of technical substitution will be raised by deliberate investment of capital. It will, of course, not happen when the ratio is equal to or less than 1. The ratio of equity indicates no gains from additional
Diagram No. 4

Cost of Capital

Cost of Wages

Diagram of relationships between cost of capital and cost of wages.
investments. The investors are not usually inclined to undertake projects of capital investment.

The hypothesis for capital intensity may be concluded on the key-note that it happens in an industry when return (profitability) fulfils the anticipations of investors. In a bid to modernise the industry, it should be promoted by rationalising the cost of capital, cost of sales and boosting sales efforts.

'The Cost of Capital' has been considered as 'Composite cost', including the cost of equity and debenture. In 'terms of mathematical formulae, it has been specified as follows:

\[
K_w = \frac{(K_e x P_r) + K_d + P_r}{n}
\]

It is appropriate to find out the suitability of capital structure. It has been found that the Aligarh Lock Industry assigned importance to the 'Cost of Capital'. That is why it applied heavy financial leverage to lower the Cost of Capital. For the Research Scholar, it has not been feasible to work out 'Cost' componentwise, viz., separately for the equity and borrowings. Further, there has been impact of the main features of the industry on the 'Capital structure' of the industry. The classification of the
industry into firms of different sizes highlighted the fact that small units depended on money-lenders for capital and bore unduly heavy cost. Secondly, the capital structure lacked flexibility due to limited access to institutional finance. There is uneven distribution of capital among firms of different sizes. The medium-and-the large firms hogged the lion's share - 79% of the institutional finance.

The case study suggests that the medium-and-the large units need capital for expansion. Most of the capital has been committed to land and building, plant and machines. The land and building claimed 33% of the additional capital investment an average in contrast to 67% of investment in plant and machines.

The capital formation has taken place in all types of firms largely through financial leverage. Of course, there have been divergent constraints in the capital structure of the firms of different sizes. For instance, it has been the 'Cost of Capital' which led the large firms to apply 'heavy financial leverage'. The small firms worked largely with 'equity' due to uncertain 'income'. In case of large and the medium firms, 'equity' constituted 33% of the total 'Capital employed'. 
The capital structure has also come under the impact of the 'Working Capital' needs. The 'inventories' in general accounted for the large part of 'working capital'. The 'Cycle of Working Capital' comprised 60 days. It would go a long way in reducing the cost of capital if the 'Cycle of Working Capital' is reduced to 4 weeks.

The high cost of capital is traceable to large funds committed to working capital; 57% of the capital employed is committed to current assets. It is the outcome of insistence of commercial banks on high level of liquidity which the industry is compelled to maintain.

The cost of capital is also the result of the industry's main reliance on traditional sources of working capital. The industry fulfils 75% of its working capital requirements from traditional sources of capital.

On the other hand, the industry's return is extremely low, viz., 4% on average. The emancipation of the industry lies in efficient combination of capital and labour which are the major factor-inputs. The study of capital intensity by the Research Scholar indicated deceleration in capital intensity during the period under review.
In other words, the industry resorted to labour for expansion in general. The main observations in regard to capital intensity have been confirmed by 'Technical Rate of Substitution' which has been 'less than 1' in case of the 'medium-and-the-large units'. The capital formation has taken place at 8% during the period under review in contrast with 30% of growth in labour force. It raises the question as to whether the 'factor efficiency' has to account for worsening 'Capital intensity'. The factor efficiency has been expressed as follows:

\[
fe = 1 - \frac{A}{C} \left( --- \right)^t
\]

The capital efficiency tended to stagnate at 0.4 during the period under review. The heavy burden of 'interest' has to account for extremely low capital efficiency. The marginal capital efficiency at '0.04' is alarmingly low. The quinquennial analysis of capital efficiency yields the rate of '0.03'. On the contrary, the labour efficiency has been 0.34 during the period under review.

On the basis of analytical study, the Research Scholar suggests that there should be innovation in the forms of organisation, technology and the marketing system for 'optimum capital intensity'. It leads to fresh vista for further researches in the business studies.