Analysis of Differentiation Strategy and Profitability of Business Auto Parts Industry in Brazil

Análise Estatística da Estratégia de Diferenciação e Rentabilidade de Empresas da Indústria de Autopeças no Brasil


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ABSTRACT

The objective of this research is to investigate how costs and expenses explain the profitability of the company with emphasis on Statistical Analysis of Differentiation Strategy in Product Quality. The literature review indicates that the company's profitability depends on the generic strategy adopted to deal with this structural force in the industry. Among these strategies should focus on the differentiating features unique and valued by the purchasers and at the same time, attempt to costs. This study was done using the values of costs, expenses, and net sales of seven companies, originally extracted from the financial statements of the same, published by BM&F BOVESPA. These analyzes via multiple regression indicate that costs and expenses explain the profitability in the auto parts industry when it adopted the generic strategy of differentiation management in product quality.

KEYWORDS:

Differentiation strategy, costs and profitability.

RESUMO

O objetivo desta pesquisa é investigar quanto os custos e as despesas explicam a rentabilidade da empresa com ênfase na Análise Estatística da Estratégia de Diferenciação em Qualidade de Produto. A revisão da literatura indica que a rentabilidade da empresa depende da estratégia genérica adotada por esta para lidar com as forças estruturais da indústria. Dentre essas estratégias, a de diferenciação deve enfocar características únicas e valoradas pelos compradores e, ao mesmo tempo, atentar aos custos. Este estudo foi feito usando os valores dos custos, despesas, patrimônio líquido e vendas de sete empresas, extraídos originalmente dos demonstrativos contábeis das mesmas, divulgados pela BM&F BOVESPA. As análises feitas via regressão múltipla indicam que custos e despesas explicam a rentabilidade na indústria de autopeças quando adotada a gestão estratégica genérica de diferenciação em qualidade do produto.

PALAVRAS-CHAVE:

Estratégia de diferenciação, custos e rentabilidade.
1. INTRODUCTION

Porter (1989) says that the value of the costs of a company has important implications for the successful differentiation strategy. For the autoparts industry the most common way to measure quality is given by means of certifications that aim to ensure the establishment of criteria patterns of relationships between customers and suppliers (LAMENZA, 2008).

The problem of this research appeared on the idea of Porter (2004) that, for use in the management of differentiation strategy, costs must be sized, but to explain how the costs reflected in profitability is also necessary to scale the amount of expenses.

As Iudícibus et al. use to say (1998), expenses are directly or indirectly goods or services consumed for obtaining revenue, thus the problem of this research is: the costs and expenses explain the profitability of the company with emphasis on generic strategy of differentiation in product quality?

The objective of this research is to investigate the relative importance of costs and expenses to explain the profitability of the company that adopts the generic strategy of differentiation in product quality in the auto parts industry. Therefore, the hypothesis of this research is: costs and expenses explain the profitability in the auto parts industry when adopted the generic strategy of differentiation in product quality?

This study was done using the values of the costs, expenses, equity and sales of firms in the Brazilian autoparts industry, originally of the financial statements of the same companies, published by BM & F BOVESPA extracted. Data collection was exploratory, documentational type (Malhotra, 2001). A sample of seven companies in the auto parts industry comprises: Fras-Le S/A; Iochpe Maxion S/A; Mahle-Metal Leve S/A; Marcopolo S/A; Randon S/A Implements and Interests; Tupy S/A and metallurgical Riosulense S/A.

Applied regression analysis where made and the dependent variable studied was the amount of the return and the independent variables were the sales figures, costs, expenses, operating income and net worth.

2. DEVELOPMENT

The beginning of the automobile industry in Brazil coincides with the policy of internationalization of production of vehicles from large corporations and the incentives offered by the government (financial, protectionism, infrastructure installation and running administrative reforms) (LADIES; DIAS, 2005).

In the XXI century, given the need for product launches with agility in the marketplace, companies are applying concurrent product development, working with various departments in an integrated manner, saving time and producing a positive effect by omitting some stages of development (KOTLER; ARMSTRONG, 1999). Thus, the mutual exchange of information tends to improve the design quality and the product becomes more chances of commercial success (BAXTER, 2000).

Greater integration of suppliers and manufacturers in product development activities has enabled to reduce design complexity, shorten the execution time, the hours of necessary engineering and renew more frequently, both the product and the technology used, with lower costs and division of
responsibilities. These factors have contributed to the partnerships with suppliers are recognized as important for the acceleration of the product development cycle, since a significant percentage of the cost of the vehicle comes from parts purchased from autoparts companies (CUSUMANO; NOBEOKA, 1993).

The involvement of suppliers in product development contributes significantly to the improvement of process performance in terms of time and quality (CLARK; FUJIMOTO, 1991; WOMACK et al., 1990; BROWN; EISENHARDT, 1995; KESSELER, 1997). The specialization of suppliers enables faster technology innovations and frees the company to specialize in what is their core business (PRAHALAD; HAMEL, 1990), the design and assembly of the vehicle, not your specific parties via organizational strategies.

To Hofer and Schendel (1978), strategy is evidenced by the existence of levels when they explain that there is strategy focused on the corporation and so turned to the business unit.

Mintzberg (1987), for example, provided about five synonyms for the word strategy in the field of business:
- A plan.
- A play.
- A pattern.
- A positioning.
- A perspective.

Ansoff and McDonnell (1993) define strategy as a set of rules that helps in the decision making process and aims to guide the behavior of an organization to achieve its goals.

In this sense, quality Garvin (1992) has five main settings are:
- Transcendent.
- Product based.
- User based.
- Production based.
- Value based.

When referring to the definition of quality is meant to mean "innate excellence" and that perceived differences in the same can be seen in some ingredient or product attribute.

According to Oliveira (2004), the quality within the strategic management must be defined before fixed and internal standards are the customers that determine the acceptance of a product, is the need for customers to be served.

Narasimhan, Ghosh and Mendez (1993), claim that the quality and cost are compatible for leadership in business strategies. Therefore, costs should actually decrease more rapidly with the acquisition of more experience in producing high quality products.

The central point of the total cost leadership strategy is the company to make its total cost is less than that of its competitors. Lowest cost works as a defense mechanism against the rivalry of the company from its competitors, especially with regard to price wars (PORTER, 2004).
Differentiation gives the company a defense against the forces of the environment, although other than as permitted by cost leadership.

Loyalty and decreased sensitivity to price (customers willing to pay more to have a product that they consider best suits your needs) isolate, to a greater or lesser degree, the company rivalry of its competitors (PORTER, 2004).

For Porter (1989) the success of the strategy and goal achievement became a competitive advantage. In the 1990s, Porter (1989) competitive advantage related to value creation, competitive advantage arises from the value that a company can create for its buyers exceeds the cost of making the company and provides the difference between the supply of one against the other company.

In the case of suppliers, the bargaining power is manifested when the market is dominated by a few organizations and there are no substitute products, the industry is not important client, produce buyers depend on the products of suppliers and the supplier's products are differentiated (PORTER, 1989).

According to Hill and Jones (1998), a firm has a competitive advantage when its profitability is greater than the industry average, and it is sustainable when it can maintain this higher long-term profitability.

3. METHODOLOGY

The population in this research is the Brazilian auto parts industry and the sample consists of seven companies was used as a criterion for choosing the sample of firms non-probability selection and trial (MALHOTRA, 2001), because the selections of the companies studied here are publicly traded and, therefore, disclose their financial data.

Companies analyzed were: Fras-Le S/A; Iochpe Maxion S/A; Mahle-Metal Leve S/A; Marcopolo S/A; Randon S/A Implements and Interests; Tupy SA and Metallurgical Riosulense S/A. Considering that, when adopted the strategy of differentiation in product quality, should be controlled or even reduce costs (PORTER, 2004), the seven companies already mentioned were surveyed, listed on the BM & F BOVESPA (2009) of the auto parts industry the period 1996-2007.

Secondary data were collected through documentary exploratory research based on reports provided by the BM & F BOVESPA. Sales information, costs, expenses, net worth, operating profit came from the balance sheets posted on the BM & F BOVESPA site.

For data analysis techniques of multiple regression and Pearson correlation were used, since the data metrics have natures and are described by well-defined quantities. Data were analyzed with SPSS 5.0 software, where the normal distribution was evaluated.

Levene's test to assess the homogeneity of the variances (homoscedasticity) was used. Cook distances to evaluate conflicting or extreme points (outliers) in the regression model. The values of collinearity (Variance Inflation Factor - VIF) to check whether the independent variables are highly correlated, and analysis of the normal distribution of non-standard residues and for how assumptions of multiple linear regression requires that the dependent variable has normal distribution and that the independent variables present is homoscedastic form (DOBSON, 2002).
Based on the statistical tests we observed that costs explains 36% of the profitability of the auto industry of the seven companies studied.

4. DATA ANALYSIS AND PRESENTATION

Porter (1989) says that the value of the costs of a company has important implications for the successful differentiation strategy.

From the data obtained in the financial statements of companies, made use of multiple linear regression for each company in order to quantify the importance of costs and expenses to determine profitability for the proposition Porter (2004) that costs should be minimized when adopted the strategy of differentiation, product quality.

The variable profitability ROE (return on equity) was obtained by dividing the net income (LL) by equity (PL) (Kassai; Kassai and Santos, 2000).

\[
\text{Rentabilidade ou ROE} = \frac{LL}{PL}
\]

The other variables, namely: sales, costs, expenses, equity and operating profit were used with their original values.

Clarifying further, the term sales or revenue input elements for the asset (rights organization), in the form of cash or rights to receive, corresponding usually to the sale of goods, products or services (IUDÍCIBUS et al. 1998).

The costs are expenditures on goods or services used in the production of other goods or services (MARTINS, 2008). Already expenditure means as Iudícibus et al. (1998), as the consumption of goods or services that directly or indirectly help in the production of income and thus increase profitability.

Operating income is the amount of profit on the sale of goods or services of the company (GITMAN, 1997).

Finally, as equity (PL) means the difference between the value of assets (rights) and liabilities (obligations) of a company at a given time (IUDÍCIBUS et al., 1998). Also according to Gitman (2004) profitability or ROE measures the return earned on investment of capital of the company shareholders. The higher this number better for homeowners.

In short, we collected data from 1996 to 2007 seven companies, according to five variables and calculated (taken as the dependent variable in a linear regression model).

More specifically data analysis, according to the Kolmogorov-Smirnov (Table 1) revealed that independent (sales, costs, expenses, operating income and net worth) and the dependent variable variables (profitability) is shown with values of probability significance (p-value) above 0.05, indicating that all can be described by normal distributions.

This evidence meets the first assumption of linear regression models (Malhotra, 2001).
TABLE 1
Kolmogorov-Smirnov test for normal distribution tests for non-standard residues.

<table>
<thead>
<tr>
<th>KOLMOGOROV-SMIRNOV (A)</th>
<th>STATISTICS</th>
<th>DF</th>
<th>P-VALUE</th>
</tr>
</thead>
<tbody>
<tr>
<td>non-standard residues</td>
<td>0.073</td>
<td>56</td>
<td>0.200</td>
</tr>
</tbody>
</table>

A = Lilliefors’s significance correction

For homogeneity of variances, the Levene test showed the following values of probability of significance (p-value):

- $p_{\text{sales}} = 0.114$
- $p_{\text{Costs}} = 0.078$
- $p_{\text{expenses}} = 0.410$
- $p_{\text{PL}} = 0.099$
- $p_{\text{operating profit}} = 0.191$

What indicates failure to reject the null hypothesis of the test because the variances are homogeneous, and have similar shapes for the independent variables (MAROCO, 2005).

The analysis of possible extreme values or outliers showed that the distances Cook showed lower values than 0.50.

The Cook distance is a measure that is intended to assess the individual influence of each observation on the estimate of the coefficient vector $\beta$. In other words, it evaluates whether the regression change much if each value were eliminated each time.

Thus, values greater than 0.50 indicate that the data are atypical and aberrant and should be investigated carefully. For this study, removing each analyzed value would not change regression (DOBSON, 2002).

The calculations of the values of collinearity (VIF) showed that VIFCosts = 6.046; VIFExpenses = 3.130; VIFPL = 6.906 and VIFOperating profit = 3.337. Therefore, all values are below 10.0, indicating that the variables keeps good and reasonable independence of one another.

When the values of collinearity are greater than 10.0, the estimated regression coefficients tend to be inaccurate and the coefficient estimates vary greatly from one sample to another (MAROCO, 2005). However, for the sales value of the VIF variable appears more than 1000 and thereby varying the model must be eliminated. In fact, the p-value calculation of independence the Student t test shows no significant ($p = 0.434$). The interpretation of the value of t when the beta test is not significant is that it does not contribute to the multiple regression model and, so to speak, is zero (DOBSON, 2002).

Entering more specifically in the multiple linear regression model, it is seen that the values of the standardized beta coefficients (coefficients with application of z-scores to facilitate interpretation of results), indicates that the major contribution is the variable operating profit because beta = 1.526 and the smallest contribution is the variable expenses (beta = -0.275), as shown in Table 2.
TABLE 2
Standardized values of the multiple linear regression model coefficients.

<table>
<thead>
<tr>
<th>MODEL</th>
<th>STANDARDS COEFFICIENTS</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>BETA</td>
<td>T</td>
<td>P-VALUE</td>
</tr>
<tr>
<td>(Constant)</td>
<td>12,170</td>
<td>0,000</td>
<td></td>
</tr>
<tr>
<td>Costs</td>
<td>0,360</td>
<td>2,960</td>
<td>0,005</td>
</tr>
<tr>
<td>Expenses</td>
<td>-0,275</td>
<td>-3,143</td>
<td>0,003</td>
</tr>
<tr>
<td>PL</td>
<td>-1,119</td>
<td>-8,606</td>
<td>0,000</td>
</tr>
<tr>
<td>Operating profits</td>
<td>1,526</td>
<td>16,882</td>
<td>0,000</td>
</tr>
</tbody>
</table>

a) Dependent variable: profitability.

In addition, to verify the quality of the fitted model should be noted the value of the Pearson coefficient of determination (R2) (see Table 3). The value of R2 is R2Adjusted and 93.5% (with the z-score) is 86.5%. Either one or the other indicates an excellent fit (DOBSON, 2002). It is thus confirmed that the fitted model can be interpreted. Still, the Durbin-Watson test was lower than 2.0 indicating that the model does not auto correlated variables significantly and there are no problems with the data impossible to interpret the results and to present possible misinterpretations (DOBSON, 2002).

TABLE 3
Values of the fit of the multiple linear regression model.

<table>
<thead>
<tr>
<th>MODEL</th>
<th>R</th>
<th>R2ADJUSTED</th>
<th>STANDARD ERROR ESTIMATION</th>
<th>DURBIN-WATSON</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0,935 a</td>
<td>0,865</td>
<td>0,063</td>
<td>1,402</td>
</tr>
</tbody>
</table>

a) Predictors: (Constant), operating profits, expenses, costs and pl.
b) Dependent variable: profitability.

Table 3 indicates that corporate profitability is influenced by costs, expenses, operating income and PL. Among these, the most important factors influencing the profitability are operating income and costs.

Still, it remains to analyze the residuals of the fitted model. Such analysis is of great importance, because a condition of acceptance of the regression models is the need of residuals respect a normal distribution, otherwise there outliers that may indicate poor quality of the adjustments.

Table 4 shows the Kolmogorov-Smirnov test for non-standard residues. The value of probability of significance (p-value) indicates no difference between the values of the waste in question and a normal distribution (p = 0.200). Thus, the condition of validity of the model is respected.

TABLE 4
Test for normal distribution by Kolmogorov-Smirnov test for non-standard residues.

<table>
<thead>
<tr>
<th>KOLMOGOROV-SMIRNOV (A)</th>
</tr>
</thead>
<tbody>
<tr>
<td>STATISTICS</td>
</tr>
<tr>
<td>Non Standards Residues</td>
</tr>
</tbody>
</table>

a) Lilliefors’s significance correction.
The consideration of the residues is confirmed by ANOVA (Table 5), because the p-value is less than 0.001 ($p < 0.001$), showing that there is independence between the variables and their waste and, once again, confirming that the model is properly adjusted.

**TABLE 5**
ANOVA between variables (multiple regression models) and the residues of the same model.

<table>
<thead>
<tr>
<th>MODEL</th>
<th>SUM OF SQUARES</th>
<th>DF</th>
<th>QUADRATIC AVERAGE</th>
<th>F</th>
<th>P-VALUE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regression</td>
<td>1,459</td>
<td>4</td>
<td>0.365</td>
<td>89.347</td>
<td>0.000 a</td>
</tr>
<tr>
<td>Residues</td>
<td>0.208</td>
<td>51</td>
<td>0.004</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TOTAL</td>
<td>1,667</td>
<td>55</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

a) Predictors: (Constant), operating profit, expenses, costs and PL.
b) Dependent Variable: profitability.

Finally, one can write the equation of multiple regressions as: profitability = $0.360 \text{ costs} - 0.275 \text{ expenses} - 1.119 \text{ PL} + 1.526 \text{ operating profit}$.

The above equation shows that a cost explains 36% of profitability, thus indicating a positive relationship between investments in production and its services, and profitability. In this sense, the equation shows that more investment on production, tend to increase the profitability of companies in this sector studied.

This proves consistent with the assertions of Porter (2004) that investment in production and services relating to the production generate more scale that increases the profitability of these companies.

Costs, it is noted that these are inversely related to profitability, representing -27.5%, indicating that the effective control of expenditure is an important factor contributing to corporate profitability. What is striking is that the value of equity (PL) is also negated. Thus, the research shows that most companies in this industry should be with high levels of debt, excess capacity or low sales, if this is the case, you should seek to increase sales to asset optimization.

5. **FINAL DISCUSSION AND RECOMENDATIONS**

This article was based on the idea of Porter (2004) that, for use in the management of strategic differentiation, costs must be sized, but to explain how the costs reflected in profitability is also necessary to scale the amount of expenses.

As Iudícibus et al. used to say (1998), expenses are directly or indirectly goods or services consumed for obtaining revenue, thus the problem of this research is: the costs and expenses explain the profitability of the company with emphasis on generic strategy of differentiation in product quality?

For this matter, based on the study made by this research, it was observed that both costs and expenses explain the generic differentiation strategy in product quality.
Costs explain the profitability by 36% and expenses -27.5%, indicating that a better use of the expenditure will further contribute to profitability.

The objective of this research was to investigate the relative importance of costs and expenses to explain the profitability of the company that adopts the generic strategy of differentiation in product quality of the auto parts industry. The analysis of the data obtained through the multiple linear regression equation results in:

\[
\text{Profitability} = 0.360 \times \text{costs} - 0.275 \times \text{expenses} - 1.119 + 1.526 \times \text{operating profits}.
\]

Based on this equation one can conclude that the value of cost explains 36% of the yield factor for these companies in the industry.

The values of investments have been higher than revenues obtained by them. Therefore, the value of equity (PL), (-1.119) has declined and expenses have not contributed effectively to the production of income (-0.275), since the values of costs, namely expenditures made for production of new goods or services used in production has been constant.

Thus, the operating profit is the amount of profit on the sale of goods or services of the company are positive, showing that there is profitability. What is suggested as more grounded in the theoretical aspects equation would be:

- Costs are kept or, these expenditures occur in the production in order to seek greater profitability (ROE).
- Reduced costs.

The reflection would be stagnation or increase in equity (PL) and possibly considerable increase in operating income and profitability (ROE). So when Porter (1989) asserts that the value of the costs of a company has important implications for the successful differentiation strategy, in this study, for these businesses, and industry in this period, the statement shown to be feasible in its fullness.

The equation shows that cost is an important factor for profitability, therefore, explains 36% of the profitability for companies that compete through product differentiation, corroborating the findings of the author that while companies that compete on differentiation should pay attention to costs.

For these companies, the industry and the successful period of differentiation strategy should be based on: decrease expenses with the goal of producing revenue, enhance equity, increase operating income and thus increase profitability (ROE). Costs could be kept in the form that present or elevated.

6. REFERENCES


