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Analysis of the Competitiveness of the Brazilian Food Industry by Resource-Advantage Theory

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Abstract

The objective of this study was to analyze the competitiveness of companies of the Brazil's publicly traded food industry by the Resource-advantage Theory. Therefore, financial indicators of sixteen food companies, listed on the BM&Fbovespa, were assessed in the period from 2011 to 2016. The TOPSIS multi-criteria method was used to classify the companies according to their performance, based on the Resource-Advantage Theory, which establishes financial performance as superior, at parity and inferior. The results revealed that about 20% of the companies had superior financial performance. The company Ambev S/A presented the best financial performance in all years of the period in analysis. The company M. Dias Branco S/A presented a superior financial performance in most of the years of the study and Excelsior S/A had its performance divided into superior, for three years, and at parity, for the other three years. On the other hand, Biosev S/A and Minupar S/A had inferior financial performance in all years of the study, suggesting low competitiveness in the sector. Marfrig S/A had its performance at parity in only one year and inferior performance in the remainder of the study period.

Keywords: Financial performance. Topsis. R-A Theory.

Introduction

According to the OECD-FAO Agricultural Outlook 2015-2024 (Food and Agriculture Organization of the United Nations) Brazil is the world's second largest food supplier. Brazili-

an's food exports totaled over R$ 35.2 billion in 2015 and because continuous improvements in productivity, its supply capacity goes toward growth. Acting on global level, the Brazilian food industry operates in a competitive environment. Brazil's domestic food industry follows this competitiveness and market needs differentiation. According to Machado (2003), competitive companies are those capable to hold strategic advantages to survive in highly competitive environments.

The Resource-Advantage Theory (R-A Theory) has been successfully applied to studies of competitiveness. The theory has a foundational premise that the firm's objective is superior financial performance, resulting from competitive advantages. Thus, best market positions come from tangible and intangible resources that increase the firm's efficiency (Hunt & Morgan, 1996).

In view of the above, the following research problem arose: How do companies compete in the Brazilian food industry from the perspective of the Resource-Advantage theory? Therefore, the objective of this work was to analyze the competitiveness of Brazilian food industry companies by Resource-Advantage theory. The object of study was the publicly traded food companies listed on the Brazilian stock exchange.

According to Cunha, Dias and Gomes (2006), the sector has more than 40,000 establishments throughout the country and generates approximately 1 million jobs that produce about 850 different types of products. Data from ABIA (Brazilian Association of Food Industry) demonstrate that the food industry reached, in 2015, a 9.5% share of GDP and net sales of 562 billion real. In this sense, the article is justified by the prominence of the food industry in the national and international scenario, by the importance of understanding the behavior of companies within a competitive environment, as well as the opportunity to explore the use of R-A Theory for academic and professional gains. Hall, de Brito, Viana, Hein and Novaes (2014) used different analyzes and variables to study the performance of the Brazilian food industry, based on the study by Hall and Hein (2016), which applied the R-A Theory to agribusiness companies in six agricultural producing countries and in five different agribusiness sectors. The authors obtained results that justify the continuity of research on the subject.

The study advances as an empirical test of Resource-Advantage Theory, and presents an overview of the competitiveness of the food industry, enabling the industry to evaluate and establish strategies in relation to its competitors.

Theoretical reference

Resource-advantage theory

According to Hunt and Morgan (1995), R-A Theory is a general theory of competition that characterizes the evolutionary process of competition. The R-A Theory is interdisciplinary and has affinities with numerous other theories, including Evolutionary Economics, "Austrian" Economics, Heterogeneous Demand, Differential Advantage, Historical Tradition, Industrial Organization Economics, Resource-Based Tradition, Competency-Based Tradition, Institutional Economics, Transaction-Cost Economics, and Economic Sociology.

According to Hunt (2012) and Rossi and Mafud (2014), the R-A Theory advocates that the competition process contributes to organizational learning. It emphasizes proactive innovation (inherent in the business movement) and reactive innovation (which generates dynamism in competition). In this way, competition is seen as an evolutionary process, which occurs through a provocative imbalance: there is no final phase, but an endless process of

changes. According to R-A theory, companies and resources are durable and hereditary. The search for competitive advantages, comparing resources, constitutes the process of evolutionary selection. This whole process is influenced by five environmental factors: the resources of society, social institutions, the actions of competitors and suppliers, consumer behavior and public policy decisions.

According to Rossi and Mafud (2014), the R-A Theory structure shows a network of cause and effect relationships in which a firm's competitive position in the marketplace is consequence of comparative advantages of its resources and the reason of its superior financial performance is conferred with direct competitors. Firms can gain a competitive advantage when they have a range of resources that allow a value offering that is perceived as superior or produced at lower costs in a given market segment. The firm loses comparative advantage in resources when it fails to maintain and understand the importance of resources or when it does not adapt to changes. The firm may also lose comparative advantage with changes in the resources of society and institutions, as well as changes in consumer behavior, government actions, suppliers and competitors. The feedback generated by the competition process refers to the relative financial performance, whereby firms recognize their resources and their market positions.

Figure 1 presents the competition representation of organizations according to R-A Theory.

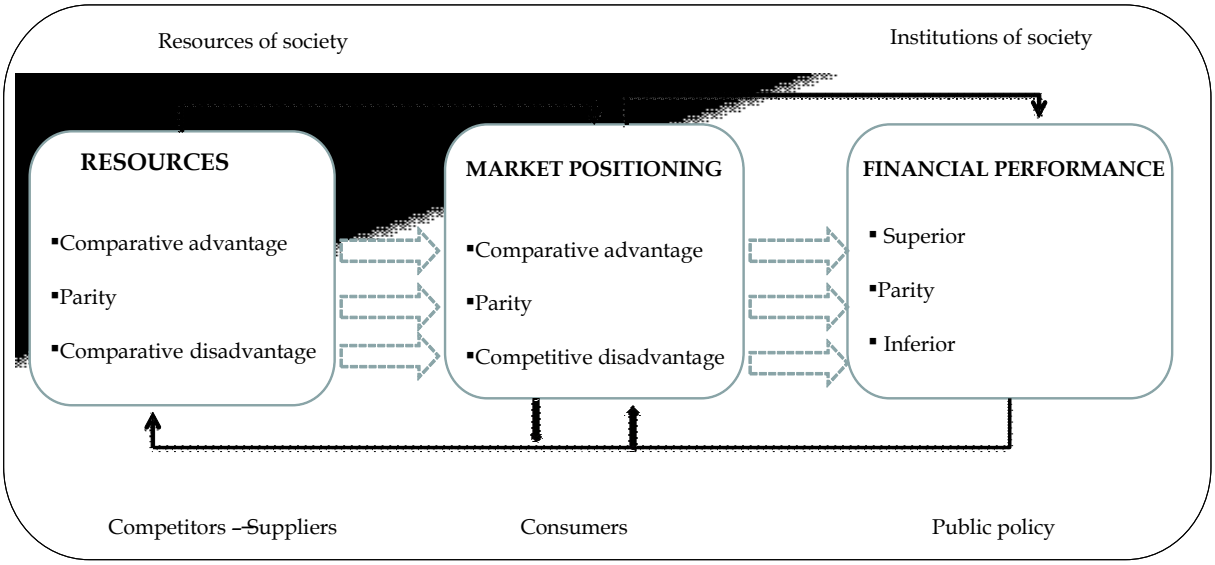

Figure 1 – Representation of R-A Theory
Source: Adapted from Hunt and Morgan (1996).

Hunt (2012) mentions that each firm has at least some resource exclusivity that constitutes a comparative advantage, through which a competitive advantage is obtained in the market, and, consequently, a superior financial performance. Comparative advantage defines resources as tangible and intangible entities, available to the company, which allow it to produce a value-added product efficiently for a given segment of the market. On the other hand, competitive advantage refers to the achievement of superior performance in a market by combining the best resources of an organization strategically.

Superior Financial Performance

Performance analysis is done by a set of measures of effectiveness and efficiency of the organization's operations. From a business perspective, efficiency is measured by services geared to the needs of consumers and efficiency is assessed by the economic use of resources to satisfy customers (Nelly, Gregory & Platts, 2005).

The measurement of performance has several objectives, among which stand out: support in the decision making, monitoring performance trends, behavior change and increased motivation, improvement in the dissemination of organizational results through marketing and support in benchmarking processes (Vilalonga, Magalhães Filho & Balestieri, 2015).

Measuring performance is imperative to achieve planned goals and objectives. The performance measures are aimed at the future, since the "management objective is to create and shape the future of the organization as well as that of society"(Lebas, 1995, p. 23).

Performance is measured in two environmental dimensions. The first is the internal dimension, that is, the organization itself. The second is the external dimension, that is, the market in which the organization competes. Performance in the external dimension is usually evaluated with a focus on competition, through *benchmarking* techniques (Nelly, Gregory & Platts, 2005).

As previously described, the main purpose of the company, according to R-A Theory, is superior financial performance. Hunt (2001) explains that in terms of financial performance, "superior" means "much more than" and "better than". This implies that companies are looking for a level of financial performance superior to that of some competitor, as measured by financial accounting performance indicators such as accounting profit, earnings per share, return on assets and return on equity (Hunt, 2001).

Companies operate under imperfect and often costly conditions to obtain information about existing segments, potential markets, competitors, suppliers, shareholders and production technologies. Such informational asymmetry makes profit maximization difficult for firms (Hunt, 2001). Due to the informational asymmetry between the manager and the principal, high agency costs may arise along with opportunistic agent behavior. This can reduce the company's profit by incurring more expenses (Jensen & Meckling, 2008). In addition, the motivation of human resources must be conditioned. People are naturally motivated by self-interest that comes from moral and personal codes and this can be a limiting factor for maximizing profit within a company (Hunt, 2000a).

Companies cannot all be simultaneously superior. However, according to R-A Theory, all continually seek superiority in financial performance. This implies that the competition process will not only efficiently allocate resources but will also proactively and reactively innovate for further increases in efficiency and effectiveness (Hunt & Deroizier, 2004).

The performance of the company can be analyzed through financial statements obtained in a traditional way, relating items (Hunton, Lippincott & Reck, 2003). The following section will present indicators that usually measure the financial performance of companies.

Financial Performance Evaluation

Financial performance indicators have the function of evaluating and classifying companies competitively. According to Hunt (2001), superior financial performance can be measured by means of profitability indicators. Profitability indicators, according to Barney

and Hesterly (2010), are Return on Total Assets (ROTA), Return on Total Equity (ROTE), Gross Profit Margin (GPM), Earnings per Share (EPS), Price-Earnings Ratio (P/E) and the Cash Flow per Share (CFPS).

Financial indicators are traditionally used in the evaluation of the companies' performance, which is obtained by comparing the company with competitors or units of the same company (Bezerra & Corrar, 2006). According to Damodaran (1997), financial indicators that originate from financial statements are commonly used to offer standardized measures of profitability and to measure the degree of risk of a company.

There are several ways to measure profitability, one of which is to look at the profitability relative to the capital employed in obtaining the return on investment, which can be obtained by Return on Asset (ROA), from the company's perspective, or by Return on Equity (ROE), from the shareholder perspective (Damodaran, 1997). The author also examines profitability by estimating the profit margin on sales. According to Reilly and Norton (2008), there are two perspectives on the financial measures of profitability of operations: the rate of return on sales and the percentage of profit on capital employed.

The great advantage of financial measures that evaluate a company's competitive advantages is that they are relatively easy to calculate (Barney & Hesterly, 2010). Publicly-held companies make their financial statements available, so various accounting ratios can be calculated and used to compare a company's performance with the industry and then predict the competitive position of that company. Financial performance indicators are presented in sequence.

Financial Performance Indicators

The previous section suggests that the most appropriate indicators for measuring financial performance are those that compare profitability to invested capital and sales. In this line, the most used for purposes of analysis of the Superior Financial Performance are presented below.

Return On Capital

The indicators that measure return on capital are Return on Investment (ROI), Return on Equity (ROE) and Return on Asset (ROA). ROI is one of the main indicators of business performance (Perez & Famá, 2006). By measuring the company's efficiency in managing invested capital, ROI is an important indicator of operating profitability (Gitman, 1997).

The return on investment is the income before extraordinary items (available to shareholders), divided by the sum of total long-term debt, preferred shares, minority interest and total common equity (Hunton, Lippincott & Reck, 2003). According to Assaf Neto (2010), ROI is the ratio of operating profit to net investment, calculated by subtracting the operating liability from total assets, according to the following equation:

$$ROI=OP/(TA-OL) \quad (1)$$

Where:
ROI = Return On Investment
OP = Operating Profit
TA = Total Asset
OL = Operating Liabilities

Performance based on profitability is also obtained by ROE. According to Damodaran (1997) this indicator is commonly used to analyze a longer period of time in which its average is compared to the cost of equity. ROE represents the return of funds invested by shareholders (Assaf Neto, 2010) and can be calculated as follows:

$$ROE=NP/NW \quad (2)$$

Where:
ROE = Return On Equity
NP = Net Profit
NW = Net Worth

To measure the return on the company's assets (ROA), the profit is divided by the value of the total resources invested in assets. A high ROA reveals the company's ability to buy the same assets and get a high return. However, the low ROA does not necessarily suggest that the assets invested should be used elsewhere (Brealey & Myers, 2003). The ROA assesses the company's ability to generate profit and capitalization (Damodaram, 1997; Assaf Neto, 2010). The practical reason for adopting ROA as a measure of competitive advantage is the extension of the analysis, which can be broken down into two components, profitability and efficiency (Dehning & Stratopoulos, 2002).

Deitz (2005) used ROA as a proxy for measuring business value creation based on R-A Theory. The indicator was calculated as net income divided by total assets.

$$ROA=NI/TA \quad (3)$$

Where:
ROA = Return On Assets
NI = Net Income
TA = Total Assets

Profit margin

The ratio of profits to sales can be evaluated by Operating Profit Margin (OPM) and Net Profit Margin (NPM). "In general, profit margins reflect the production capacity of a good or service at a low cost for a high price" (Ross, Westerfield & Jaffe, 1995, p. 52). According to Assaf Neto (2010), the indicators of sales' profitability measure the efficiency of a company to generate profit through its sales. For the author, the indicator can be calculated in the operational base, by the Return on Sales, or in the liquidity base, by the Net Profit Margin.

According to Assaf Neto (2010), OPM relates operating profits to net sales. The calculation is done as follows:

$$OPM=OP/NS \quad (4)$$

Where:
OPM = Operating Profit Margin
OP = Operating Profit
NS = Net Sales

According to Weston and Brigham (2000) the net margin (NM) measures the profit per monetary unit of sales and is calculated by dividing net profit (NP) by net sales (NS). According to Ross, Westerfield and Jaffe (1995), NM is the most important measure of profitability. The formula for calculating NM is presented by Assaf Neto (2010):

$$NM=NP/NS \quad (5)$$

Where:
NM = Net Margin
NP = Net Profit
NS = Net Sales

Economic Value Added (EVA)

In addition to profitability measures, there is a measure for aggregate economic value (EVA), which, according to Assaf Neto (2010), is the amount that exceeds the minimum remuneration required by the owners.

Economic Value Added (EVA®) is an accurate estimate because it includes the cost of financing debt and capital (Young & O'Byrne, 2003). According to Young and O'Byrne (2003), EVA is the difference between the cost of capital of the company and the return on invested capital. The simplest way to calculate it is to subtract capital charges (invested capital multiplied by WACC) from net operating profit after tax (NOPAT). Barney and Hesterly (2010) present economic profit as a measure of competitiveness, obtained by subtracting WACC from ROIC and multiplying the result by invested capital. Thus, the formula for calculating EVA is as follows:

$$\mathbf{EVA®= (ROIC-WACC)\times IC} \quad \mathbf{(6)}$$

Where:
EVA® = Economic Value Added
ROIC = Return on Invested Capital
WACC = Weighted Average Cost of Capital
IC = Invested Capital

The invested capital represents the investment in resources to maintain the operations of the company. Its value is identified by the investments made in the company's activities. To obtain it, the working capital is added to the permanent assets and the long-term liabilities are eliminated (Frezatti, 1998).

Value of the Company in the Capital Market

Some financial indicators are used to compare the relative value of the company with the stock market, such as: Earnings per Share (EPS), Price Earnings Ratio (PER) Cash Flow per Share (CFPS) (Pinheiro, 2014). The formula for calculating earnings per share is described as:

$$EPS=NW/IS \quad (7)$$

Where:
EPS = Earnings per Share

NW = Net Worth
IS = Issued Shares (number of authorized shares that is sold to and held by the shareholders of a company)

The Price Earnings Ratio (PER) is calculated as follows (Pinheiro, 2014):

$$PER=SP/NW \quad (8)$$

Where:
PER = Price Earnings Ratio
SP = Stock Price
NW = Net Worth

Cash Flow per Share (CFPS) differs from PER by using cash flow instead of net income. This eliminates the accounting effects of the operations' launches that do not generate monetary disbursement for the company (Pinheiro, 2014). Cash Flow per Share is calculated as follows:

$$CFPS=SP/NCF \quad (9)$$

Where:
CFPS = Cash Flow per Share
SP = Stock Price
NCF = Net Cash Flow

Methodological Procedures

This study was developed based on a descriptive research. According to Cervo and Bervian (2002), the descriptive research seeks, observes, records, analyzes and correlates facts and phenomena without modifying them. In this way, this research aims to analyze the level of competitiveness of companies from different agro-industrial sectors, located in the main agricultural countries, through R-A Theory.

The study has a quantitative approach to the research problem. In this type of approach, the researcher specifies a theory, tests hypotheses, and, finally, analyzes and collects data to support or refute the hypotheses (Creswell, 2003).

According to Martins and Theóphilo (2010, p. 107), quantitative researches "are those in which data and evidence can be quantified and measured." In quantitative research, data are analyzed statistically to quantify and generalize the results of the sample to a target population (Malhotra, 2004).

The study also has a documentary character, as it investigates documents and reports to discover trends, compare differences and find patterns for observation (Cervo & Bervian, 2002). Thus, the variables of the survey were collected from the companies' financial statements, in the Economática website, from 2011 to 2016.

The choice of companies was intentional and the research population comprised all food and related companies listed on the BM&fBovespa, which had data accessible by the Economática platform, in the period from 2011 to 2016, according to Chart 1.

Chart 1 – Sample of Companies and Period of Data Analysis

Sample of Companies	Period of Data Analysis
Ambev S/A	2011 – 2016
Biosev S/A	2013 – 2016
BRF S/A	2011 – 2016
Excelsior S/A	2011 – 2016
Forno de Minas S/A	2014 – 2016
J. Macedo S/A	2011 – 2016
JBS S/A	2011 – 2016
Josapar S/A	2011 – 2016
M.Dias Branco S/A	2011 – 2016
Marfrig S/A	2011 – 2016
Minerva S/A	2011 – 2016
Minupar S/A	2011 – 2016
Oderich S/A	2011 – 2015
Pão de Açúcar Cbd S/A	2011 – 2016
Raizen S/A	2011 – 2016
São Martinho S/A	2011 – 2016

Source: Research data.

Company variables were selected from the Economática database according to data availability in the period 2011 to 2016 and in accordance with the financial performance measures established by R-A Theory.

Chart 2 – Research Construct

Variable	Formula	Source
Earnings per Share	$EPS = \frac{NW}{IS}$	Economática
Net Profit Index	$\$ = \frac{NP_i - NP_{minXi}}{NP_{máxXi} - NP_{minXi}}$	Adapted from Hall (2015)
Operating Profit Index	$\$ = \frac{OP_i - OP_{minXi}}{OP_{máxXi} - OP_{minXi}}$	Adapted from Hall (2015)
Gross Margin %	$\$ = \frac{\text{Gross margin}}{\text{Net operating income}} \times 100$	Economática
ROA %	$\$ = \frac{\text{Net profit} + \text{Min. div. of shareholders' net profit}}{\text{Total asset}} \times 100$	Economática
ROE%	$\$ = \frac{\text{Net profit} + \text{Min. div. of shareholders' net profit}}{NW + \text{Min. div. of shareholders' net profit}} \times 100$	Economática
ROIC %	$\$ = \frac{1 - IT}{100} \times \frac{Earnings\ before\ Interest\ \&\ Tax\ (EBIT)}{invested\ capital\ (fim)} \times 100$	Economática

Source: Prepared by the authors.

TOPSIS (Technique for Order Preference by Similarity to Ideal Solution) is a multi-criteria decision method, used in this study to analyze and classify the competitiveness level of companies according to R-A Theory. TOPSIS measures the performance of multiple variables through its similarity with an ideal solution. The method was also used by Hall (2015) and Hall and Hein (2016) to measure the competitiveness of agribusiness companies in several countries.

According to this technique, the best alternative is the one that is closest to the ideal solution and further away from the non-ideal solution. TOPSIS is widely used to solve decision problems involving many criteria of choice (Benitez, Martin & Roman, 2007). According to Bulgurcu (2012), the model considers the distance between two extreme points of classification. Thus, the ideal solution should be the one that is farther from the ideal negative solution and closer to the ideal positive solution (Wu, Tzeng & Chen, 2009).

Bulgurcu (2012) explains that TOPSIS transforms the original data matrix containing value criteria for each alternative into a normalized matrix, according to the following steps:

The process begins with a decision matrix composed of alternatives and criteria.

$$A=\begin{bmatrix} v_{11} & \cdots & v_{1n} \\ \vdots & \ddots & \vdots \\ v_{m1} & \cdots & v_{mn} \end{bmatrix} \qquad (10)$$

Three steps are required to apply the technique: the first step is to calculate the ideal optimal solutions A^+ (benefits) and the ideal negative solutions A^- (costs), as follows:

$$A^+=(p_1^+, p_2^+, \ldots, p_m^+) \qquad (11)$$

$$A^-=(p_1^-, p_2^-, \ldots, p_m^-) \qquad (12)$$

Where:

$$p_j^+=\{Max_i P_{ij}, j \in J_1; Min_i P_{ij}, j \in J_2\} \qquad (13)$$

$$p_j^-=\{Min_i p_{ij}, j \in J_1; Max_i p_{ij}, j \in J_2\} \qquad (14)$$

The results, J1 and J2 represent benefit and cost criteria, respectively.

For the second step, the Euclidean distances between the benefits are calculated as follows:

$$d^+ = \sqrt{\sum_{j=1}^{n} w_j (p_j^+ - p_{ij})^2} \qquad (15)$$

$$d^- = \sqrt{\sum_{j=1}^{n} w_j (p_j^- - p_{ij})^2} \qquad (16)$$

With i=1, m to d^+ and d^-.

Finally, in the third step of TOPSIS, the relative proximity is calculated as follows:

$$\xi_i = \frac{d_i^-}{d_i^+ + d_i^-} \qquad (17)$$

After these steps, the company with the closest proximity to the ideal positive solution is ranked in the best position and so on. The classification for resource dimensions, economic performance and market positioning is done as follows:

$$P_{(-)} = \text{average}_x - \frac{\text{standev}_x}{\sqrt{3}} < \text{I} < P_{(+)} = \text{average}_x + \frac{\text{standev}_x}{\sqrt{3}} \qquad (18)$$

Where:

$P_{(-)}$ = Inferior position

$P_{(+)}$= Superior position

Average_x = Average value of TOPSIS classification values
Standev_x= Standard deviation of TOPSIS classification values
I = Intermediate position (Parity).

Thus, the classification was determined in a way that$P < I < P_+$.

Analysis And Discussion Of Results

The results of the study are presented in this section. First, a description of the competitiveness of the Brazilian food industry in the years 2011 to 2016 is presented by the TOPSIS multi-criteria classification. Next, the position of each company in terms of financial performance is presented. Finally, a comparative table demonstrates the position of the companies according to R-A Theory.

Table 1 shows the result of the TOPSIS classification of companies in 2011.

Table 1 – TOPSIS classification of food industries and their financial performance in 2011

COMPANIES	D(-)	D(+)	TOPSIS 2011	FINANCIAL PERFORMANCE 2011
Ambev S/A	9,44	1,60	0,86	Superior
BRF S/A	4,47	6,44	0,41	Parity
Excelsior S/A	5,67	6,37	0,47	Parity
J. Macedo S/A	4,45	6,83	0,39	Parity
JBS S/A	3,15	7,85	0,29	Parity
Josapar S/A	4,30	7,07	0,38	Parity
M. Dias Branco S/A	5,88	6,00	0,49	Superior
Marfrig S/A	2,09	8,58	0,20	Inferior
Minerva S/A	3,71	7,47	0,33	Parity
Minupar S/A	0,35	9,92	0,03	Inferior
Oderich S/A	2,19	8,76	0,20	Inferior
P. Açúcar Cbd S/A	4,73	6,55	0,42	Parity
São Martinho S/A	3,92	7,17	0,35	Parity

Source: Research Data

Table 1 shows that Ambev S/A is the best classified company since it is farthest from the ideal negative solution point (D-) at 9,44 and closer to the ideal optimum solution point (D +) at 1,60. After comparing $[D_{(-)}/D_{(+)}+D_{(-)}]$, the TOPSIS was 0,86 (value close to 1), which is the best result achieved. Ambev S/A presented the best financial performance; therefore, it was positioned as superior financial performance.

M. Dias Branco S/A also positioned as superior financial performance, with a TOPSIS of 0,49. However, this result was closer to results of parity, as of the company Excelsior S/A,

which showed a TOPSIS of 0,47, the highest value among parity companies. In the mid-position of parity, eight companies were classified with TOPSIS ranging from 0,29 (JBS S/A) and 0,47 (Excelsior S/A).

Three companies presented inferior financial performance in 2011: Marfrig S/A, with TOPSIS of 0,20, Oderich S/A, with 0,20, and Minupar S/A, with 0,03. Minupar S/A had greater proximity to the ideal negative solution point and greater distance from the optimum positive solution point, presenting the worst financial performance among the companies analyzed in 2011.

These results agree with the results of Hall, de Brito, Viana, Hein and Novaes (2014), who studied the competitiveness of the Brazilian food industry from 2009 to 2012. However, the authors used a smaller group of financial performance indicators together with the MOORA multi-criteria technique and a bit bigger group of companies, twenty-two in total. Hall, de Brito, Viana, Hein and Novaes (2014) observed that the Ambev S/A also positioned among the best performances, while Minupar was classified among the worst financial performances.

The results of 2012 are presented in sequence. In this year, the company Biosev S/A was added to the analysis. Table 2 shows the TOPSIS classification of the food industries and their financial performance according to R-A Theory.

Table 2 – TOPSIS classification of food industries and their financial performance in 2012

COMPANIES	D(-)	D(+)	TOPSIS 2012	FINANCIAL PERFORMANCE 2012
Ambev S/A	9,97	0,76	0,93	Superior
Biosev S/A	4,63	8,32	0,36	Inferior
BRF S/A	5,51	6,83	0,45	Parity
Excelsior S/A	7,27	5,96	0,55	Parity
J. Macedo S/A	6,20	6,38	0,49	Parity
JBS S/A	5,36	7,03	0,43	Parity
Josapar S/A	5,79	6,83	0,46	Parity
M. Dias Branco S/A	6,62	6,00	0,52	Parity
Marfrig S/A	5,09	7,47	0,41	Parity
Minerva S/A	5,01	7,59	0,40	Parity
Minupar S/A	1,29	9,87	0,12	Inferior
Oderich S/A	5,61	6,86	0,45	Parity
P. Açúcar Cbd S/A	5,99	6,08	0,50	Parity
São Martinho S/A	5,38	7,19	0,43	Parity

Source: Research Data.

The company Ambev S/A keeps the best TOPSIS classification (0,93) being the unique company with superior performance. Hall, de Brito, Viana, Hein e Novaes (2014) found similar results in the year 2012 for Ambev S/A.

In this analysis we have a new participant, the company Biosev S/A, presenting inferior financial performance with TOPSIS of 0,36. However, its performance was higher than Minupar S/A (0,12), which presented the worst performance as in 2011. All eleven other companies surveyed in 2012 reported financial performance at parity. Despite of this, the results found in 2012 were superior to 2011, year in which the companies at parity presented TOPSIS from 0,40 (Minerva S/A) and 0,55 (Excelsior S/A). In general, the performance of companies in 2012 was better than in 2011.

The results of 2013 are presented in sequence. The company Raizen S/A was added

to the analysis totalizing fifteen companies surveyed in 2013. Table 3 demonstrates the TOPSIS classification of the food industries and their financial performance, according to the R-A Theory.

Table 3– TOPSIS classification of food industries and their financial performance in 2013

COMPANIES	D(-)	D(+)	TOPSIS 2013	FINANCIAL PERFORMANCE 2013
Ambev S/A	9,31	2,80	0,77	Superior
Biosev S/A	3,28	8,96	0,27	Inferior
BRF S/A	5,06	7,23	0,41	Parity
Excelsior S/A	8,17	6,10	0,57	Superior
J. Macedo S/A	5,58	7,22	0,44	Parity
JBS S/A	4,76	7,56	0,39	Parity
Josapar S/A	5,07	7,57	0,40	Parity
M. Dias Branco S/A	6,65	6,61	0,50	Superior
Marfrig S/A	3,20	8,92	0,26	Inferior
Minerva S/A	2,84	9,06	0,24	Inferior
Minupar S/A	2,51	9,91	0,20	Inferior
Oderich S/A	5,18	7,53	0,41	Parity
P. Açúcar Cbd S/A	5,81	6,77	0,46	Parity
Raizen S/A	4,30	8,11	0,35	Parity
São Martinho S/A	4,83	7,65	0,39	Parity

Source: Research Data.

In 2013 three companies achieved superior financial performance: Ambev S/A, Excelsior S/A and M. Dias Branco S/A, with TOPSIS of 0,77; 0,57 and 0,50; respectively. Again, the company Ambev S/A presented the best performance, with a very strong competitive power.

This analysis considered a new participant, the company Raizen S/A, which presented financial performance at parity with TOPSIS of 0,35. Other seven companies also obtained financial performance at parity, with TOPSIS ranging from 0,35 (Raizen S/A) to 0,44 (J. Macedo S/A).

Four companies were in the situation of inferior financial performance in 2103, Minupar S/A, Minerva S/A, Marfrig S/A and Biosev S/A, with TOPSIS of 0.20, 0.24, 0.26 and 0.27, respectively. Again, the company Minupar S/A presented the worst financial performance among the surveyed companies.

The results of the year 2014 are presented below. A new company was analyzed, Forno de Minas S/A, totalizing sixteen companies surveyed in 2014. Table 4 shows the TOPSIS classification of the food industries and their financial performance according to the R-A Theory.

Table 4 – TOPSIS classification of food industries and their financial performance in 2014

COMPANIES	D(-)	D(+)	TOPSIS 2014	FINANCIAL PERFORMANCE 2014
Ambev S/A	8,92	3,00	0,75	Superior

Biosev S/A	2,24	8,97	0,20	Inferior
BRF S/A	4,79	6,61	0,42	Parity
Excelsior S/A	7,19	6,29	0,53	Superior
Forno de Minas S/A	5,11	7,15	0,42	Parity
J. Macedo S/A	5,17	7,02	0,42	Parity
JBS S/A	4,30	7,19	0,37	Parity
Josapar S/A	4,03	7,78	0,34	Parity
M. Dias Branco S/A	6,03	6,56	0,48	Superior
Marfrig S/A	1,87	9,26	0,17	Inferior
Minerva S/A	1,05	9,74	0,10	Inferior
Minupar S/A	3,13	8,64	0,27	Inferior
Oderich S/A	3,60	8,10	0,31	Parity
P. Açúcar Cbd S/A	5,25	6,63	0,44	Parity
Raizen S/A	3,22	8,52	0,27	Inferior
São Martinho S/A	3,98	7,79	0,34	Parity

Source: Research Data

Table 4 shows that three companies achieved superior financial performance in 2014, maintaining the same position of the year 2013: Ambev S/A, Excelsior S/A and M. Dias Branco S/A, with TOPSIS of 0,75; 0,53 and 0,48; respectively. On this way the rank was also maintained.

In 2014, eight company had their financial performances at parity again, with TOPSIS ranging from 0,31 (Oderich S/A) to 0,44 (P. Açúcar Cbd S/A).

Five companies presented inferior financial performance in 2014, with TOPSIS between 0,10 and 0,27. Minerva S/A appeared with the worst performance.

The results of 2015 are presented in sequence for the sixteen companies analyzed. Table 5 demonstrates the TOPSIS classification of the food industries and their financial performance in 2015, according to the R-A Theory.

Table 5 – TOPSIS classification of food industries and their financial performance in 2015

COMPANIES	D(-)	D(+)	TOPSIS 2015	FINANCIAL PERFORMANCE 2015
Ambev S/A	9,99	1,92	0,84	Superior
Biosev S/A	3,82	7,77	0,33	Inferior
BRF S/A	6,32	5,63	0,53	Superior
Excelsior S/A	6,15	6,48	0,49	Parity
Forno de Minas S/A	6,24	6,34	0,50	Parity
J. Macedo S/A	5,99	6,68	0,47	Parity
JBS S/A	5,52	6,37	0,46	Parity
Josapar S/A	4,79	7,31	0,40	Parity
M. Dias Branco S/A	6,69	6,37	0,51	Superior
Marfrig S/A	2,08	9,20	0,18	Inferior
Minerva S/A	3,79	8,72	0,30	Inferior
Minupar S/A	3,17	8,81	0,26	Inferior
Oderich S/A	4,26	7,32	0,37	Parity

P. Açúcar Cbd S/A	4,08	7,46	0,35	Parity
Raizen S/A	4,04	7,86	0,34	Parity
São Martinho S/A	4,19	7,71	0,35	Parity

Source: Research Data.

In 2015 three companies were again classified for superior financial performance. However, Excelsior S/A decreased its performance to parity while BRF S/A increased its performance to superiority.

In 2015, the best performances were observed for Ambev S/A, BRF S/A and M. Dias Branco S/A, with TOPSIS of 0,84, 0,53 and 0,51, respectively, as demonstrates Table 5.

In 2014, nine companies showed performances at parity, with TOPSIS varying from 0,34 (Raizen S/A) to 0,5 (Forno de Minas S/A). In 2015, nine companies were classified for inferior financial performance, Marfrig S/A, Minupar S/A, Minerva S/A and Biosev S/A, with TOPSIS ranging from 0,18, 0,26, 0,30 and 0,33, respectively.

The results of 2016 are presented in sequence for the fifteen companies analyzed. Data of Minupar S/A were not available for analysis in this year. Table 6 shows the TOPSIS classification of the food industries and their financial performance in 2016, according to the R-A Theory.

Table 6 – TOPSIS classification of food industries and their financial performance in 2016

COMPANIES	D(-)	D(+)	TOPSIS 2016	FINANCIAL PERFORMANCE 2016
Ambev S/A	8,71	2,80	0,76	Superior
Biosev S/A	0,42	9,48	0,04	Inferior
BRF S/A	3,19	8,04	0,28	Parity
Excelsior S/A	5,83	6,45	0,47	Superior
Forno de Minas S/A	5,34	6,58	0,45	Parity
J. Macedo S/A	4,66	6,71	0,41	Parity
JBS S/A	3,65	7,54	0,33	Parity
Josapar S/A	4,21	7,15	0,37	Parity
M. Dias Branco S/A	6,28	5,89	0,52	Superior
Marfrig S/A	1,83	8,84	0,17	Inferior
Minerva S/A	4,52	7,25	0,38	Parity
Oderich S/A	5,32	6,60	0,45	Parity
P. Açúcar Cbd S/A	2,97	8,52	0,26	Inferior
Raizen S/A	3,82	7,43	0,34	Parity
São Martinho S/A	3,61	7,71	0,32	Parity

Source: Research Data.

In 2016, the performance position of companies altered again. Excelsior S/A returned to superior performance with TOPSIS of 0,47 together with the companies Ambev S/A, with 0,76 and Dias Branco S/A, with 0,52.

BRS S/A, which in the previous year was superior, returned to performance at parity together with other eight companies. The parity companies had their TOPSIS varying from 0,28 (BRF S/A) to 0,45 (Forno de Minas S/A and Oderich S/A). Biosev S/A (0,04), Marfrig

S/A (0,17) and P. Açúcar Cbd S/A (0,26) were the companies that presented inferior financial performance in 2016. The following is a summary of the number and percentage of companies in each position, from 2011 to 2016 (Table 7).

Table 7 – Summary of the competitive position of the food industry from 2011 to 2016

FINANCIAL PERFORMANCE	2011		2012		2013		2014		2015		2016	
Superior	2	15,4%	1	7,1%	3	20,0%	3	19%	3	19%	3	20,0%
Parity	8	61,5%	11	78,6%	8	53,3%	8	50%	9	56%	9	60,0%
Inferior	3	23,1%	2	14,3%	4	26,7%	5	31%	4	25%	3	20,0%
	13	100%	14	100%	15	100%	16	100%	16	100%	15	100%

Source: Research Data.

In most of the period studied, three companies demonstrated superior financial performance, except in 2011, where only two companies were superior and in 2012, where only Ambev S/A demonstrated superior performance. In percentage, the variation of the companies in superior position ranged from 7.1 to 20% in the period of analysis.

With respect to financial performance at parity, the companies varied from 50 to 78,6% for this position within the period analyzed. In three years eight companies occupied this position and in two years, nine companies. In 2011 occurred more situations of parity, with eleven companies in this position. Situations of inferior financial performance were observed during the period analyzed, with variations from 14,3% to 31%, with 2 to 5 companies alternating in this position.

These results are similar to the findings of Hall and Hein (2016), who surveyed agribusiness companies in six countries (Argentina, Australia, Brazil, Canada, United States of America and Russia) from 2009 to 2013. The authors assessed 139 companies in the wholesale and retail food sector and found variations of 18-22% for superior financial performance, 60-70% for parity and 12-15% for inferior financial performance, similar to the results presented in table 7. Chart 3 displays the financial performance positioning of the companies analyzed in the period from 2011 to 2016.

Chart 3 – Financial Performance Positioning of Companies from 2011 to 2016

Companies	Financial Perfor-mance 2011	Financial Perfor-mance 2012	Financial Perfor-mance 2013	Financial Perfor-mance 2014	Financial Perfor-mance 2015	Financial Perfor-mance 2016
Ambev S/A	Superior	Superior	Superior	Superior	Superior	Superior
Biosev S/A	-	Inferior	Inferior	Inferior	Inferior	Inferior
BRF S/A	Parity	Parity	Parity	Parity	Superior	Parity
Excelsior S/A	Parity	Parity	Superior	Superior	Parity	Superior
Forno de Minas S/A	-	-	-	Parity	Parity	Parity
J. Macedo S/A	Parity	Parity	Parity	Parity	Parity	Parity
JBS S/A	Parity	Parity	Parity	Parity	Parity	Parity
Josapar S/A	Parity	Parity	Parity	Parity	Parity	Parity
M. Dias Branco	Superior	Parity	Superior	Superior	Superior	Superior

S/A						
Marfrig S/A	Parity	Parity	Inferior	Inferior	Inferior	Inferior
Minerva S/A	-	Parity	Inferior	Inferior	Inferior	Parity
Minupar S/A	Inferior	Inferior	Inferior	Inferior	Inferior	-
Oderich S/A	Inferior	Parity	Parity	Parity	Parity	Parity
P. Açúcar Cbd S/A	Parity	Parity	Parity	Parity	Parity	Inferior
Raizen Energia S/A	-	-	Parity	Inferior	Parity	Parity
São Martinho S/A	Parity	Parity	Parity	Parity	Parity	Parity

Source: Research Data.

Ambev S/A was the only company that demonstrated superior financial performance in the whole period. According to Hunt and Morgan (1995) a company that is continuous in superior performance is considered sustainable over time. M. Dias Branco S/A obtained superior financial performance in almost all years studied, except in 2012, when its performance was at parity. Nevertheless, M. Dias Branco S/A presented the second best performance among the companies surveyed in 2012. Excelsior S/A also stood out with superior performance in the half of the period and performance at parity in the other half of the period. BRF S/A showed superior financial performance only in 2015 and parity in the other years of the analyzed period.

Biosev S/A and Minupar S/A presented inferior performance in all years of the analyzed period, thus, were considered the least competitive among the companies. Marfrig S/A had inferior performance in the last four years of the study and performance at parity in the first two years, therefore suggesting low competitiveness. Minerva presented inferior performance in years 2013, 2014 and 2015 and parity in 2012 and 2016, with heterogeneous performance over the period. The companies Raizen S/A, Pão de Açúcar Cbd S/A and Oderich S/A had only one inferior performance, in other years, their level of performance was parity.

Forno de Minas S/A, J. Macedo S/A, JBS S/A, Josapar S/A and São Martinho S/A maintained their classification at parity in the whole period, suggesting an intermediate level of competitiveness.

Final Considerations

The objective of this study was to analyze the competitiveness of Brazilian food industry companies by Resource-Advantage theory. Financial indicators of companies were collected from the Economática database and companies were classified by the TOPSIS multi-criteria decision method. The R-A Theory assumptions about financial performance were applied to position performances as superior, parity and inferior.

The results of this study demonstrated that about 20% of the companies had superior financial performance. The best performance in all years of the study was observed for Ambev S/A. The company M. Dias Branco S/A presented superior financial performance in most of the years of the study and Excelsior S/A had its performance divided into superior, for three years, and at parity, for the other three years.

On the other hand, Biosev S/A and Minupar S/A had inferior financial performance in all years of the study, suggesting low competitiveness into the sector. Marfrig S/A presented performance at parity in only one year and inferior performance in the remainder of the study period.

The results represent a contribution to RA Theory, since they demonstrate that the assumptions Hunt and Morgan (1995) are correct, in which the competitiveness is dynamic, since the positions alternate between the companies, however the companies with superior financial performance sustainable results show stability in its results, which was demonstrated by Ambev S/A.

The findings of the research contribute to an analysis of the sector in the study period in which the companies involved can understand the competitive process, evaluate, and signal strategy for subsequent periods. For the academy, the study contributes to the affirmation of R-A Theory as a theory of competitiveness.

This study presented restrictions regarding the sample, only the companies that presented availability of information for the whole period were analyzed. In addition, these are publicly held companies, which make inference to other impossible Brazilian companies. However, it was not the purpose of this study to exhaust the subject. Therefore, further research should continue the study to improve scientific knowledge on the subject.

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