A Structure, Conduct, and Performance Paradigm for the Industrial Analysis of India Over Two Decades of Economic Reforms

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Abstract

The Indian economic reforms of 1991 and other policy measures have brought changes in business conditions over the long-term. In order to assess how well firms have responded to these reforms and policy initiatives over the two decades of reforms in India, the structure-conduct and performance (S-C-P) approach was used to study the industrial sector of India. S-C-P, a standard industrial economics approach, has been considered as a brain child of the Harvard School of thought, which takes the structural, conduct, and market performance variables of firms into its ambit and tries to draw results on the basis of these variables. In this context, the present paper attempted to formulate or to modify the S-C-P framework according to the reforms and policy initiatives of the industrial sector of India, which takes all economic variables, apart from standard variables, which emerged as major changes for the industrial sector over the two decades of economic reforms in India. Albeit, the S-C-P approach is taken as a standard approach, but due to the emergence of various new variables after reforms and policy initiatives, it cannot be said that it depicts a true picture of the industrial sector until and unless it is formulated according to the Indian industrial sector and includes the major variables that reveal the true picture of the industrial sector of the Indian economy.

Keywords : **S-C-P framework, industrial sector, economic reforms, competition policy, deregulation**

JEL Classification: E6, L1, P21

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India has seen wide-ranging reforms over two decades, which have opened up avenues for the economy by dismantling the old licensing system and introduced privatization and globalization in the economy. The economic reforms of 1991 have brought many changes in the economy, but the success of the industrial sector is still likely to depend upon the strategies and performance of firms in response to these policies and fine tuning of these policies taking the behavior and trends of firms into consideration. What structural changes these reforms have ushered into the Indian industry? How well have firms responded to these reforms? In order to assess and answer all these questions, we need to modify and formulate an S-C-P framework which suits Indian industries very well so that we can do the performance evaluation of industries over policy-led reforms.

The structure, conduct, and performance (S-C-P) paradigm was the brain child of Harvard school of thought, and it got popularized during 1940-1960 with the identification of correlations between industry structure and its performance. S-C-P, a standard approach of industrial economics is used to establish a relationship between

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an industry's structure, behavior of the firms within that industry, and its market performance. Most of the studies done in the past to estimate the existing relationship between the structure and performance of an industry have also concluded with a positive relationship between concentration and profitability of an industry. Hence, when few dominant firms produce an industry's output, there should be a higher rate of return to the firms in the long run (Mann, 1966). However, the earning and sustainability is totally dependent on the industry's entry and exit barrier. Berger (1995) explained the positive concentration-profit relationship by giving two alternative hypotheses, that is, (a) relative market power hypothesis, which states that higher profits can be earned only by large and well-diversified firms, (b) abnormal returns are dependent on production technology and superior management.

Therefore, the formulation of the S-C-P framework for Indian industries is the main objective of the present paper so that it would help us gain better insights on the impact of economic reforms on Indian industries over two decades. Have economic reforms paved ways to facilitate imports and exports? Has the restructuring process expanded across countries? Have foreign institutional investments grown significantly over the period and impacted the industrial sector positively? In order to investigate all these questions, an apt S-C-P framework is expounded in the study so that an accurate study and analysis can be done further to assess the impact of economic reforms on the overall industrial sector of India and recommend fine-tuning of policies accordingly. Thus, in this perspective, the present paper examines various exogenous and endogenous variables related to the industrial sector so as to formulate a suitable S-C-P framework which includes the structural, conduct, and performance variables.

Key Economic Reforms of India

The economic reforms initiated in 1991 have significantly changed the industrial, investment, competition, and trade policies of India. The Industrial Policy of 1991 had come up with various deregulatory measures, which had reduced the scope of industrial licensing, simplified rules and procedures, and expanded the area for private sector enterprises & SSIs (small scale industries) by opening up areas reserved particularly for public sector undertakings. Besides this, the new policy also removed the restrictions on mergers, acquisitions, and entry of large firms, as were applicable under the Monopolies and Restrictive Trade Practices (MRTP) Act. Along with this, the regulations imposed by Industries Development and Regulation Act (IDRA) and Foreign Exchange Regulation Act (FERA), restricting the entry of private enterprise and the shareholding in multinational corporations (MNCs) have been substantially relaxed.

Industrial policy and competition opened up avenues for a number of investments and have brought various liberal measures to the trade policy. Trade policy reforms phased out import licenses, reduced import duties, removed quantitative restrictions, and also brought a flexible exchange rate system in order to bring competition in the market. The liberalization of foreign direct investment (FDI) is seen as another important aspect which enhanced foreign equity participation in domestic industries and enabled foreign institutional investors (FIIs) to purchase shares of listed companies by relaxing procedures and allowing further foreign technology participation.

Thus, the key economic policy reforms can be enumerated as (a) deregulation of the domestic economy, and (b) softening up of foreign investment and foreign technology regulations. Later on, in 1994, India signed the TRIPS agreement and became a member of the WTO in the year 1995, followed by amendments in the Patent Act which gave market power to firms to innovate. With the corporate response towards reforms and the emergence of WTO, there arose a demand for a competition policy so that the wave of business strategies & corporate restructuring (merger & acquisitions etc.) post reform does not pose any threat to competition, and

this led to the advent of the Competition Act, 2002. Hence, reforms have impacted the industrial sector of India, its regulatory and competition policies, and affected its strategies, performance, structure, and efficiency.

The Structure-Conduct-Performance(S-C-P) Approach

The structure-conduct-performance (S-C-P) approach is used as a standard economics tool which establishes a causal relationship between structure, conduct of a firm, and market performance of an industry. Empirically, the relationship between structure of an industry and its performance is very easily observable (Carlton & Perloff, 2000) as the firm's conduct is generally omitted from analysis due to calculations and measurement of data variables. We use S-C-P framework in order to analyze the impact of these reforms and policy changes on the behavior of firms and their performance across the industry (Hay & Morris, 1991; Schmalensee & Willig, 1989). Competition and regulatory policies have their individual impacts on the industry as a competition policy attempts to influence the structure of an industry, while the regulatory policy aims to alter the conduct of the economic agent.

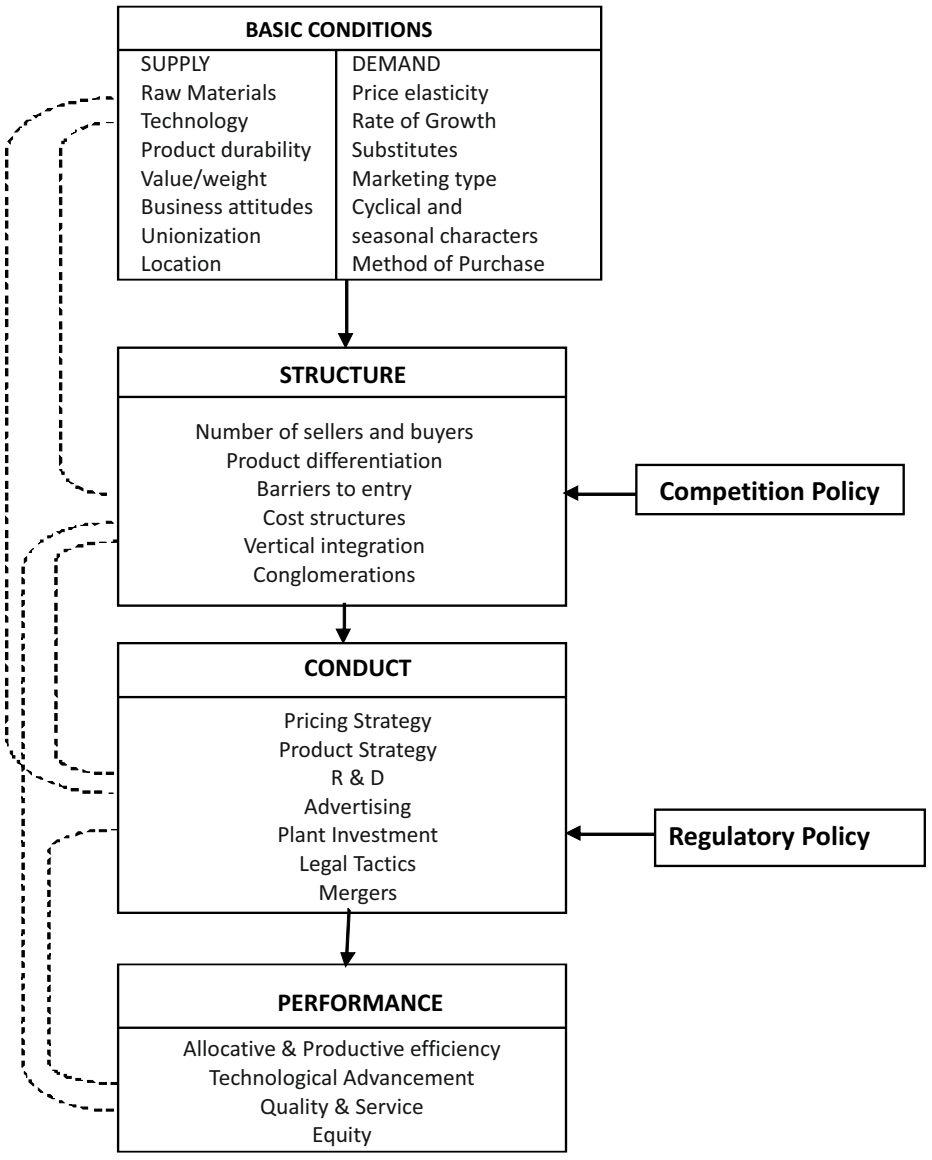
The S-C-P approach clearly brings out the mutual causation and the resultant interdependence of variables of an industry so as to represent its structure-conduct-and-performance. The S-C-P paradigm is usually elucidated through the flowchart as represented in the Figure 1. Prior to defining these structural, conduct, and performance variables, one has to analyze the conditions for basic demand and supply of an industry. Raw material, price elasticity, technologies, and so forth are taken here as variables of demand and supply in the S-C-P framework. Neuberger (1997) suggested that in order to explain the basic market conditions, asymmetric information, uncertainty, and transaction costs should also be examined. Analyzing Neuberger's concept of the S-C-P paradigm, stressing on each term separately, the *structure of a firm* can generally be said to be examined in terms of concentration of buyers and sellers, entry conditions of firms, product differentiation, type of products, costs structures, and so forth. The *conduct of a firm*, on the other hand, can be assessed by analyzing advertisements, R & D, pricing behavior, strategy, and so forth. Lastly, emphasizing on the *performance of a firm*, which is completely dependent on the above set of structures and conduct of a firm, represents the viability and efficiency of a firm by measuring the values of economic value added (EVA), net operating profit after tax (NOPAT), profit rates, productivity, growth, and so forth.

However, the relationship among the sets or variables of framework is not found to be unidirectional as performance also influences conduct and structure of a firm. Higher profit and productivity induces higher investment in technology, advertisements, and so forth, which are financed from profits earned. Market structure has an influence on R&D and other expenditures done on innovation (Schumpeter, 1943).

To study the impact of economic reforms, the discussion of some of the salient features of reforms will be helpful in the selection of relevant variables we have to choose for the study. Previous literature has considered many of the S-C-P variables, but in India, the post reform era has seen a break in entry barriers due to the emergence of the delicensing system, which has a ground impact upon the structure, conduct, and performance variables of industries. Apart from this, globalization and modernization have opened up avenues for industries towards international trade of final as well as intermediate goods, technology imports, overseas mergers, and acquisitions, and so forth. Hence, in order to analyze the impact of reforms on the Indian industries, we need to formulate a S-C-P paradigm which includes all the responsible factors to get accurate industrial analysis for economic reforms.

When preparing the SCP analysis, one systematically goes through the following steps: first, a set of structural variables is selected and defined. Second, variables measuring firm conduct have to be identified. Finally, market performance measures have to be specified.

Figure 1. SCP Paradigm



Source: Adapted From Neuberger (1997). Structure, conduct and performance in banking markets. Thunen-Series of Applied Economic Theory, Working Paper No. 12. University of Rostock, Germany.

S-C-P Variables and Measures for Indian Industries with Respect to Reforms & Policies

Structure

(1) Structural Variables : The structure of a firm represents the set of variables which are relatively stable and affect behaviour of sellers and/or buyers. Structural variables consist of :

(i) Number, size, and distribution of buyers (demand concentration),

(ii) Number, size, and distribution of sellers (supply concentration),

(iii) Product differentiation,

(iv) Market entrance barriers,

(v) Integration,

(vi) Cost structure.

(2) Tools/Framework for Structural Variable Analysis : In order to determine the structure of an industry and its related variables, we can use market concentration ratio as an indicator to find out the percentage of market share of a firm in the industry. Usually, the 4-firm concentration ratio (CR4) is used (Scherer & Ross, 1990). The high value of CR4 indicates that only a few firms account for the major share of economic activity in the market. Herfindahl Hirschmann Index (HH-Index) can be taken as an economic measure to determine the market concentration ratio, that is, the size of firms in relation to the industry and the amount of competition. It is named after Orris C. Herfindahl and Albert O. Hirschman and is calculated by squaring the market share of each firm competing in the market and then summing up the resulting numbers. The HHI number can range from 0 to 1.0, in percentage terms or close to zero to 10,000, in absolute terms. An increase in the Herfindahl Index indicates that there is a decrease in competition and an increase of market power, that is, the higher the market concentration, lower is the competition and the closer a market is to monopoly.

The HH Index is the sum of the *i*th firm's squared market share taking all the market relevant firms into its consideration. The HH Index can be expressed as:

$$HH-\text{Index}=\Sigma S_i^2 \qquad (1)$$

where, S_i represents the market share of the *i*th firm.

The HH Index thus infers the type of market structure, that is, whether it is monopolistic, perfect, monopoly, or oligopoly. Thus the index can answer (a), (b), and (c) variables as defined above, to predict the structure of an industry. Apart from this, (d) barriers to entry can also be known, as with the entry of a new firm, concentration ratio should decrease which ultimately determines the market entrance barrier of an industry. Coming to integration, merger should lead to increase in concentration ratio of an industry.

According to Bain (1956), there are three barriers to entry that are used in SCP analysis (a) product differentiation advantages, (b) economies of scale, and (c) absolute cost advantages. According to him, the impact of barrier to entry can be analyzed by, "…the advantages of established sellers reflected in the extent to which [they] can persistently raise their prices above a competitive level without attracting new firms to the industry" (p.3).

Lastly, in order to assess the cost structure of a firm *(f)*, we can adopt the economy of scale as a factor to analyze the cost advantage that an enterprise obtains due to its size, output, or scale of operation. Theoretically, with an expansion of a firm, there is a decreasing cost per unit with increasing scale ; as fixed costs spread over the units of production. Economies of scale can thus be defined mathematically as :

$$\text{Economies of scale} = \frac{\text{MES (Minimum Efficient Scale)}}{\text{Market Output}} \qquad (2)$$

The higher this measure, the greater is the influence of economies of scale on the firms/industry.

Conduct

(1) Conduct Variables : Conduct of a firm can be defined as the way in which buyers and sellers behave, both amongst themselves and with each other. The variables which are used as an indicator for a firm's conduct are :

(i) pricing strategies (Jerger, 2004, p. 16) ,

(ii) advertising expenditures (Jerger, 2004, p. 16),

(iii) investment in research & development (Jerger, 2004, p. 16),

(iv) diversification (Jacobson & Adréosso-O'Callaghan, 1996, p. 151 and p. 168),

(v) plant investment collusion (including FDI and FIIs as after economic reforms in India),

(vi) product strategies,

(vii) legal strategies,

(viii) technology imports/exports,

(ix) expenditure on manpower and,

(x) collusions.

(2) Tools/Framework for Conduct Variable Analysis : Advertising expenditures are used to approximate product differentiation. In addition to this, the Lerner Index, developed by Lerner in 1934 is used to measure the deviation of price from marginal costs so as to determine the degree to which a firm can exercise its monopoly power. Most of the conduct variables are available in the balance sheet of a firm except strategy (legal, pricing, & product) which is an intangible factor and thus not taken into consideration for accounting assessment. However, economically, this factor impacts the firms to a large extent and this can be analyzed through the firm's performance.

Collusion cannot be estimated by any index or tool as it is a legal term (Asch & Seneca, 1975). Collusion can also be accessed through the observation of variables that render collusion and colluding outcome like it can be done for strategies. Thus, at an industrial level, collusion can be analyzed through the analysis of industrial structure, number of restructures, motive, and colluding outcome. Both the sets of variables, that is, structural and conduct variables have an influence on the performance of an industry as indicated by the rate of profit, growth, margins, productivity, and international orientation.

Performance

(1) Firms' Performance Variables/Measures : The firm's performance can be analyzed with the help of its profitability which can be further assessed with the following variables:

(i) Capital - output ratio,

(ii) Growth in sales & assets,

(iii) Return on capital employed (ROCE),

(iv) Rate of technological advancement,

(v) Debt-equity ratio ,

(vi) PAT etc.

However, these variables can be used to measure the following indicators of performance :

(i) Allocative efficiency,

(ii) Production efficiency,

(iii) Quality of product and services,

(iv) Employment,

(v) Salary & wages of employees,

(vi) Business per employees,

(vii) Sales growth and,

(viii) Return on capital.

(2) Tools/Framework for Conduct Variable Analysis : We can choose between accounting or market based measures to determine the profitability of a firm. These financial ratios, as mentioned above, can help in analyzing the performance of a firm and thus are taken here as indicators of performance. Along with these variables, the internal rate of return (IRR) has been proved to be the only unbiased measure of a company's performance, and hence it can be used here in the framework to assess the rate of return of a firm. However, in order to calculate the IRR, we need to predict future cash flows, which will be discounted at a future rate, so the forecasts may not give the true picture of the future. On the other hand, in order to judge corporate performance, one can use economic value added (EVA), which represents actual value added and will be available to equity holders, but due to difficulty in determining the weighted average cost of capital (WACC), the same has been rejected in the study. In order to calculate close to approximation, we moved to a more appropriate measure, that is, return on invested capital (ROIC).

ROIC has some distinct advantages over other tools, as an accounting based measure, that is, :

(i) It allows for comparability across firms and industries as a ratio,

(ii) It enables comparison with the cost of capital (also expressed in percentage terms) and,

(iii) It is easily computable by outsiders (Reese & Cool, 1978).

ROIC, as an optimal measure to assess a firm's profitability, can be calculated by adopting the framework as suggested by Copeland, Koller, and Murrin (2000). Copeland et al. (2000) directed that in order to compute the optimal approximation of ROIC, one needs to reorganize the balance sheet and P&L data to use the framework given by them [1] .

ROIC, a financial measure, is used to quantify a company's capability of cash generation relative to its invested capital in a business. It is defined as net operating profit less adjusted taxes divided by the invested capital:

$$\text{ROIC} = \frac{\text{NOPLAT}}{\text{Invested Capital}} \qquad (3)$$

The nominator, net operating profit less adjusted taxes (NOPLAT) refers to the total operating profits of a firm adjusted to its taxes. It is calculated by using the profit and loss statement of a company.

[1] The need for adjustments was also pointed out by Carlton and Perloff (2000, p. 239).

NOPLAT = EBITDA - taxes on EBITDA - taxes on non-operating income (4)

Now, in order to calculate the EBITDA (earnings before interest, taxes, and amortization), we need to sum up the profit before tax (PBT) with the interest expense and depreciation of fixed assets. NOPLAT calculation can thus be represented as:

NOPLAT = EBITDA (PBT + interest expense + depreciation of fixed assets) – taxes on EBITDA – tax on non-operating income (5)

NOPLAT can thus be said to incorporate everything which is assumed to be essential for financial analysis, that is, (a) interest income and expense, (b) the deduction of non-operating income. Now, coming to the denominator, that is, invested capital, which refers to the amount invested by the shareholders and creditors in the company, we need to know the total assets of a firm. To compute the capital invested, we are required to deduct the non-operating assets and non-interest bearing current liabilities from total assets. Formally, it can be expressed as:

Invested capital = Total assets – non-operating current assets – non-interest bearing current liabilities (6)

Now, having the value of nominator and denominator, we can compute the return on invested capital, that is, ROIC of firms and can finally judge the financial performance of industries of India over the two decades of economic reforms.

S-C-P Model for Indian Industries

Economic reforms of 1991 of India have impacted industrial, trade, competition, and as well as the regulatory policies over business cycles. The S-C-P framework of India adds more variables to its paradigm than the simple S-C-P framework and hence, it is specifically formulated here in this paper to analyze the industrial impact of these economic reforms over two decades in India.

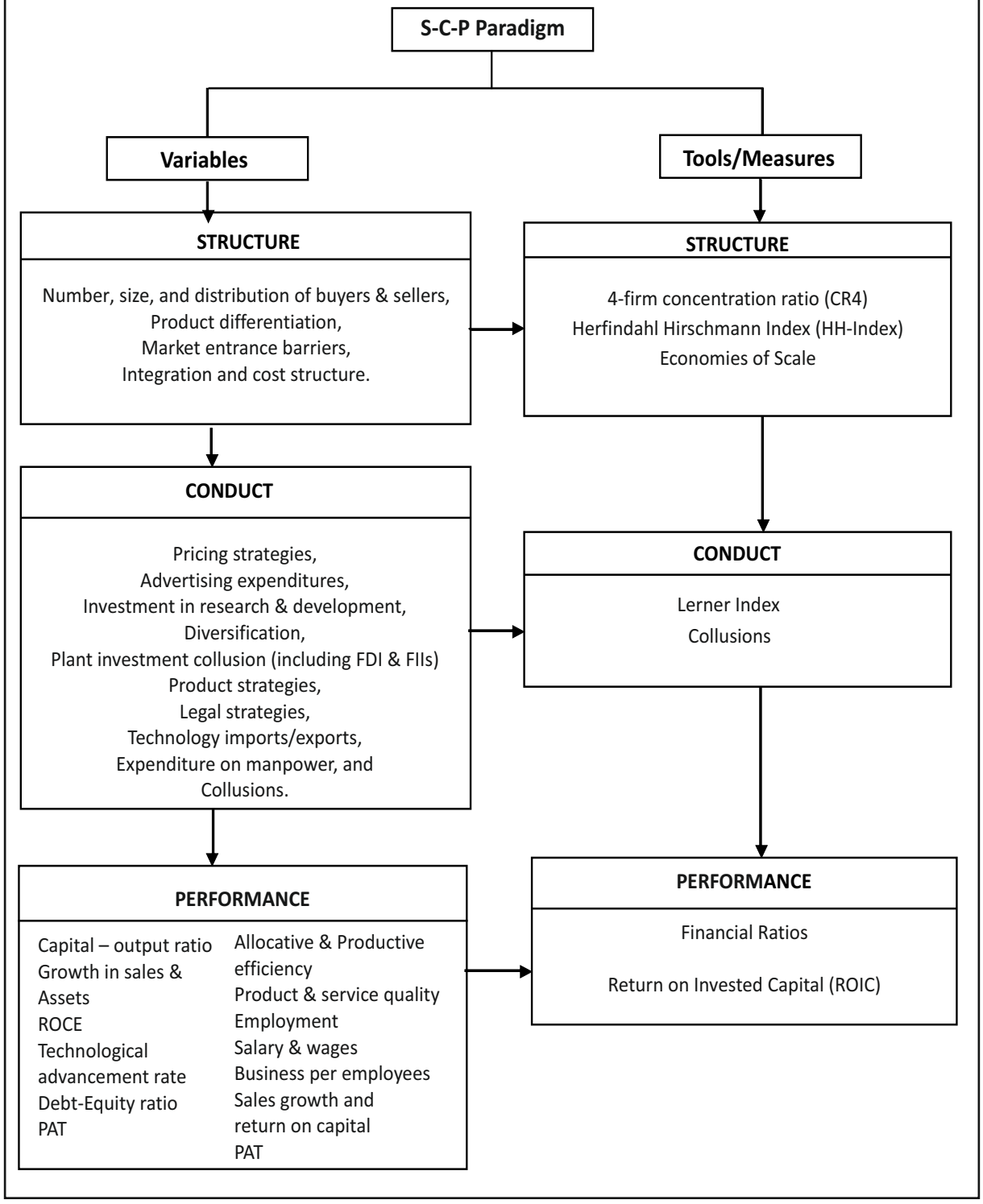
The Figure 2 represents the S-C-P paradigm of Indian industries considering all the relevant variables responsible for the structural, conduct, and performance impact of industries along with the tools and measures which can be used further to do the industrial analysis of India over business cycles so as to assess the impact of economic reforms over two decades on Indian industries. The formulated S-C-P framework includes all the affected industrial variables of economic reforms such as deregulation, FDI, FIIs, overseas mergers/acquisitions which have been introduced or relaxed during the economic reforms and over business cycles in India.

Research and Policy Implications

The formulated model can have great implications towards the government and industrial sector. As the model represents the real picture of industries of India, it can give accurate results for industrial analysis and help in further formulation of policies by the government and strategies by industrialists.

(1) Research Implications : The S-C-P Model formulated in the study, suitable for the after reforms industrial sector of India can depict a true and real picture and hence, the findings of the study based on the formulated

Figure 2. S-C-P Framework of Indian Industries Over the Economic Reform Period



model, analysis of its structure, conduct, and performance individually will help in determining the impact of economic reforms on the industrial sector of India over business cycle. Along with this, the short and long run elasticity coefficients of the relevant measured variables would also help in predicting the short term and long-term impact of these economic reforms on the industrial growth of India.

Thus, the model formulated can be used statistically to determine the actual impact of past reforms on Indian industries over two decades and can help in determining the need for further industrial reforms in the industrial sector of India.

(2) Policy Implications : Industrial policies are aimed at attaining efficiency & optimality in production and growth. Therefore, the formulation of accurate S-C-P framework may ultimately lead to drawing appropriate inferences for policy formulation which will contribute particularly to the industrial sector of India and to the country as a whole.

Conclusion

In the context of economic reforms and other policy initiatives made during reforms over two decades in India, the present paper attempts to formulate/modify the S-C-P paradigm according to reforms, particularly, industrial reforms to analyze the resultant changes in industries over business cycles of India. Deregulation of licenses, technological advancement, foreign direct investments, mergers & amalgamations, research & development, and overseas collusions have impacted industrial sector performance. Defining the structure of an industry involves defining the structural variables which impact the conduct and performance of an industry. Here, in the present paper, we considered HH-Index as a major tool for the assessment of a firm's concentration which can indicate the structure of an industry and further, the Lerner Index and collusion analysis can be used to determine the conduct of an industry. Lastly, in order to adjudge the performance of a firm, return on invested capital (ROIC) and other financial ratios have been taken as a measuring tool to execute industrial performance analysis. The present paper thus formulated a suitable S-C-P paradigm for Indian industrial analysis over two decades of economic reforms of India and the present paradigm, if used, can represent the close picture of Indian industries as a helpful measure for policy and decision makers.

Limitations of the Study and Scope for Further Research

The present paper has been an attempt to formulate a modified S-C-P framework and for the purpose, we have used HH index, Lerner index, 4-firm concentration ratio, and ROIC to study the structure, conduct, and performance of Indian industries, and therefore, the variables should be determined accurately, and it should also be noted that the *n*-firm concentration ratio has a number of limitations. The magnitude of the ratio gets impacted by the choice of *n* and also by the way a market is defined. HHI satisfies all the desirable properties by cumulating the number and size distribution of firms in the industry, and is thus considered a better measure of market concentration. But in case of HHI index, when we square the market share, the values for large firms are weighted more heavily than the values for small ones. Apart from this, as geographical limitations, it might not be possible to take the whole population as a subject of study and thus, the model may conclude a vague statistical result, including a large error term. However, despite these limitations of the model, the present study can help in fulfilling the need of determining the impact of economic reforms of India on the industrial sector, if the researchers take proper care of the values of all exogenous or independent variables.

The study has great scope for further research as it can be extended by using the value of data inputs of each industrial sector differently. The researcher can further investigate and build the best S-C-P framework for each segment of the industrial sector in order to analyze the impact of industrial reforms on the industrial sector of India. Once the value is analyzed using statistical indexes and tools such as the formulated S-C-P paradigm;

one can better assess and suggest further policy formulation and industrial reforms required for the industrial sector of India.

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