REVISTA DE CONTABILIDADE DO MESTRADO EM CIÊNCIAS CONTÁBEIS DA UERJ
e-ISSN: 1984-3291

Performance measures that support executive compensation shown in the reference forms of companies listed on B3

Ivan R. Mello [1], Juliana F. de Carvalho [2], Júlio O. da Silva [1]

EDITORIAL DETAILS

Affiliation
[1] Federal University of Goiás (UFG)

[2] University of Brasília (UnB)

Article history
Received: 07/24/2024
Accepted: 07/04/2024
Published: 09/16/2025

APA citation
Mello, I. R., Carvalho, J. F., & Silva, J. O. (2025). Remunerações de executivos com base em métrica financeiras e não-financeiras: evidências dos formulários de referência das empresas B3. *Revista de Contabilidade do Mestrado em Ciências Contábeis da UERJ, 30*(1), 88-100.

Portuguese version

Abstract

This study aimed to identify the performance measures that companies use to establish executive compensation. To achieve this, it employed a qualitative method involving content analysis of 7,752 Reference Forms from companies listed on the B3 that disclosed these forms between January 2010 and September 2021. The procedure to achieve the proposed objective utilized Robotic Process Automation (RPA) and the Python programming language, integrating the PyAutoGUI library and Natural Language Processing (NLP). The main results indicated a greater concern among companies with cash generation, a characteristic feature of increasingly competitive scenarios; an increased focus on items related to customer satisfaction; and in issues related to the Environmental, Social, and Governance (ESG) indicator, the word "social" appeared with the highest frequency. Regarding Return on Equity (ROE), a decrease was observed over the period analyzed, followed by a resurgence in mentions. ROE assists in aligning the interests of managers and shareholders, suggesting that companies are replacing salaries (which are risk-free and offer little incentive) with bonuses (which are riskier but provide greater incentives). Concerning more qualitative metrics, there was an increase in the number of expressions related to customer satisfaction. The results contribute to advancing discussions on executive compensation and performance measures by demonstrating how these aspects have been addressed by companies and evidenced in the Reference Forms.

Keywords: performance, compensation; natural language processing

1 INTRODUCTION

The market is agile and dynamic due to economic globalization, aggressive competition, and the provision of incentives for executives to achieve progressively better results (Behera, 2020). To incentivize them, a significant portion of these incentives are tied to economic-financial performance, and in Brazilian publicly traded companies, top executives can have compensation 600 times greater than the average paid to other employees (Schincariol, 2020).

Interest in the topic of executive compensation stems from the need for companies to establish remuneration aligned with performance in accordance with shareholder interests to avoid pay discrepancies in the face of mediocre performance.

For example, executives from the OGX group earned variable compensation tied to short-term performance goals that, in total, exceeded BRL 1 billion. It should be noted that the aforementioned group raised substantial public funds, allocated a significant portion of these funds to management compensation, and ultimately imposed significant losses on shareholders (n. d. 2013; Valenti & Torres, 2013).

With the objective of preventing government resources from being allocated to the payment of executive bonuses, the United States implemented a program to monitor and reduce variable compensation in companies that benefited from such funds. This initiative limited the form of remuneration for top executives, seeking to mitigate losses and avoid the distribution of earnings backed by public funds (Brealey et al., 2018, p. 286).

When analyzing the literature and empirical research, there is still no consensus on how to structure performance-based executive compensation, specifically whether it should be short or long-term, or linked to economic-financial versus market performance. Many studies are based on Agency Theory (Meckling & Jensen, 1976), which aims to explain how conflicts of interest between shareholders and executives are mitigated by stipulating forms of compensation.

A key consideration on this topic is whether executive objectives align with corporate objectives, since they often become confused with those of the shareholders (Murphy, 1999). The answer to this question, at least in part, depends on their compensation. In this context, the bibliometric study by Santos and Silva (2017) found that the topic of compensation is more researched internationally than domestically, with a focus on both executive and corporate performance, and suggests that future domestic research should examine this theme. Led by Aggarwal and Samwick (1999), researchers and market regulators have undertaken efforts to implement performance-based assessments, given that this practice is already robust in the US and UK markets yet is insufficiently debated in Brazil.

Research by Holmström (1979), Feltham and Xie (1994), and Devers et al. (2007) has shown that simultaneously using a mix of short and long-term performance measures improves corporate efficiency and the alignment of interests. While these measures play a crucial role in assessing the outcomes of executive work, there is still a need for additional robust research. In the Brazilian context, Aguiar and Pimentel (2017), Dalmacio et al. (2009), Krauter (2013), Vasconcelos and Monte (2013), and Santos and Silva (2017) have addressed the relationship between performance and compensation from different perspectives.

Given the relevance of this topic, it is important to analyze how this compensation is implemented and how it is disclosed in the Reference Forms (*Formulários de Referência* - FR). Therefore, this study seeks to answer the following question: What were the financial and non-financial performance measures linked to executive compensation disclosed in the Reference Forms of Brazilian companies listed on the B3?

Thus, this study aims to identify which financial and non-financial performance measures companies use to link to executive compensation. The procedure to achieve this objective uses Robotic Process Automation (RPA), the Python language integrated with the PyAutoGUI library, and Natural Language Processing (NLP). The empirical justification for this research lies in identifying, over a broad period, the performance metrics that underpin executive compensation. Furthermore, given the evolution of compensation practices, it is necessary to analyze the financial and non-financial metrics used by the market.

Moreover, theoretically, this study expands the understanding and analysis of the topic, which is still controversial, especially due to the lack of domestic research and studies in emerging markets. From a social perspective, merely monitoring corporate performance is not enough. It is essential to establish metrics that align corporate interests with those of executives, as they are responsible for the management and implementation of strategies that seek to maximize results and promote business continuity.

2 THEORETICAL FRAMEWORK

2.1 Executive compensation and corporate performance in the short and long term

The greater number of international studies on compensation compared to domestic research is justified by the existence of more developed capital markets and greater access to information on business activities, especially concerning executive compensation, which enables research to be conducted (Vasconcelos & Monte, 2013). Conversely, the smaller number of studies in the domestic scenario can be justified by the lack of available data prior to 2009, as only then did the Securities and Exchange Commission of Brazil (*Comissão de Valores Mobiliários* - CVM) mandate that this information be disclosed in the Reference Forms (FR).

Murphy (1999) conducted a study to examine the empirical and theoretical findings of research on executive compensation published in the US up to that time. In summary, he concluded that forms of executive compensation varied according to company size and industry sector. Furthermore, in regulated companies, compensation was less sensitive to performance than in non-regulated ones; higher amounts were generally granted through stock options; and, in the United States, at the time of the study, both the level of compensation and its sensitivity to performance had increased substantially, driven by the growing share of stock-based compensation.

Murphy (1999) further argues that, although the theoretical and empirical literature on executive compensation was well-developed, there were still many issues that warranted further research and debate. The most important area for research was the relationship between executive incentives and corporate performance, as many executives understood how their actions and management style affected accounting results but were not concerned with how they affected shareholder value. Therefore, they focused on increasing the metrics that interested them and dedicated less attention to factors that did not.

The theoretical arguments regarding executive compensation stem from Agency Theory. This theory posits that compensation is established through a plan (a contract) aimed at aligning the interests of the parties involved. In other words, it functions as a motivating mechanism based on the premise that offering higher compensation leads to better performance (Devers et al., 2007; Aguiar et al., 2017). However, Scott and O'Brien (2019, p. 430) note that the literature on executive compensation has shown that, in practice, executives act opportunistically and do not focus on contract efficiency.

In contrast, the literature shows that the underlying idea of variable compensation is to align employee interests so that they commit to maximizing corporate results. This alignment is advocated by Agency Theory. According to this theory, employees (agents) and shareholders (principals) often have distinct interests. Thus, performance-linked compensation promotes the alignment of interests between both parties and prevents personal interests from being placed ahead of corporate ones (Meckling & Jensen, 1976).

A proper alignment of interests often includes a combination of salaries, bonuses, stock-based compensation, and, in some cases, golden parachutes, which are benefits granted during mergers and acquisitions that involve a change in management. In this regard, companies use variable compensation, which is generally tied to various performance measures, both short and long-term, with the most common being net income and stock price (Scott & O'Brien, 2019).

According to Devers et al. (2007), there is a gap in establishing a consistent relationship between executive compensation and corporate performance. Although research has revealed alternative theoretical arguments and findings with the potential to significantly improve the understanding of this relationship, the literature still lacks theoretical integration. Therefore, challenges remain in guiding the choice of appropriate performance measures, time frames, methods, and variables.

Similarly, Aguiar et al. (2017), based on Motivation Theory, found that the Brazilian companies that paid higher total or variable compensation to executives between 2011 and 2015 also had better performance, both short and long-term. These results confirm the premise of the theory: compensation motivates executives to seek better financial and market results, but only in the short term. However, they suggest further in-depth studies on long-term results.

Aggarwal and Samwick (1999) are among the pioneers in addressing the concept of corporate performance evaluation by identifying a relationship between executive compensation and the performance of rival firms. They focused on market competition and its implications for designing incentive plans. They also highlighted that the market seeks ways to evaluate executives as a means of obtaining information about corporate economic-financial performance.

In the Brazilian context, Dalmacio et al. (2009) found that performance indicators could be used as a metric for executive compensation, but only in some sectors. They noted that in industries such as mining, pulp and paper, oil and gas, and non-metallic minerals, performance could be more tied to the sector itself than to actions undertaken by executives. However, in sectors like telecommunications, construction, food and beverages, and vehicles, metrics such as margin and profitability could be parameters for defining compensation with a focus on aligning interests and minimizing agency costs.

If compensation is a way to motivate executives, then it is logical to verify which performance metrics form the basis for their pay. This allows for the establishment of benchmarks for more suitable evaluations by comparing actual results against targets or previous outcomes. However, a paradox exists: while the definition of performance is simple, its measurement is not.

Executives are often paid through variable compensation. Although this type of pay can be an effective tool for reducing conflicts of interest, it can also lead to substantial costs if not managed properly. The explanation is because investments are needed in the integrity of an organization's management systems to ensure they are not gamed, as these systems are the very instruments that provide performance data. It should be noted, however, that having board members with integrity encourages such investments, because they understand that good governance and monitoring systems support corporate success (Jensen et al., 2004).

Therefore, if the intention is to align interests, establishing variable compensation is logical. Nonetheless, Brealey et al. (2018, p. 299) pointed out that this measure is imperfect for three reasons. First, if compensation is based on stock price, this price partly reflects the development of the company's sector, which is unrelated to the specific performance of the company or its managers. Consequently, incentives based on stock price expose executives to risks and returns beyond their control. Second, current stock prices already reflect executive performance. Third, excessive expectations about the stock price can lead to the manipulation of earnings per share.

Furthermore, executives can manipulate short-term results to meet targets. One common method is to implement investments with a positive net present value (NPV) while deferring the associated expenses to subsequent periods. From this perspective, to understand the ethical and moral values involved in short-term earnings management, Bruns and Merchant (1990) conducted a survey on 13 practical business situations with 649 executives from various fields, but there was no consensus among the respondents' opinions (Brealey et al., 2018).

Bruns and Merchant (1990) highlighted that the essence of an ethical and moral approach to management is to balance the interests of executives with their obligations to stakeholders. They found that many executives believe that when practice or action is not explicitly prohibited by regulatory bodies, it can be carried out regardless of who might be affected, even if the action is unethical or amoral. This means that anyone who uses short-term results information is vulnerable to misinterpretation, manipulation, or some form of error.

In light of the above, executive compensation requires constant monitoring by the board of directors and audit committees, as well as the disclosure of reports to the market, given that incentives are greater for executives compensated with stock. From this perspective, additional monitoring is necessary due to the possibility of manipulating reports and/or decisions that generate higher short-term returns. Thus, it must be ensured that executives do not receive short-term benefits from an increase in stock prices when these gains are achieved at the expense of long-term value destruction. This means going against the universal human reluctance to endure short-term pain for long-term benefits (Jensen et al., 2004).

The findings from studies by Holmström (1979) and Feltham and Xie (1994) have assisted companies in establishing performance measures. Their research indicated that multiple performance metrics improve contract efficiency and are important components in

assessing the outcomes of work performed by executives. These authors further mentioned that net income and stock price together better reflect executive efforts than an analysis based on a single variable.

Additionally, compensation plans can be divided into short and long-term categories, although this does not prevent executives from being compensated based on both. Short-term plans are typically based on a percentage of the company's current-year profitability and are paid in cash. In contrast, long-term plans usually relate to the appreciation of the company's stock price and are paid through Share-Based Payment (SBP), which provides a long-term right, but not an obligation, to buy shares that may increase in price before expiration. Both forms of compensation have limitations, especially short-term ones (Anthony & Govindarajan, 2008, p. 515).

Research by Banker et al. (2000) reports the growing use of non-financial measures and notes that the literature frames them as predictors of long-term performance. The results indicated that non-financial metrics used by the 18 hotels in the sample impacted performance. In fact, both non-financial and financial performance improved after the implementation of an incentive plan that included performance measures such as customer satisfaction.

Scott and O'Brien (2019), based on Agency Theory, view executive efforts from two perspectives: short-term and long-term. Short-term efforts involve activities such as cost control, asset maintenance, advertising campaigns, and other daily activities that impact current results. Long-term efforts, in contrast, consist of capital investment planning, research and development, and mergers and acquisitions. Although these long-term efforts can generate some results in the short term, a significant portion of the revenues and disbursements extend into future periods. Recognizing these different efforts in business activities introduces the concept of "Congruence of Short and Long-Term Performance Measures."

The study by Lambert and Larcker (1987) used a sample of 370 US companies from 1970 to 1984 to investigate the relationship between stock returns and Return on Equity (ROE). The objective was to understand executive cash compensation (salary plus bonus), and the results were in line with the findings of other studies. In this regard, they noted that ROE was more correlated with cash compensation than stock returns were. However, they also highlighted that this correlation was more noticeable in companies where net income was less sensitive to stock returns. Furthermore, on average, the compensation established by large companies tended to have a weaker relationship with ROE.

Complementing this, Indjejikian and Nanda (2002) noted, based on their findings, that on average, the lower the variability of ROE, the higher the target bonus in relation to the base salary paid to executives. This suggests that companies substitute salaries (low-risk and with little incentive effect) for bonuses (riskier, but with a greater incentive effect). The bonuses paid, therefore, tend to increase, and this supports the theory's premise that incentive plans align the interests of the parties involved.

3 METHODOLOGY

3.1 Sample definition

The proposed objective of this study is to identify the financial and non-financial performance measures that companies used to establish executive compensation. To achieve this, a content analysis was conducted on the Reference Forms (FR) disclosed by companies listed on the B3. According to Bardin (1977), content analysis uses systematic and objective procedures to describe document content. It extracts information and records it in categories for the purpose of making inferences about the reported content, provided these inferences are based on empirical and theoretical assumptions.

Data on executive compensation metrics were collected from the website of the Securities and Exchange Commission of Brazil (CVM) using Robotic Process Automation (RPA). This process was carried out with a Python script that utilized the PyAutoGUI library to simulate user behavior and extract information from the site. According to Hoffmann et al. (2019), process automation through software and programming for both qualitative and quantitative purposes enhance the efficiency and focus of research.

A total of 7,758 Reference Forms (FR) in PDF format were identified from companies listed on the B3 between January 2010 and September 2021. From this total, 6 FRs were excluded because they were either unavailable at the provided link or could not be processed automatically by the script, leaving 7,752 forms. It should be noted that many companies resubmit their FR for various reasons. In cases of resubmission, the last file disclosed for the year was used.

On the final sample of 7,752 FRs, Natural Language Processing (NLP) was used to identify, specifically in item 13, what type of metrics companies used as a basis for their executive compensation. It should be noted that the required information on compensation is contained in item 13, as provided for in Article 21 of Normative Instruction No. 480/2009 (CVM, 2009).

The Python script converted the content of each FR into a single, continuous plain text. Subsequently, the text segment located between the heading of item 13.1, letter C, 'the main performance indicators that are taken into account in determining each element of compensation,' and the heading of item 13.1, letter D, 'how compensation is structured to reflect the evolution of performance indicators,' was extracted from each of the 7,752 FRs. According to this subtotal, 188 forms did not contain this specific excerpt and were therefore disregarded. This process resulted in a final valid sample of 7,564 FRs.

The next stage consisted of enriching the database with company information, using their respective National Registry of Legal Entities (CNPJ) number as the key. The following information was added: industry sector, issuer status, date of incorporation, and shareholding control (state-owned, foreign, and private). Table 1 shows the main business sectors of the 1,023 companies in the sample, which submitted the 7,564 FRs. Notably, the Receivables Securitization, Electric Power, and Transportation and Logistics Services sectors were the ones that disclosed the most FRs.

Table 1

Sample Distribution by Sector

Sector	No. of Companies	(%)	No. of Observations	(%)
Receivables Securitization	119	11,63%	768	10,15%
Electric Power	111	10,85%	952	12,59%
Transportation and Logistics Services	100	9,78%	831	10,99%
No Main Sector	88	8,60%	593	7,84%
Civil Construction and Decoration	66	6,45%	465	6,15%
Commerce (Wholesale and Retail)	59	5,77%	359	4,75%
Telecommunications	41	4,01%	263	3,48%
Textiles and Apparel	38	3,71%	316	4,18%
Banking	37	3,62%	343	4,53%
Machinery, Equipment, and Vehicles	33	3,23%	292	3,86%
Other Sectors	331	32,36%	2382	31,49%
Total	**1023**	**100,00%**	**7564**	**100,00%**

Note. The authors (2021).

3.2 Extraction of words: most frequent bigrams and trigrams

The subsequent stage consisted of extracting the most frequent bigrams and trigrams from the text contained in item 13.1, letter C, of the 7,564 collected FRs. For this purpose, several Python packages were used. Pandas (McKinney, 2010) was utilized for working with and manipulating tabular data. NLTK (Bird et al., 2009) was used to load the list of Portuguese language stop words, which are high-frequency words that add little semantic meaning and primarily serve to connect ideas. Finally, Scikit-learn (Pedregosa et al., 2011) was used to perform the vectorization process on the most frequent bigram (two-word) and trigram (three-word) expressions.

Bigrams and trigrams represent the most frequent combinations of two or three words within a given text after the removal of stop words. As there was no predefined list of indicators to search for, an ordered list of bigrams and trigrams was created, ranked from highest to lowest frequency. Next, a list of the most frequent single words, also ordered by frequency, was compiled. Cross-referencing these lists made it possible to identify the most recurrent high-frequency terms.

As a result of the aforementioned process, it was possible to classify the bags of words by broad areas, grouping them into categories of expressions. These categories were used to identify the indicators within the text excerpts extracted from item 13.1, letter C, of all valid FRs. Table 2 summarizes the bags-of-words classifications and the words or expressions used in each category. Although this table shows accented words, it should be noted that for all analyses performed by the scripts, word accents were removed to increase the compatibility of the searches.

Table 2

Bag-of-Words Classification

Classification	Considered Keywords, Bigrams, and Trigrams (PT-BR)	Considered Keywords, Bigrams, and Trigrams (EN-US)
Expressions Related to the Non-Use of Indicators	*'não aplicável', 'não há, 'não preenchimento', 'não aplica', 'fixa não', 'não há indicadores', 'ainda não', 'companhia não possui', 'remuneração fixa não', 'fixa não considera', 'não recebem', 'não possui indicadores', 'sem indicador'*	*'not applicable', 'none', 'not filled in', 'does not apply', 'fixed not', 'no indicators', 'not yet', 'company does not have', 'fixed compensation not', 'fixed does not consider', 'do not receive', 'has no indicators', 'without indicator'*
Expressions Related to the Balanced Scorecard (BSC)	*'balance', 'balanced', 'BSC', 'score', 'scorecard', 'scorecard'*	*'balance', 'balanced', 'BSC', 'score', 'scorecard'*
Expressions Related to Cash	*'caixa', 'FFO'*	*'cash', 'FFO (funds from operations)'*
Expressions Related to Customers	*'satisfação', 'cliente', 'stakeholders'*	*'satisfaction', 'customer', 'stakeholders'*
Expressions Related to the ESG Indicator	*'ambiente', 'governança', 'social', 'socioambiental', 'sustentabilidade', 'sustentável'*	*'environment', 'governance', 'social', 'socio-environmental', 'sustainability', 'sustainable'*
Expressions Related to Financial Indicators	*'capex','ebit','ebitda','ebtda','ebtida','kpis','"kpi's","lair','lajida','net','nopat','nps','opex','pdd','plr','receita','renda','roe','vpl'*	*'capex', 'ebit', 'ebitda', 'ebtida', 'KPIs', 'lair (ebt in PT-BR)', 'lajida (ebitda in PT-BR)', 'net', 'nopat', 'nps', 'opex', 'pdd (ecl IFRS 9 in PT-BR)', 'plr (profit sharing in PT-BR)', 'revenue', 'income', 'roe', 'vpl (npv in PT-BR)'*
Expressions Related to Profitability	*'lucratividade', 'lucro', 'rentabilidade', 'resultado'*	*'profitability', 'profit', 'return', 'result'*
Expressions Related to the Subjectivity of Evaluations	*'meritocracia', 'qualitativo', 'subjetiv'*	*'meritocracy', 'qualitative', 'subjetiv (stem for the word subjective in PT-BR)'*

Not. The authors (2021).

Finally, with the bags of words compiled for each major group of expressions, the 7,564 excerpts extracted from item 13.1, letter C, were searched to identify the number of expressions present for each classification. Thus, for example, a text excerpt that simultaneously contained 'meritocracy,' 'qualitative,' and the word stem 'subjetiv' would receive a score of 3 in the expressions related to subjectivity. This same logic was applied to all classifications.

4 RESULTS

4.1 Overall analysis of bags-of-words

Using the bags-of-words constructed and presented in Table 3, it was possible to measure the frequency of word occurrence through a time series analysis of the textual sets from the FRs between 2010 and 2021. Table 3 shows the results for the most frequent expressions, organized by year and by bag-of-words.

Table 3

Summary of Most Frequent Terms

Words and Phrases (PT-BR | EN-US)	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**
Related to Cash	**28**	**33**	**34**	**36**	**44**	**52**	**66**	**63**	**72**	**71**	**86**	**102**
caixa | cash	28	33	34	36	43	51	63	60	69	68	84	99
FFO | FFO	0	0	0	0	1	1	3	3	3	3	2	3
Related to Customers	**27**	**29**	**31**	**26**	**31**	**31**	**37**	**41**	**39**	**45**	**47**	**59**
Satisfação | satisfaction	27	29	31	26	31	31	37	41	39	45	47	59
Related to Financial Indicators	**135**	**158**	**172**	**180**	**193**	**195**	**205**	**196**	**217**	**214**	**265**	**324**
EBIT | EBIT	71	78	91	96	107	115	125	128	137	141	167	197
receita | revenue	31	45	49	55	53	47	49	40	49	44	60	60
NPS | NPS	0	0	0	0	0	0	0	0	0	8	12	28
net | net	0	0	0	0	0	0	0	0	0	8	13	21
ROE | ROE	11	19	16	11	15	14	12	9	9	0	13	18
KPI's | KPI's	0	0	7	0	0	0	0	0	0	0	0	0
rentabilidade | profitability	14	10	9	11	10	13	12	11	15	13	0	0
EBTIDA | EBITDA	0	6	0	0	8	0	0	0	0	0	0	0
CAPEX | CAPEX	0	0	0	0	0	6	7	0	7	0	0	0
PLR | Profit Sharing	8	0	0	7	0	0	0	8	0	0	0	0
Related to Profitability	**193**	**225**	**207**	**221**	**242**	**237**	**235**	**235**	**231**	**240**	**269**	**275**
lucro | profit	113	122	115	128	137	134	134	136	128	125	144	154
resultado | result	66	84	73	68	81	81	78	78	80	85	93	91
lucratividade | profitability	4	6	6	6	6	6	6	6	6	11	13	15
Related to the Non-Use of Indicators	**178**	**182**	**194**	**197**	**197**	**172**	**173**	**176**	**185**	**174**	**174**	**164**
não há | none	58	70	67	69	73	71	74	76	80	76	78	81
não preenchimento | not filled in	40	44	45	43	42	35	38	42	44	43	40	37
não aplicável | not applicable	60	46	50	55	53	49	43	41	45	35	29	26
remuneração fixa | fixed compensation	0	0	0	0	0	0	9	8	8	9	14	11
companhia não possui | company does not have	11	0	10	10	10	0	0	9	8	11	13	9
não recebem | do not receive	0	0	0	0	0	0	9	0	0	0	0	0
ainda não | not yet	9	13	22	20	19	9	0	0	0	0	0	0

Words and Phrases (PT-BR | EN-US)	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Related to the Subjectivity of Evaluations	**11**	**14**	**22**	**19**	**18**	**21**	**16**	**16**	**13**	**15**	**22**	**23**
meritocracia | meritocracy	2	5	11	9	9	9	8	8	5	7	11	12
qualitativo | qualitative	9	9	11	10	9	12	8	8	8	8	11	11
Related to the Balanced Scorecard (BSC)	**36**	**15**	**7**	**11**	**24**	**16**	**13**	**18**	**15**	**13**	**14**	**21**
score | score	14	7	4	5	9	7	6	9	11	10	11	18
BSC | BSC	12	5	2	5	11	6	5	5	3	2	2	2
Related to the ESG Indicator	**223**	**217**	**213**	**193**	**201**	**216**	**194**	**203**	**187**	**191**	**204**	**214**
social | social	188	186	182	161	165	181	159	172	163	165	167	167
sustentabilidade | sustainability	4	6	11	10	7	8	9	14	12	13	18	22
sustentável | sustainable	10	6	5	8	9	7	9	6	0	4	6	10
governança | governance	10	9	8	7	10	12	10	7	4	5	8	8
ambiente | environment	0	0	0	0	0	8	7	4	4	0	0	7
socioambiental | socio-environmental	11	10	7	7	10	0	0	0	4	4	5	0

Note. The authors (2021).

Regarding the first group of expressions, those related to Cash, only two terms were considered: 'Cash' and 'FFO' (Funds From Operations), which represent a company's operating cash flow. The time series reveals a gradual increase in the frequency of the word 'cash' year after year. These trends may indicate a greater concern among companies with cash generation, a notable characteristic in increasingly competitive market scenarios.

Regarding the expressions related to customers, the word 'satisfaction' showed an upward trend in frequency during the period analyzed. Among the mapped performance indicators, Earnings Before Interest and Taxes (EBIT) stood out throughout the entire period, followed by 'revenue'. These two terms consistently occupied the first and second positions every year.

The Net Promoter Score (NPS) indicator is also noteworthy. It is linked to customer loyalty and can be measured with questions such as, “On a scale of 0 to 10, how likely are you to recommend the company's product or service to a friend?” (Reichheld & Markey, 2011). From being virtually non-existent before 2018, NPS became the third most frequent indicator by 2021, suggesting its growing mention or perhaps a greater concern from companies regarding customer satisfaction.

Regarding the expressions classified in the profitability *bag-of-words*, these words showed growth in frequency. It is worth noting that the word 'lucro' (profit) had a higher frequency than EBIT until 2017; however, from 2018 onwards, EBIT surpassed it in this statistic.

Finally, it was observed that terms related to the Environmental, Social, and Governance (ESG) indicator gained significant prominence, becoming some of the most frequent terms overall, even when compared to all other categories.

4.2 Discussion of the results

The results of this study provide insights into the dynamics of executive compensation and its correlation with performance indicators among companies in Brazil, an emerging

market. The data revealed several key patterns and trends, offering a deeper understanding of how firms structure executive remuneration in relation to sustainability and governance practices. This discussion aims to explore these findings in detail, contextualizing them within the broader framework of existing literature and theoretical models. By examining the implications of these results, we can better comprehend the underlying factors influencing compensation strategies and their potential impact on corporate behavior and performance.

Regarding cash-related measures, Lambert and Larcker (1987) noted that ROE was more related to cash compensation than to stock returns. They added that this relationship is more noticeable in companies where net income is less sensitive to stock returns. This aligns with their finding that, on average, compensation in large companies tends to have a weaker relationship with ROE. The present study supports this, as it identified that for Brazilian companies, the use of the term 'cash' has increased considerably over the years. This may indicate a greater concern among these companies with cash generation in the face of increasingly competitive scenarios. In contrast, the frequency of the term Funds From Operations (FFO) was low and remained relatively stable throughout the period.

Table 3 also shows that, regarding ROE, there were 18 mentions at the beginning of the period. The frequency of this metric then decreased, only to rise again in later years. This metric helps align the interests of executives and the company. This idea is supported by the findings of Indjejikian and Nanda (2002), who noted that the lower the variability of ROE, the higher the bonuses paid to executives in relation to their base salary. This suggests that companies substitute low-risk salaries (which offer little incentive) with riskier bonuses (which provide greater incentive).

Regarding metrics of a more qualitative nature, Banker et al. (2000) pointed to the growing use of non-financial measures. They argued that the literature frames them as capable of indicating long-term financial performance and that there is an improvement in both non-financial and financial performance after implementing incentive plans that include measures like customer satisfaction. Table 3 shows that expressions linked to customer satisfaction have been increasing in frequency. For example, the Net Promoter Score (NPS), an indicator linked to customer loyalty, reached its highest frequency in 2021. This demonstrates a greater concern and responsibility on the part of companies regarding customer satisfaction.

FINAL CONSIDERATIONS

The way executive compensation is structured often serves to align the interests of managers and shareholders, as their interests do not always move in the same direction. This alignment, in turn, increases the possibility of maximizing corporate wealth. An analysis of the theoretical and empirical literature shows that there is still no consensus regarding the most appropriate way to establish performance-based compensation. In light of this, this study sought to identify which performance metrics companies use to establish executive compensation.

Therefore, this research is classified as qualitative. To answer the research question, it employed the method of content analysis on 7,752 Reference Forms (FR) disclosed by companies listed on the B3 between January 2010 and September 2021. The procedure to achieve this objective utilized Robotic Process Automation (RPA), the Python language in conjunction with the PyAutoGUI library, and Natural Language Processing (NLP).

The results showed that, in terms of frequency of occurrence within the text excerpts from item 13.1, letter C, of the FR, the main performance indicators linked to executive compensation are EBIT, revenue, and ROE. Furthermore, an increasing trend was observed in the frequency of expressions related to customer satisfaction in the composition of executive compensation, particularly through the Net Promoter Score (NPS) index. This suggests a greater concern and responsibility among companies regarding customer satisfaction.

It is important to expand on the inherent limitations of the methodological approach used. The bag-of-words model, while effective for identifying term frequency on a large scale, fundamentally disregards semantic context, grammar, and word order. This means the analysis cannot distinguish between affirmative, negative, or conditional statements. For example, the model quantifies the mention of "customer satisfaction" but does not discern whether the

context refers to its achievement or its absence. Furthermore, this method is susceptible to oversimplification, as it cannot capture nuances, irony, or the strategic intent behind the disclosures. Therefore, while the frequency of a term indicates its prominence as a topic, it is not a direct measure of its effective implementation or positive performance in compensation practices.

This limitation is particularly evident in the analysis of the term ESG – Environmental, Social, Governance. As the term was not analyzed within its context but rather by the frequency of the word itself, it was not assessed whether the context of all mentions was truly related to the ESG framework. However, it is possible to observe an evolution in the frequency of the word "sustainability" during the sample period.

This research has certain limitations that should be noted: I) not all PDF files of the FRs could be fully downloaded and subsequently converted to text; II) the selection logic for the textual expressions used in the bag-of-words, while grounded in statistical frequency of occurrence, may still be influenced by the researchers' subjective bias; III) regarding the analyzed clusters, it is observed that the sample does not assume a normal distribution.

The findings also present significant practical implications for both companies and market regulators. For companies, the growing frequency of non-financial metrics like NPS and ESG-related terms suggests that executive compensation plans are evolving to reflect a broader definition of value beyond traditional financial results. This indicates a strategic need to develop robust systems for measuring and reporting on these non-financial areas, ensuring that incentive structures genuinely drive long-term sustainable growth, not just short-term financial gains. For regulators, such as the CVM, the results highlight an opportunity to enhance disclosure guidelines. Given the heterogeneity in how performance indicators are reported, regulators could consider promoting more standardized frameworks for reporting on non-financial metrics. This would improve comparability for investors and strengthen corporate governance by ensuring that compensation is transparently and effectively tied to a comprehensive set of performance drivers.

For future research, it is suggested to conduct similar processes with companies from other emerging countries to determine if the observed behavior is consistent with that identified in this study. Furthermore, sector-focused analyses aimed at assessing whether the sector to which each company belongs affects the use of performance indicators in executive compensation could contribute to future discussions.

REFERENCES

Aggarwal, R. K., & Samwick, A. A. (1999). Executive compensation, strategic competition, and relative performance evaluation: Theory and evidence. *The journal of finance*, 54(6), 1999-2043. https://doi.org/10.1111/0022-1082.00180

Aguiar, A. B. D., & Pimentel, R. C. (2017). Remuneração de executivos e desempenho no mercado brasileiro: relações contemporâneas e defasadas. *Revista de Administração Contemporânea*, 21, 545-568. https://doi.org/10.1590/1982-7849rac2017160228

Anthony, R. N., & Govindarajan, V. (2008). *Sistemas de controle gerencial*. AMGH Editora.

Banker, R. D., Potter, G., & Srinivasan, D. (2000). An empirical investigation of an incentive plan that includes non-financial performance measures. *The accounting review*, 75(1), 65-92. https://doi.org/10.2308/accr.2000.75.1.65

Bardin, L. (1977). *Análise de Conteúdo*. Edições 70, São Paulo.

Behera, S. (2020). Does the EVA valuation model explain the market value of equity better under changing required return than constant required return? *Financial Innovation*, 6(1), 1-23. https://doi.org/10.1186/s40854-019-0167-8.

Bird, S., Klein, E., & Loper, E. (2009). *Natural language processing with Python: analyzing text with the natural language toolkit*. O 'Reilly Media, Inc.

Brealey, R. A., Myers, S. C., & Allen, F. (2018). *Princípios de Finanças Corporativas*. 12ª edição. AMGH.

Bruns, W. J., & Merchant, K. (1990). The dangerous morality of managing earnings. *Management accounting*, 72(2), 22-25.

Comissão de Valores Mobiliários (2009) Instrução CMV nº 480. https://conteudo.cvm.gov.br/legislacao/instrucoes/inst480.html

Dalmacio, F. Z., Rezende, A. J., & Slomski, V. (2009). Análise setorial das medidas de performance utilizadas nos contratos de remuneração dos gestores. *Revista Universo Contábil*, 5(3), 06-23. https://doi:10.4270/ruc.2009319

Devers, C. E., Cannella Jr, A. A., Reilly, G. P., & Yoder, M. E. (2007). Executive compensation: A multidisciplinary review of recent developments. *Journal of management*, 33(6), 1016-1072. https://doi.org/10.1177/0149206307308588

Feltham, G. A., & Xie, J. (1994). Performance measure congruity and diversity in multi-task principal/agent relations. *Accounting review*, 429 - 453. https://www.jstor.org/stable/248233

Herzberg, F.; Mausner, B.; Snyderman, B. B. (1959). *The Motivation to Work*. Taylor & Francis Group. https://doi.org/10.7202/1022040ar

Holmström, B. (1979). Moral Hazard and Observability. *The Bell Journal of Economics,* 10(1). 74 – 91. https://doi.org/10.2307/3003320

Indjejikian, R. J., & Nanda, D. (2002). Executive target bonuses and what they imply about performance standards. *The Accounting Review*, 77(4), 793-819. https://doi.org/10.2308/accr.2002.77.4.793

Jensen, M. C., Murphy, K. J., & Wruck, E. G. (2004). Remuneration: Where we've been, how we got to here, what are the problems, and how to fix them. *Financial Working Paper*. https://dx.doi.org/10.2139/ssrn.561305

Krauter, E. (2013). Remuneração de Executivos e Desempenho Financeiro: um Estudo com Empresas Brasileiras. *Revista de Educação e Pesquisa em Contabilidade*. 7(3): 259-273. https://doi.org/10.17524/repec.v7i3.988.

Lambert, R. A.; Larcker, D. F. (1987). An Analysis of the Use of Accounting and Markets Measures of Performance in Executive Compensation Contracts. *Journal of Accounting Reaseach. Studies on Stewardship Uses of Accounting*. 25, 85-125. https://doi.org/10.2307/2491081

McKinney, W. (2010). Data structures for statistical computing in python. In Proceedings of the 9th Python in Science Conference (Vol. 445, No. 1, pp. 51-56).

Meckling, W. H., & Jensen, M. C. (1976). Theory of the firm: Managerial behavior, agency costs and ownership structure. *Journal of financial economics*, 3(4), 305-360.

Pedregosa, F., Varoquaux, G., Gramfort, A., Michel, V., Thirion, B., Grisel, O., Blondel, M., Prettenhofer, P., Weiss, R., Dubourg, V., & others (2011). Scikit-learn: Machine learning in Python. *Journal of machine learning research*, 12(Oct), 2825–2830.

Reichheld, F.; Markey, R., 2011. The Ultimate Question 2.0 (Revised and Expanded Edition). *How net promoter companies thrive in a customer-driven world*. Harvard Business Review Press. Boston: Perseus Book LLC (Ingram).

Santos, T. R., & Silva, J. O. (2017). Remuneração de executivos: uma análise dos artigos nacionais e internacionais na última década. *Revista de Gestão, Finanças e Contabilidade*, 7(2), 265-283. https://doi.org/10.18028/rgfc.v7i2.2876

Schincariol, J. (2020). CEOs têm remuneração 600 vezes maior que funcionário. Valor Econômico. https://valor.globo.com/carreira/noticia/2020/09/28/ceos-tem-remuneracao-600-vezes-maior-que-funcionario.ghtml

Scott, W. R. & O'Brien, P. C. (2019). *Financial Accounting Theory*. 8º ed. Ontário: Pearson.

Valenti, G.; Torres, F. (2013). Ação daria R$ 1 bi a executivos da OGX. *Valor Econômico*. https://valor.globo.com/empresas/noticia/2013/08/06/acao-daria-r-1-bi-a-executivos-da-ogx.ghtml

Vasconcelos, A. F.; Monte, P. A. (2013). A Remuneração de Executivos e o Desempenho Financeiro das Empresas brasileiras. *Revista Registro Contábil*, *4*(1):1-18.