ABSTRACT

With high velocity of growth in the already expanding coal markets, the coal mining industry is, in response, undergoing many and varied kinds of structural changes in terms of strategic shifts in mining methods, technology, intensive exploration, organizational changes and so on. Consequently, today’s industry is totally different from the one that existed, say, a quarter century back. This motivated us to take up the present study in the way it is designed.

There is an indispensable and definite role for coal in the processes of development. Growth of coal industry in fact triggers economic development. Such is its role. While analyzing the vital issues, we encountered the paradox of **Growth-Decline Syndrome** in the coal mining sector. It was a challenging task to unravel this paradoxical situation. This imperated us to take up the construction of some relevant concepts such as:

1. **Extraction-intensities**;
2. **Technology-mix and Mine-mix**;
3. **Compensating variability**;
4. **Corporate Social Obligation**; and
5. **Resource-base myth**.

Their application proved to be effective and fruitful in understanding, evaluating and assessing the structural changes in the shifts in mining systems and technology and their impacts on cost behavior along with their economic and managerial implications.

The whole empirico–conceptual analysis is carried out through a case study on The Singareni Collieries Company Limited in Andhra Pradesh. It follows the grounded theory approach using a frame of reference to develop new hypotheses/propositions. The broad framework for the investigations was the “Theory of the Firm” as applied to the mining sector. The focal or thrust area in the Theory of the Firm is the size-cost relationship, which the present study aims to empirically verify. The analysis of the operations of a single enterprise has been carried out at multiple levels — All-Colliery level, Area/coalfield level, Mine-wise and Technology-wise. A mine-by-mine cost analysis for eight years for about seventy five mines has been undertaken from the primary data collected through field surveys. In addition, time series data for about thirty five years relating to company’s operations have also been analyzed. Simple statistical techniques such as regression analysis, correlation analysis, co-efficient of variation, indices etc have been used to carry out the analysis.

Growth cannot be achieved merely by fixing targets. It requires a judicious blend of technology-mix and mine-mix in such a way that the levels of extraction will be maximum; the extraction costs competitive and the mine-size facilitative. All boil down to scale effects. In a competitive globalized economy, the **unit costs** become the major source of competitive
advantage/strength. In this context, the economies of scale assume special significance and relevance. The empirical analysis on the size-cost relationship reveals to our surprise, that this vital sector is subject to the laws of economies of scale. This goes indeed against our established belief that the mineral industries are generally subject to the law of increasing costs. The major source of economies of scale, among other things, is identified to be the extent of extraction-intensities. Incidentally, an optimum-size is also worked out. The realization of this fact impacts drastically mine planning and design. The whole analysis gives rise to a logical sequence as: scale effects leading to higher mine-size that facilitates higher technology levels resulting in higher extraction levels and all culminating in higher growth.

Mining is said to be the destructive use of land/environment. Since environmental protection assumes special dimensions in coal mining industry, it is to be treated as a Corporate Social Obligation instead of mere responsibility.

The tracing of the growth path and the dynamics of growth of coal mining industry has been analyzed by using a long time series data for 120 years. Premising the fact that a Ton extracted is a Ton depleted, it was observed that the depletion rates are found to be alarmingly high leading to the increasing criticality of the issue of sustainability. Economic reforms add fuel to the fire. In the recent years, several scholars use the term sustainability in several divergent ways. However, sustainability at bottom refers to resource sustainability and that too, non-renewables. The problems of depletion and sustainability can be resolved by initiating more number of intensive explorations and conservation programmes on a scale that keeps the resource-base undiminished. Viewing differently, this situation gives rise to yet another issue of matching supply with demand. It is the technology that acts as an equilibrating force. The whole coal market-structure will be under equilibrium conditions through the constant, intricate mechanisms of the acronymed “pri-ma-te” factors (price, market and technology).

Since costs being what they are in a competitive economy, a Strategic Cost Management approach has been suggested to exercise rational cost control mechanisms. More importantly, our study advocates that the policy of cross-subsidization needs to be an integral part of the overall corporate strategy. To our understanding, this policy does not conflict with any other. It provides a built-in mechanism by which the social costs of conservation, environmental protection and depletion can be internalized. The compensating variabilities in resource endowments necessitate the policy of cross-subsidization to deal with the unfavourables by favourables. By mobilizing the rental elements of fertile mines/favourables, it protects the less fertile mines/unfavourables from premature closure and thus, contributes to resource-protection and sustainability as well. Therefore, it becomes a logical necessity and a policy imperative to achieve a sustainable mining sector to support sustainable development.
Our analysis attempts to give an integral framework in which extraction, depletion, environment and conservation/sustainability find their due space. As a matter of fact, all these elements **form the fundamentals of the resource extraction-management approach.**