

An Approach of Corporate Strategic Factors and Performance in an Emerging Economy

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Abstract

This paper aims at contributing to the understanding of the relationship between Corporate Strategic Factors, Resources Management Capability, Governance Structure and Performance of companies operating in an emerging economy - some Brazilian companies active during the 1997 - 2006 interlude. This interlude of time was characterized by intense changes in the national and worldwide macroeconomic scenarios, leading those companies to increase investments on production and technology as a way to achieve results that are above industry average. As methods of processing the data obtained in secondary databases, we adopted artificial neural networks and genetic algorithms. With reference to the role of corporate strategic factors for determining the performance levels of the studied organizations, we proposed and estimated a model based on genetic algorithms, under the Evolutionary Theory's perspective. The main objective of the modeling process through genetic algorithms was to estimate the independent variables values, representing resources management capacity, corporate strategic factors and governance structure, which equalize the average value of the estimated financial performance to the maximum value of this same variable, identified at the original sample.

We did not identify any statistically significant differences between the estimated values and the original ones for the variables representing sales intensity and organization's size. As to resources management capacity, the results indicate the need of increasing the utilization capacity for raw material and production resources and the need for organizations to invest in productive factors as a manner of increasing performance. As to corporate strategic factors, the model processing results indicate the relevance of increasing the proportion of invested resources in purchasing fixed assets facing the total assets, in order to obtaining a better performance level. As to the variable representing the diversification strategy, we estimated a higher probability of increasing performance for the organizations which adopts a strategy of sales concentration in a smaller product line.

We also obtained information which indicates the probability of a better performance for the organizations which adopt a debt structure with a long term profile, as well as for those which maintain a larger number of individuals in the composition of the board of directors,

which should be composed by a higher number of individuals with formal bonds to other institutions.

Introduction

Organizations have been seeking ways of adapting their configurations to the environmental factors that determine competition. The identification of the strategic options which are feasible and possible of being adopted by the organizations has been demanding the development of an evolutionary perspective, which shall use as a reference the set of strategic investments and directions done in a given context, in order to identify the most adequate choices to be made in order to reach organizational objectives.

The attainment and maintenance of performance levels which satisfy the demands of stakeholders, shareholders and directors shall demand adjustments in corporate strategies, as well as in the resource management capabilities, considering the pressures exercised by the market. The identification of the optimal combination of resources and capacities as well as of the corporate strategies which makes possible an average performance level similar to the one identified at the market, shall be a crucial issue so that the organizations may adapt to the competitive environment in which they act.

Based on these points, we highlight the relevance of this study by seeking to understand the relations between corporate strategic factors and performance, in the Brazilian business environment, which is characterized by an increase in competition primarily in function of public policies related to industrial and technological investments. We place as the main proposal of this research the following guiding question:

What is the relation between Corporate Strategic Factors, Governance Structure, Resources Management Capability and Performance, from an Evolutionary Theory's perspective?

The assessed results directs us to the relevance of the corporate strategies in determining performance and, from the evolutionary perspective, we highlight the importance of managing the operations as an influencing factor of the organization's adequacy, so as to obtain better performance levels, as well as establishing relationships with other organizations by means of interlocks.

Theoretical Background

The structure of the theoretical references follows the hierarchy of the approaches established on the research objective. On the following subsections we approach aspects related to the Evolutionary Theory and its relation to the strategy field. The corporate strategic factors are approached afterwards and the role of resource management in the attainment and maintenance of competitive advantages is presented.

Evolutionary Theory

According to Nelson & Winter [1], profitability acts as one of the main factors that establishes the expansion and contraction rates of firms, through the implemented investment policies, altering the organization size, which in its turn shall determine new input needs and new production capacities, influencing the price and profitability levels, in a cyclic model. This evolutionary cycle of organizations also influences the environment, having in mind that the aggregate levels of input needs, production capacity and price levels for the industry will generate dynamic changes, regardless of the maintenance of the firm's productive characteristics. Thus, through the processes of market search and selection of the most adequate strategies for dealing with the industry configuration, the evolution of organizations occurs throughout time.

Dosi and Nelson [2], adopt the term “evolutionary” to the theories which have as their purpose explaining the alterations in the research object along the time, involving both the random elements which generate variation in the variables under analysis, and the mechanisms which lead to said variation. The authors highlight that the firm's competitiveness, representing their adjustment to the environmental conditions, is reached through their behavior patterns, in terms of investment policies, research and development, pricing, diversification, among other aspects, and that the search for this alignment is determined by the market demands in terms of products and technology, which constitute the basic dimension of evolution, representing the complementarities between the evolutionary theories and the business related fields.

Corporate strategic factors

Corporate strategy has its existence explained in natural and inevitable situations which occur on company diversifications, which, if ignored, may lead to the failure of all the strategy of a given organization. These situations may be considered as their premises: 1) the competition occurs at the level of the Business Units – BU; 2) diversification inevitably brings costs and limitations for the BUs; and 3) the shareholders are capable of diversifying themselves at any moment (Porter [3]).

Constituting the most elevated definition level of corporate strategy, it encompasses relevant matters for the organizations' development, such as the determination of the BU's competition and diversification form, thus spanning the other two levels of the strategy – business and functional. The corporate strategy, considering the company conditions in terms of size, field of action and structure, among other aspects, may be considered as the most important in the company field due to the broadness of the strategic decisions which comprise it, determining the organization's direction and objectives, having an impact on all their BUs and functional areas.

Corporate strategy presents as its content broad decisions, such as the definition of the corporate frontiers (decisions on scope); direction of the corporation's decisions for the relationships between the business units; and the determination of the methods which define the corporation diversification's degree and form. Between this methods are the mergers, acquisitions, incorporations, divisions, among others (Christensen [4]).

Corporate diversification strategy

Rumelt [5], when studying the relations between strategic changes, in terms of alterations on the differentiation strategies and the financial performance of conglomerates, proposes that organizations adopt the position of diversifying the portfolio as a means of defending themselves from the competitors' actions and the alterations in the competitive context. In the same manner, Amit and Livnat [6] state that companies select the industries in which they act according to the business cycles (variations of macro-economic indicators around a trend) and of the existing seasonality between the industries, so that the peaks in one industry compensate for the valleys of another. Also according to Rumelt [5], diversified companies presented a tendency to improve their performance after the adoption of such strategy and present two basic behavior patterns: (a) companies which modified their dependency position in relation to only one business towards a limited related business strategy tend to obtain above average return on capital rates when compared to other companies which adopted the first position, and (b) companies which altered their position towards non related or connected business presented growth rates above the average of other companies, but their profitability rates remained below average.

Also in what regards the relations between diversification strategies and competition, Rumelt [7] proposes that, since the effects of the industry's profitability variation are controlled, there will still remain a single pattern of effects related to the diversification categories adopted by the studied companies. In order to verify the validity of such assertion, the author develops models which incorporated variables related to the diversification strategies adopted by the studied companies, to market share and to financial performance, concluding that (a) companies which act in a broader field of related business tend to develop production factors which make possible the diversity due to the growing returns and the transaction costs, and (b) those companies which are less diversified tend to obtain higher averages of market share.

Size of the firm as corporate strategic factor

Considering that the company lowers the transaction costs, why study the company size? According to Coase [8], as they grow, companies may increase the costs of organizing additional transactions inside the company, leading to a point at which the costs of organizing an additional transaction inside the company are equal to the costs which arise in performing a transaction at the open market, or to the costs of the organization by another entrepreneur, thus making difficult, or even impossible, for the entrepreneur to make the best use of the production factors. If the company detains its expansion at a point below the costs of trading at the open market, and at a point equal to that of the organization costs in all the company, this shall imply in a market transaction. Thus, the company shall tend to be bigger when: a) the organization costs are lower even when increasing the number of organized transactions; b) there is a lower probability of errors by the entrepreneur; c) the reduction in the offer price of the production factors for bigger sized companies is higher.

So that firms may exercise their role of efficient resource and effort allocation, the comprehension and adequacy of the organization structure to the opportunities and needs arising from the market are crucial, making possible the constitution of firms as structures in which the relations are controlled and adjusted according to the predominant interests. So, the

alignment between structure and transaction costs allows for minimizing the costs, leading to a point of balance in the conflict relations inherent to the bilateral dependence transactions, in which the firms' specialization makes it so that contracts are established in a supplier x buyer relationship, considering also the impossibility of covering all situations with a possibility of occurring in a relation between firms, due to its managers' limited rationale, and the parties' opportunism in seeking the best result (Williamson [9]).

Board size and interlocking

When analyzing the composition of Boards of Directors, in terms of size, of endogenous executive director and principal, and its relation to the performance of Australian companies, Kiel and Nicholson [10] identified that big companies seek to monitor and control the organization through a board of directors with a higher number of members, a higher number of directors exogenous to the organization and the separation between the roles of company president and board president. As to the relation with performance, the authors identified a significant correlation between the board size and market performance, measured by Tobin's Q. Such result also was assessed for the relation between market performance and exogenous executive directors, an aspect which did not present a significant correlation to the performance measured through variables of accounting aspect (ROA – Return on Asset).

Boyd [11] assign that board's size must be optimized in order to guarantee access to key information and resources and to act with efficiency. According to the author, two factors should guide the board optimization - resources scarcity and market uncertainty – and that, in both cases, organization must reduce board's size and expand the number of interlockings, providing that strategic decisions could be made most rapidly and that access to resources and information could be reached with success. According to Bazerman & Schoorman [12] organizations could benefice from interlocking relationships when they allow them to have access to information related to prices in market place, to advertising expenditures and to the amount of financial and organizational resources allocated to research and development. Another advantage of establishing interlocking relationships is the possibility of reducing uncertainty in terms of resources availability and access, reducing transaction costs.

Resources and competitive advantages

The resource based theory has as basic foundations the premises that the results available to the companies are, at the same time, significantly heterogeneous between them, implying that each company possesses an unique resource set, and present imperfect mobility; that is, one company's resources are not easily found and acquired by the competition (Hunt [13]). Wernerfelt [14] proposed the approach of the factors related to the companies based on their resources – Resource Based View – in substitution of an evaluation of the capacities and organizational results focused only on the available product line, affirming that the company's growth is directly bound to the balance between capitalizing on the available resources and the development of new resources. This did not mean, however, that diversifying resource application will assure a better performance, as there is a tendency that the competition for them will be intensified.

At short-term, a company's competitiveness is originated from the attributes related to product price and financial performance, while at long-term it is derived from its ability to

build, at lower cost and quicker than its competitors, the competencies which allow them to develop products not yet planned (Prahalad & Hamel [15]). According to the authors, the true advantage sources are in the managers' ability in consolidating technological and productive training in competencies, which strengthen the organization's capability of quickly adapting itself to new scenarios.

Constructs and Variables Studied

The *Corporate Strategic Factors* are comprised by: (a) the *debt profile* (*debtpro*) which reflects the long or short term posture adopted by the organization, was calculated as the ratio between the short-term debts and total debts; (b) the aggressive posture is expressed through the *investment in assets* level (*invassets*) calculated as the ratio between the financial resources invested in purchasing fixed assets and the total assets; (c) the *company size* (*size*) was estimated by the logarithmic transformation of the total asset assessed by the companies at the end of the period; (d) the *diversification level* (*diversif*) was obtained through the Herfindahl-Hirschman index for the concentration of sales per product line. The data necessary for its elaboration were obtained in the annual information reports provided by the companies to the Brazilian Committee of Securities – CVM. The data utilized for the calculus of the first three variables was obtained on the financial statements available in the Economática ® database.

Governance Structure - the variable representative of the interlocking strategies was assessed based on the percentage of board members which maintain formal relations with other institutions (*interlocking*). Another variable that compound the model was the number of members in the board of directors (*boardsize*).

The *Resources Management Capability* reflects the organization's competence when making use of the available resources in order to generating net results. It is composed by the variables *sales intensity* (*intensity*) - proportion between general, administrative and sales expenses and net sales; (b) *efficiency* – proportion between the cost of the sold product and net sales; and (c) *capital expenditures* (*capexpend*) - proportion between net capital expenditures and net sales. *Performance* was measured by means of the variables *ROA* (Return on Assets) and *Tobin's Q*.

Data Analysis

Aiming at identifying which was the most adequate network configuration for the estimation of the dependent variables (*performance*) through the independent variables, multi-layered post-feeding neural network models (MLFN) with two, three, four, five and six layers, linear prediction and generic regression (GRNN) was estimated.

Eighty percent of sample cases were used in training the neural network and the remaining 20% were used for testing the network. The acceptable margin of error for the forecasts was stipulated at 20% and the network test tolerance percentage was fixed on 30%. If the forecast error is above the established parameter, it shall be qualified as bad and if the network test percentage stays above the 30% limit, it shall be considered as not apt for

processing the predictions. The network test tolerance percentage stayed below the 30% parameter, both for the training subsample (0.00%), and for the testing subsample (1.89%), when considering the dependent variable *ROA*. When considering *Tobin's Q*, the tolerance percentage for the training subsample stayed on 5.21% and for the testing sample on 35.85%.

The estimated results pointed out the generic regression neural network – GRNN – as being the most adequate to estimating the financial performance (*ROA*), as well as for the stock market performance (*Tobin's Q*) – Table 1 –, followed by the linear prediction model. However, considering the estimated percentages for the network test, we identify that the artificial neural networks are not adequate for the stock market performance study, turning the processing through genetic algorithms for this variable not viable.

Table 1 – Estimated Neural Network Parameters

Model	Dependent Variable	
	<i>ROA</i>	<i>Tobin's Q</i>
Linear predictor	24.42	1.83
GRNN	22.77	1.64
MLFN 2 nodes	45.04	1.98
MLFN 3 nodes	46.73	4.35
MLFN 4 nodes	40.11	4.15
MLFN 5 nodes	25.29	2.51
MLFN 6 nodes	25.32	2.92

When processing the genetic algorithms by means of Evolver® software, values were estimated for the *ROA* variable according to equation 1 – beta coefficients parameters estimated by means of the linear prediction model.

$$ROA = 364.79 - 0.499intensity - 0.569efficiency - 0.153capexpend + \\ + 1.908size + 0.197diversif + 1.606invassets - 0.227debtpro + \quad \text{Equation (1)} \\ + 0.109interlocking + 0.235boardsize$$

The genetic algorithms model was elaborated with the objective of identifying which are the values for the independent variables which equalize the average value of the estimated financial performance to the maximum value of this same variable, identified at the original sample. Sample data referring to the year of 2005 was used in the model estimation, as a mean of making the comparative evaluation with the year of 2006 possible.

According to Table 2 there were no statistically significant differences identified between the estimated and the original values for the variables *intensity* and *size*. As to the other variables, we present below the analysis of the different averages between the estimated and original values, by construct:

- *Resources Management Capability – efficiency* – the negative difference indicates the need of increasing the utilization capacity of raw material and production resources, represented by the reduction of the proportion between the cost of the product sold and

net sales; *capexpend* variable – the positive difference represents the need for organizations to invest in productive factors as a manner of increasing performance;

- *Corporate Strategic Factors* – *invassets* variable – the estimated positive difference indicates the relevance of the increase in the proportion of resources invested in purchasing fixed assets in relation to the total assets, for obtaining a better performance level. As to the variable representing the diversification strategy – *diversif* – the positive average difference between the estimated values and the original values indicate a higher probability of increasing performance for those organizations which adopts a sales concentration strategy in a smaller product line. The negative value assessed for the *debtpro* variable indicates the probability of a better performance level for organizations which adopt a debt structure with long term profile.
- *Governance Structure* – *interlocking* variable – the positive difference points out to the possibility of increasing performance level as the organization maintains, in its board of directors, a higher number of members with formal bonds to other institutions. Relating to the board size – *boardsize* -, the assessed positive value for the difference indicates the trend in organizations with a larger number of individuals in its board to present better performance results.

Table 2. Difference Tests – Estimated X Original Values

Variables	Average Diference ^a	Standard Deviation	Standard Error	Confidence interval (95%)	
				Lower Bound	Upper Bound
ROA	28.349	39.917	6.018	16.213	40.485 *
INTENSITY	-5.846	23.974	3.614	-13.134	1.443
EFFICIENCY	-7.988	22.263	3.356	-14.757	-1.220 *
CAPEXPEND	3.019	8.189	1.234	0.530	5.509 *
SIZE	0.751	3.009	0.454	-0.164	1.665
DIVERSIF	16.412	47.566	7.171	1.951	30.874 *
INVASSETS	3.436	8.351	1.259	0.897	5.975 *
DEBTPRO	-27.636	47.167	7.111	-41.976	-13.296 *
INTERLOCKING	33.896	55.958	8.436	16.884	50.909 *
BOARDSIZE	7.436	13.841	2.087	3.228	11.644 *

^aEstimated minus observed

*Statistically significant

Conclusions

Taking as references the theoretical foundations of the Evolutionary Theory, we established as the main objective of this research to identify *the relation between Corporate Strategic Factors, Governance Structure, Resources Management Capability and Performance*. In order to answer the proposed question we processed neural network models and genetic algorithms.

The main objective of model processing through genetic algorithms was to estimate the independent variables values, representing resource management capability, corporate

strategic factors and governance structure, which equalize the average value of the estimated financial performance to the maximum value of this same variable, identified at the original sample.

We did not identify any statistically significant differences between the estimated values and the original ones for the variables representing sales intensity and organization size. As to resource management capability, the results indicate the need of increasing the utilization capacity for raw material and production resources and the need for organizations to invest in productive factors as a manner of increasing performance. As to corporate strategic factors, the model processing results indicate the relevance of increasing the proportion of invested resources in purchasing fixed assets facing the total assets, in order to obtain a better performance level. As to the variable representing the diversification strategy, we assessed a higher probability of increasing performance for the organizations which adopts a strategy of sales concentration in a smaller product line. We also obtained information which indicates the probability of a better performance level for the organizations which adopt a debt structure with a long term profile, as well as for those which maintain a large board of directors, mainly composed by a higher number of individuals with formal bonds to other institutions.

The results of the neural network models and genetic algorithms processing shows the relevance of corporate strategic factors in determining performance. Under the evolutionary perspective we emphasize the importance of investing in operations as an influencing factor of organization's adequacy so as to obtain better performance levels, as well as the relevance of establishing relations with other organizations, through the members of the board of directors. We would like to highlights that the period under investigation – 1997 throw 2006 - was characterized by intense changes in the national and worldwide macroeconomic scenarios, leading those companies that were active in this interlude to increase investments on production and technology as a way to achieve results that are above industry average.

Finally, the research objective was reached and the factors that could establish a better performance level for organizations acting in an emerging economy – the Brazilian one – were identified, constituting a reference for other researches in the area of strategy, mainly for those focused in developing markets, such that approached by this research.

References

- Nelson, R. R., & Winter, S. G. (1982). *An evolutionary theory of economic change*. Cambridge, Mass.: Harvard University Press.
- Dosi, G., & Nelson, R. R. (1994). An introduction do evolutionary theories in economics. *Journal of Evolutionary Economics*, 4 (3), 153-172.
- Porter, M. E. (1999). *Competição: estratégias competitivas essenciais*. 4ª ed., Rio de Janeiro: Campus.
- Christensen, H. K. (1999). *Estratégia corporativa: gerenciando um conjunto de negócios*. In Fahey, L., & Randall, R. M. *MBA: curso prático: estratégia*. Rio de Janeiro: Campus, 2ª ed., 67-99.

- Rumelt, R. P. (1977). Corporate diversification strategies and financial performance [Working Paper MGL-54], Managerial Studies Center, University of California Los Angeles.
- Amit, R., & Livnat, J. (1988). A concept of conglomerate diversification. *Journal of Management*, 14 (4), 593-604.
- Rumelt, R. P. (1982). Diversification strategy and profitability. *Strategic Management Journal*, 3 (4), 359-369.
- Coase, R. (1937). The Nature of the Firm. *Economica*, 4, 386–405.
- Williamson, O. E. (1998). The institutions of governance. *American Economic Review*, 88 (2), 75-79.
- Kiel, G. C., & Nicholson, G. J. (2003). Board composition and corporate performance: how the Australian experience informs contrasting theories of corporate governance. *Corporate Governance: An International Review*, 11 (3), 189-205.
- Boyd, B. (1990). Corporate linkages and organizational environment: a test of the resource dependence model. *Strategic Management Journal*, 11 (6), 419-430.
- Bazerman, Max H., & Schoorman, F. D. (1983). A limited rationality model of interlocking directorates. *Academy of Management Review*, 8 (2), 206-217.
- Hunt, S. D. (2000). *A general theory of competition: resources, competences, productivity, economic growth*. Thousand Oaks: Sage Publications Ltd.
- Wernerfelt, B. (1984). A resource-based view of the firm. *Strategic Management Journal*, 5, (2), 171-180.
- Prahalad, C. K., & Hamel, G. (1990). The core competence of the corporation. *Harvard Business Review*, 68 (3), 79-91.

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