

Compliance programs and ethics management in oil refineries: is there an effect on the compliance knowledge and intentions of employees?

Programas de compliance e gestão da ética em refinarias de petróleo: há efeito no conhecimento e intenção para compliance dos colaboradores?

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Keywords

Ethics management.
Compliance.
Oil refineries.

Palavras-chave

Gestão da ética.
Compliance.
Refinarias de petróleo.

Article information

Received: July, 29th 2022
Approved: March, 03rd 2023
Published: April, 04th 2023
Responsible editor: Dr. Silvio Hiroshi Nakao

Abstract

The study aims to identify the influence of ethics management (formal and informal) on the compliance knowledge and intentions of employees at oil refineries with compliance programs. The hypotheses were tested through structural equation modeling and fuzzy-set qualitative comparative analysis using a sample of employees from Brazilian refineries with compliance programs. On one hand, the findings reveal that the combination of formal and informal ethics management supports compliance knowledge, leading to stronger compliance intentions. Singularly, the formal (informal) management of ethics is more efficacious in promoting compliance knowledge (intentions). On the other hand, there are two pathways that lead to employees showing a high intention of compliance: the presence of a combination of formal and informal ethics management or the presence of compliance knowledge.

Resumo

O estudo objetiva identificar a influência da gestão (formal e informal) da ética no conhecimento e intenção para compliance de colaboradores de refinarias de petróleo que possuem programas de compliance. O teste de hipóteses foi realizado por meio de modelagem de equações estruturais e análise qualitativa comparativa fuzzy-set, a partir de uma amostra de funcionários de refinarias de petróleo brasileiras que possuem programas de compliance. Por um lado, os achados revelam que a combinação da gestão formal e informal da ética fomenta o conhecimento de compliance, resultando em maior intenção para compliance. Singularmente, a gestão formal (informal) da ética é mais eficaz para promover o conhecimento (a intenção) de compliance. Por outro lado, são dois os caminhos para os funcionários apresentarem alta intenção para compliance: a presença de combinação de gestão formal e informal da ética ou a presença de conhecimento de compliance.

Practical implications

Ethics management through the oil refineries' compliance programs goes through formal channels (ex: codes of conduct) and informal ones (ex: ethical culture), which together promote the employees' knowledge of compliance. Singularly, formal (informal) management must be prioritized to improve (ensure) the knowledge (intentions) of compliance.

1 INTRODUCTION

The adoption of compliance programs has stood out as a contemporary trend, especially due to the regulations and agreements that appear in response to corporate fraud scandals (Stacchezzini et al., 2020; Voss et al., 2022). In Brazil, one of the main corruption scandals hatched after Operation Carwash, which targeted Petrobras, the country's largest oil company (Medeiros & Silveira, 2017; Whitehead & Belghitar, 2022). Due to this, various measures, laws and decrees were created to avoid the recurrence of illicit acts in organizations, especially in the oil and gas sector (Castro et al., 2019).

For compliance programs to achieve their goals, the ethical aspect must be developed and improved with actions and practices that perpetuate the ethical climate, paying attention to preestablished standards and regulations that direct individuals to follow at least the minimum of the desired ethical standards (Menzel, 2012; Weber & Wasieleski, 2013). In this manner, the employee knowledge and perceptions stemming from compliance programs contribute to their daily decision-making, which tends to reflect in their ethical engagement, in the improvement of compliance policies and in the reporting of illicit activities within the organization (Weaver & Treviño, 1999).

The anti-corruption policies created an environment prone to the adherence to compliance policies within the organizations (Castro et al., 2019), serving as a manner to disseminate ethics with the goal of developing compliance knowledge and the respective intention to fulfill compliance procedures (Stöber et al., 2019; Stacchezzini et al., 2020). To this end, compliance programs can be a part of the formal (ex: codes of conduct and qualifications) and informal management of ethics (ex: informal communication and culture) (Brenner, 1992; Khaltar & Moon, 2020).

Despite the contributions of formal and informal ethics management in supporting ethical behaviors (Khaltar & Moon, 2020), little is known of their effectivity in the context of organizations with compliance programs, especially in oil refineries that were rocked by various corporate scandals. Furthermore, there is also an emerging call to theorize about possible antecedents to the compliance knowledge and intentions of individuals in these organizations (Kim & Kim, 2017). Considering these perceived gaps, this study aims to identify the influence of ethics management (formal and informal) on the compliance knowledge and intentions of employees at oil refineries with compliance programs.

The study is justified by the fact that it discusses the relevance of ethics management (formal and informal) to the comprehension of the knowledge employees have about compliance, contributing to strengthen the development and improvement of compliance programs in the organizations (Hofeditz et al., 2017; Hauser, 2020). This strengthening is beneficial for managers to promote knowledge about the compliance policies to support the intention to follow compliance rules in daily activities (Stöber et al., 2019).

From the theoretical perspective, this study contributes by analyzing formal and informal ethics management as a process that strengthens organizational commitment to the ethical performance of employees and intensifies the improvement in the understanding of compliance policies that lead to the intention of compliance in decision-making. In the context of practical contributions, the discussion regarding methods of communicating and disseminating the knowledge of compliance policies and controls lets these elements be perceived as efficacious tools for promoting ethical conduct and compliance in organizations.

2 LITERATURE REVIEW AND THE DEVELOPMENT OF HYPOTHESES

2.1 Compliance programs and ethics management

Compliance programs are created to generate more transparency and guarantee the integrity and image of organizations (Weber & Wasieleski, 2013), serving in many cases (such as in Brazilian oil and gas organizations) as a manner of legitimization in light of crises stemming from corruption and unethical behavior (Whitehead & Belghitar, 2022). Situations like this are the reason behind the growing implementation of compliance programs in organizations around the world, mainly stemming from regulations and agreements that appeared in response to fraud scandals (Stacchezzini et al., 2020). In fact, many compliance programs appear in a tragic post-occurrence stage, to legitimize and make organizations more transparent and adjusted to the reality envisioned by society, as was the case with Brazilian refineries after the Carwash operation (Voss et al., 2022). With the goal of ensuring that scandals such as the one involving Petrobras would not be repeated in Brazil, various measures, laws and decrees were created, thus evoking an emerging environment for compliance program implementation and adherence in the organizations (Castro et al., 2019; Souza et al., 2020).

Ethics is one of the pillars of success for compliance programs (Weber & Wasieleski, 2013). In the

corporate environment, ethics contemplate pre-established regulations and standards that guide individuals about what is right or wrong (Menzel, 2012). For the organization to be considered ethical, there is a joint effort of all those involved, that is, it involves the knowledge and intentions of all the employees (Weaver & Treviño, 1999). Consequently, an ethical climate generates organizational commitment (Monteiro et al., 2021), which is crucial for individuals to be willing to exhibit actual ethical attitudes (Weaver & Treviño, 1999).

Directing the individuals of an organization to act ethically is a complex task (Bellora-Bienengraber et al., 2022). As such, compliance programs must constantly contemplate concerns and updates about practices and forms of managing ethics (Stacchezzini et al., 2020). In this context, there are compliance mechanisms that stand out, such as: codes of conduct that establish conduct regulations, guiding rules for organizational action and practices (Assi, 2017), regular training that facilitates comprehension of compliance practices and ethical conducts in the organization (Hauser, 2019); and anonymous reporting channels that are internally operated, helping increase employee intentions to report frauds and help with the investigation of illicit acts (Silva & Sousa, 2017). Thus, such actions create an environment in which ethical attitudes and behaviors become natural to the employees, promoting formal and informal ethics management in the organizational environment (Khaltar & Moon, 2020; Lasaková et al., 2020).

Basically, ethics management is vital for the organizations to demonstrate responsibility to their stakeholders and, consequently, maintain a good corporate reputation (Silva et al., 2021). The means and tools of ethics management can be considered from two perspectives: formal and informal (Brenner, 1992). Formal ethics management mainly involves visible or tangible mechanisms, such as whistleblower protection programs and regulations, ethics codes and standards of conduct, as well as training about compliance / ethics (Brenner, 1992; Khaltar & Moon, 2020). Informal ethics management is mainly based on elements that are less visible or tangible within the organization, such as its culture, the ethical climate, and employee commitment to the organization's principles and values, reducing unethical behaviors within the organization (Brenner, 1992; Khaltar & Moon, 2020). The literature suggests that both management perspectives are relevant to ensure individual ethics, since one form or the other can be more relevant to a certain priority or behavior (Morris et al., 2002; Treviño & Brown, 2004).

2.2 Formal and informal ethics management and compliance knowledge

Based on the premise that both forms of ethics management (formal and informal) are relevant for the organization to reach its ethical goals, this study proposes that the combined effect (interaction) results in higher levels of compliance knowledge. Compliance knowledge includes the understanding and conception of laws, regulations, internal codes and subjective rules passed on to the employees, seeking to contribute to the perception of the rules that are related to their own compliance behavior (Safa et al., 2016; Kim, 2020). As such, employee qualification regarding compliance knowledge can be considered an efficacious manner of avoiding deviations of conduct, as well as being useful in the efforts to minimize the risk of unethical actions (Stöber et al., 2019). Consequently, compliance knowledge becomes a protection for the consolidation of the organization's compliance program and its respective ethics management (Hofeditz et al., 2017; Hauser, 2020).

On one hand, formal ethics management can contribute by explicitly sharing compliance regulations, codes, manuals and training with the employees (Brenner, 1992; Khaltar & Moon, 2020). On the other hand, informal ethics management tends to disseminate and mainly incorporate this information and these demands into the organizational culture (Brenner, 1992; Khaltar & Moon, 2020). Therefore, informal management systems can support formal management systems (Falkenberg & Herremans, 1995). Thus, combining formal and informal ethics management can be a powerful means for the organizations to encourage their employees' knowledge about compliance. This is in agreement with the need to consider and comprehend the joint relevance of both forms of ethics management (formal and informal) (Treviño & Brown, 2004; Lašáková et al., 2020). Considering this, hypothesis 1 proposes that:

H₁: The combination (interaction) of formal and informal ethics management positively influences compliance knowledge.

2.3 Compliance knowledge and intentions

Compliance intentions are accomplished by employees when there is the intention to act in accordance with the organization's compliance policies, laws and regulations, when employees encourage their peers to act

in conformity with these regulations, as well as when employees attempt to act according to the goals established by the compliance programs (Rajab & Eydgahi, 2019; Kim & Kim, 2022). Thus, it becomes essential to manage and promote manners of encouraging knowledge about compliance policies, as this is a direct antecedent of the intention to follow compliance practices in daily activities (Stöber et al., 2019).

The impact of employees' compliance knowledge on their own intentions to act in conformity with the policies is shown in the previous literature. Findings based on a sample of employees from a large Korean petrochemical company indicate that compliance knowledge boosts compliance intentions (Kim & Kim, 2017). Similarly, for Korean petrochemical company employees, compliance intentions are shown to be important for there to be an actual intention to act in a manner that is ethical and in agreement with organizational principles and values (Kim & Kim, 2022). In summation, the literature suggests that employees who are aware of compliance regulations and standards are more prone to act ethically. Thus, it is expected that:

H₂: Compliance knowledge positively influences compliance intentions.

2.4 Formal ethics management and compliance knowledge and intentions

Formal ethics management communicates an organization's fundamental values based on formal structures and policies that include ethics codes, internal policy manuals, employee training materials and methods, seminars, and internal control systems (Weaver et al., 1999; Remišová et al., 2019). In this aspect, compliance programs corroborate the management control systems to ensure that business decisions are aligned with organizational regulations, ethical principles, laws, and objectives as a whole (Ferrell et al., 2017).

There is evidence that codes of conduct, codes including reporting channels and compliance training, are relevant in making sure that employees are aware of the compliance practices expected by the organization (Stöber et al., 2019), that is, that they acquire compliance knowledge. However, merely having codes, manuals and regulations does not promote better levels of organizational commitment and ethical performance in employees (Khaltar & Moon, 2020). Thus, by themselves, formal procedures and policies do not generate higher levels of ethical intentions and behavior in employees (Fatkenberg & Herremans, 1995). The evidence suggests that formal ethics management qualifies employees to acquire compliance knowledge, which they can then use in pre-established practices, policies and procedures (Weber & Wasieleski, 2013; Jannat et al., 2021). As such, the third hypothesis proposes that:

H₃: Formal ethics management influences positively and indirectly compliance intention through compliance knowledge.

2.5 Informal ethics management and compliance intentions

Informal ethics management includes aspects such as the ethical culture and climate (Ferrell et al., 1998), emphasizing strategies that aim to encourage individuals to act in accordance with the organization's ethical expectations (Weaver et al., 1999). Generally, informal management means facilitate the development of an ethical climate in the work environment, strengthening the relationship between superiors and subordinates, which facilitates the communication and requirement of adequate compliance attitudes and postures from the employees (Lašáková et al., 2020).

Informal ethics management is intimately linked to organizational commitment and the ethical performance of employees (Khaltar & Moon, 2020). For example, the quality of feedback that employees receive is associated with the reduction of unethical behaviors (Klein et al., 2019). All of this encourages a common manner for the employees to incorporate and share the organizational mission and values (Nohria & Ghoshal, 1994), which increases the probability of exhibiting compliance intentions (Weaver et al., 1999; Khaltar & Moon, 2020). This internalization of organizational goals and values through informal paths helps keep the employees aligned with the organization's interests (Khaltar & Moon, 2020; Cruz et al., 2022). Thus, it is expected that:

H₄: Informal ethics management positively influences compliance intentions.

Figure 1 presents the hypotheses developed in this section. H_1 presents a combined-effect proposal; H_2 and H_4 , direct effect proposals; and H_3 focuses on an indirect effect. The model's control variables are age, gender, tenure at the company and position.

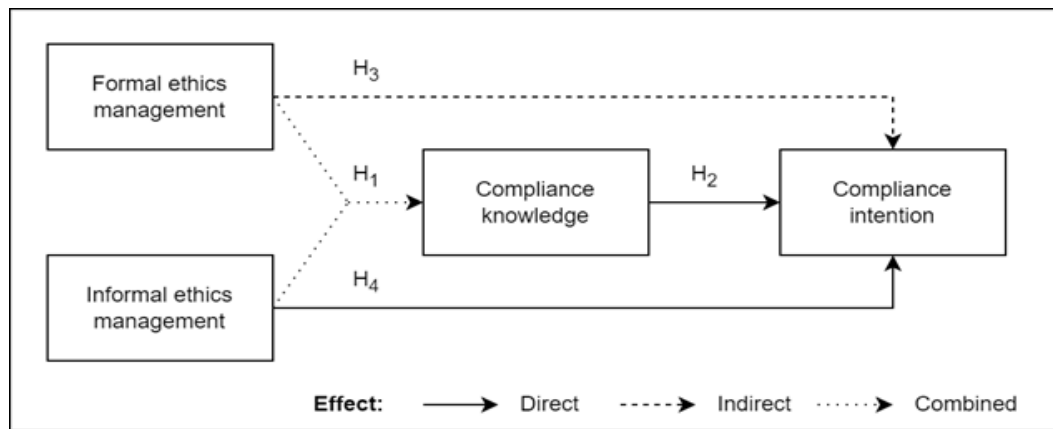


Figure 1. Research model

Source: Elaborated by the authors.

3 METHOD

3.1 Data collection and sample

To assemble only those who are employed at refineries with compliance programs, considering that there are no datasets with lists and/or contact information for this target group, the following procedures were adopted: (i) online search for oil refineries located in Brazil; (ii) filtering the refineries with compliance programs; (iii) LinkedIn search for employees from the selected refineries; (iv) sending an invitation with a cover letter to the employees that were identified, and sending the electronic questionnaire to those who accepted the invitation. The data collection occurred between January and September of 2021, and the final sample consisted of 74 completed questionnaires. Regarding the respondents, 24 of them are women and 50 are men. The average age is 35 years and they have been working at their respective refineries, on average, for nine years. Among the respondents, 16 are managers, coordinators, supervisors or unit leaders, and 58 are technicians, operators, analysts, advisers or assistants. Despite this being a common data collection procedure in similar literature, it is important to note that the sample is non-probabilistic, and the results should not be extrapolated (Crespo et al., 2021; Frare & Beuren, 2021).

3.2 Variable measurement

The analyzed variables were adapted from previous studies. After conducting a pre-test with two masters students from the business field and two practitioners (a manager responsible for an oil refinery's compliance program and another who is responsible for the control sector in a large company), small adjustments were made. These procedures are recommended to ensure the content's validity, measurement comparability and adequation to the desired population (Bellora-Bienengräber et al., 2022). Furthermore, the study employs Harman's single factor test to investigate possible issues with the method's common bias (Mannes et al., 2021). Four factors were found (contemplating 71.94% of the total variance), where the first factor represents 39.4% of the variance. Thus, it is not an issue (less than 50% of total variance) (Podsakoff et al., 2003).

All the multi-item constructs were included on a Likert-type scale with 7 points (1 = completely disagree and 7 = completely agree). Formal (3 items) and informal (4 items) ethics management are based on Khaltar and Moon (2020). Within an organizational perspective, formal ethics management includes managing through whistleblower protection programs/regulations, ethics codes and codes of conduct, and compliance through ethics training, while informal management focuses on less-formalized aspects, such as the creation of an organizational sense of right or wrong, following the laws and ethics codes, and a climate that encourages following the rules and procedures desired by the organization (Khaltar & Moon, 2020). The respondents indicated their agreement about the perception of ethics dissemination (formal and informal) in the organization through the management's efforts. For a compliance program to be successful, it is vital to consider employees' perceptions about the efforts

and guidance stemming from said program (Weaver & Treviño, 1999). Considering this, compliance knowledge (7 items) and compliance intentions (5 items) were adopted from Kim and Kim (2017); the respondents indicated their agreement regarding compliance knowledge (clear and precise understanding) and the intention to act accordingly (pretension, encouragement, following and continuing to do so), respectively.

The study employs four control variables at the individual level: gender, age, tenure at the company and position. These variables are normally controlled in studies about compliance and ethics behaviors at the individual level because, eventually, individuals with different profiles can have different perceptions and attitudes (Monteiro et al., 2021).

3.3 Data analysis procedures

First, the hypotheses were tested through PLS-SEM. Among the benefits to using this technique, there is its solidity for small samples, complex models and its applicability in the absence of data normality (Hair et al., 2017; 2019). The second technique that was employed, supplementally, was fsQCA, which highlights combinations of conditions that lead to certain outcomes (Ragin, 2000; 2008), proving its relevance by complementing the results obtained by the PLS-SEM (Frare et al., 2022; Monteiro et al., 2022). Generally, PLS-SEM allows researchers to test hypotheses while fsQCA is used in addition to that in order to understand possible organizational configurations that permit reaching high levels of the investigated outcome (Cruz et al., 2022; Frare et al., 2022), in this case, high levels of compliance intentions among the employees in the sample.

4 DATA ANALYSIS

4.1 PLS-SEM

The PLS-SEM analysis begins with the measurement model (Table 1). Loadings over 0.6 are acceptable and, among the model's loadings, only two of them were below that level (the lowest one was 0.579). Since they are flexible cutoff points and it is important to be cautious when excluding items with loads between 0.4 and 0.6, the choice was made to maintain all the items (Hair et al., 2017). The reliability indicators (Cronbach's alpha – α , rho_A and composite reliability – CR) are adequate, with values between 0.7 and 0.95 (Hair et al., 2019). The average variance extracted (AVE) with values over 0.5 reveals the convergent validity (Hair et al., 2019). The square roots of the AVE that are higher than the correlations between the constructs exhibit Fornell-Larcker's criterion, indicating the discriminant validity (Hair et al., 2017).

Table 1. Measurement model

Panel A: Descriptive statistics, reliability and convergent validity								
Variable	Min.	Max.	Mean	SD	α	rho_A	CR	AVE
FEM	1	7	5.80	1.27	0.757	0.774	0.859	0.671
IEM	1	7	5.66	1.15	0.858	0.929	0.898	0.689
CK	1	7	5.90	0.98	0.929	0.933	0.943	0.705
CI	1	7	6.64	0.54	0.833	0.884	0.885	0.616
Panel B: Discriminant validity								
Variable	1	2	3	4	5	6	7	8
1. FEM	0.819							
2. IEM	0.765	0.830						
3. CK	0.315	0.228	0.840					
4. CI	0.265	0.331	0.643	0.785				
5. Gender	0.063	0.124	0.046	0.017	-			
6. Age	-0.040	-0.046	0.075	0.175	-0.154	-		
7. Tenure	-0.163	-0.178	0.042	0.087	-0.066	0.733	-	
8. Position	0.279	0.208	0.100	0.177	-0.013	0.435	0.291	-

Note 1: FEM = formal ethics management; IEM = informal ethics management; CK = compliance knowledge; CI = compliance intention.

Source: Elaborated by the authors.

The structural model was calculated through bootstrapping with 5 thousand subsamples (Table 2). The R² of compliance knowledge (11.8%) is considered medium (near 13%) and that of compliance intentions (42.8%) is high (>26%) (Cohen, 1988). The Q² of compliance knowledge (8%) and compliance intentions (26.6%) are acceptable, as their values are above zero, which suggests the model’s predictive relevance (Hair et al., 2019). Multicollinearity is not an issue, since the highest variance inflation factor among the independent variables (3.115) is lower than 3.5 (Hair et al., 2019). None of the control variables are statistically significant, suggesting that gender, age, tenure and position do not determine compliance intentions.

Table 2. Structural model

Relationships	Beta (β)	t-statistic	p-value	CI _{LB} 5%	CI _{UP} 95%	Decision
FEM * IEM → CK	0.219	1.779	0.075*	0.045	0.446	H ₁ supported
CK → CI	0.615	6.757	0.000***	0.470	0.769	H ₂ supported
FEM → CK	0.364	2.247	0.025**	0.123	0.653	-
FEM → CI	-0.197	0.908	0.364	-0.490	0.187	-
FEM → CK → CI	0.224	2.150	0.032**	0.080	0.429	H ₃ supported
IEM → CK	0.164	0.895	0.371	-0.140	0.457	-
IEM → CI	0.336	2.076	0.038**	0.078	0.580	H ₄ supported
IEM → CK → CI	0.101	0.903	0.366	-0.083	0.280	-
Gender → CI	-0.023	0.236	0.813	-0.181	0.132	-
Age → CI	0.125	1.190	0.234	-0.065	0.279	-
Tenure → CI	-0.020	0.198	0.843	-0.164	0.161	-
Position → CI	0.052	0.629	0.530	-0.080	0.185	-

Note 1: FEM = formal ethics management; IEM = informal ethics management; CK = compliance knowledge; CI = compliance intention; ICL: confidence interval – lower bound; ICS: confidence interval – upper bound.

Note 2: * p < 0.10; ** p < 0.05; *** p < 0.01.

Source: Elaborated by the authors.

4.2 fsQCA

The fsQCA method begins with variable calibration. The conditions (formal management, informal management, and compliance knowledge) and the outcome (compliance intentions) were calibrated at: 7 (full membership), 4 (crossover point) and 1 (full non-membership) (Cruz et al., 2022; Monteiro et al., 2022). Following that, there was an analysis of the conditions that are almost always necessary (consistency greater than or equal to 0.8) and always necessary (consistency greater than or equal to 0.9) (Ragin, 2000; 2008). The results reveal that compliance knowledge is necessary (consistency = 0.900) and formal (consistency = 0.863) and informal (consistency = 0.858) ethics management are almost always necessary for there to be high compliance intentions.

Finally, the study analyzed which conditions are sufficient to reach the outcome. A truth table of 2³ lines was developed and a consistency limit of 0.80 was set to refine the results (Ragin, 2008). Based on the intermediary solutions, there were two solutions that were sufficient for achieving high compliance intentions (Table 3). The first solution (S1) involves the presence of compliance knowledge. The second solution includes the presence of formal and informal ethics management.

Table 3. Sufficient solutions for high compliance intention

Solutions	Formal ethics management	Informal ethics management	Compliance knowledge	Coverage		Consistency
				Raw	Unique	
1			●	0.900	0.130	0.998
2	●	●		0.813	0.044	0.993

Overall coverage: 0.944

Overall consistency: 0.992

Note 1: Model: compliance intention = f(formal ethics management, informal ethics management and compliance knowledge).

Note 2: ● = presence of the condition; ballots without circles = indifferent conditions.

Source: Elaborated by the authors.

4.3 Discussion of the results

A summary of the results found while testing the hypotheses is illustrated in Figure 2.

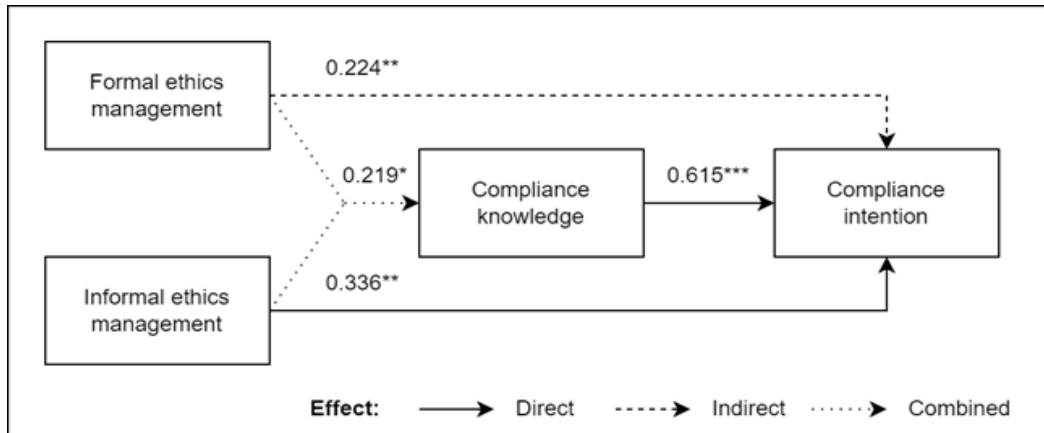


Figure 2. Research results

Note 1: The values shown correspond to the beta coefficient (β) of the proposed relationships.

Note 2: * $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$.

Source: Elaborated by the authors.

The interaction between formal and informal ethics management positively influences compliance knowledge, supporting H_1 ($\beta = 0.219$, $p < 0.10$). Singularly, formal management has a positive and significant effect on compliance knowledge ($\beta = 0.364$, $p < 0.05$), while informal management does not affect it significantly ($\beta = 0.164$, $p > 0.10$). This finding corroborates the need to jointly explore and analyze the role of both forms of management (formal and informal) (Treviño & Brown, 2004; Lašáková et al., 2020). Specifically, this finding is in agreement with the idea that informal management systems support (reinforce) the formal systems in the quest for ethical goals (Falkenberg & Herremans, 1995), in this case, the dissemination of knowledge regarding compliance rules, policies, and procedures among the employees (Khaltar & Moon, 2020). Figure 3 details the effects of this interaction. On one hand, low levels of formal and/or informal ethics management result in lower levels (below average) of compliance knowledge. On the other hand, high levels of formal and informal ethics management lead to higher levels (above average) of compliance knowledge in employees.

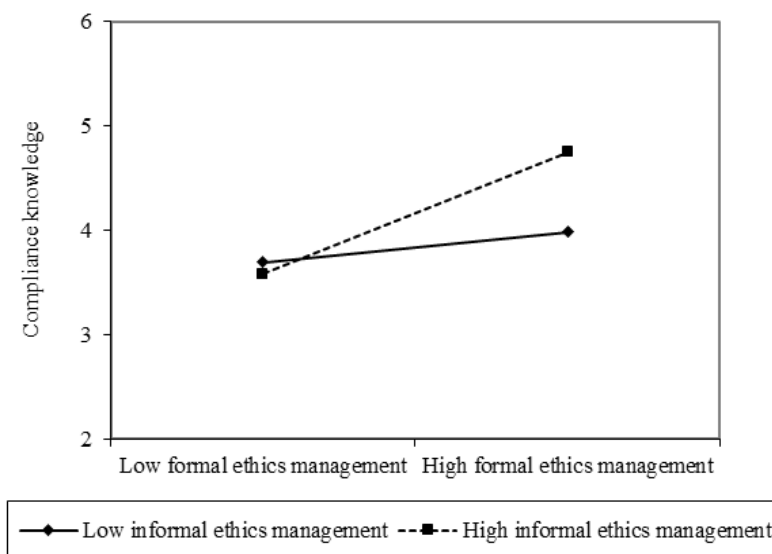


Figure 3. Combined effect of formal and informal ethics management

Source: Elaborated by the authors.

H₂ is supported ($\beta = 0.615$, $p < 0.01$), confirming that compliance knowledge positively influences compliance intentions. The results reinforce the fact that the effectiveness and comprehension of compliance knowledge stimulate the intention to practice compliance (Kim & Kim, 2017). Thus, it is vital that the managers promote manners of disseminating and encouraging compliance knowledge to reflect directly on their intentions of performing their activities in accordance with the compliance rules and policies (Stöber et al., 2019; Khaltar & Moon, 2020).

Formal ethics management positively and indirectly affects compliance intentions, through compliance knowledge, supporting H₃ ($\beta = 0.224$, $p < 0.05$). The findings demonstrate the importance of employees being qualified and instructed in compliance practices (Stöber et al., 2019; Hauser, 2020; Jannat et al., 2021); this is because it increases the chances that employees will have the intention to proceed ethically and in accordance with organizational values and principles (Kim & Kim, 2022).

H₄ is supported ($\beta = 0.336$, $p < 0.05$), proving that informal ethics management positively affects compliance intentions. This finding reinforces the role played by informal forms of management in directing employee behaviors (Khaltar & Moon, 2020; Cruz et al., 2022), especially through the internalization of the organization's missions and values (Nohria & Ghoshal, 1994) and informal communication with superiors and peers (Lašáková et al., 2020). This reinforces the role of informal management systems in guiding individuals' behavior in accordance with organizational goals (Ouchi, 1980; Falkenberg & Herremans, 1995). To summarize, it is possible to note that less visible or tangible means, such as the ethical culture, communication and climate, are relevant to ensure, monitor and induce employees to have the intention to act in a manner that is ethical and coherent with the compliance regulations, rules and conducts desired by the organization.

In the additional analysis (fsQCA), two equally efficacious manners (solutions) were found that led to employees having high compliance intentions. On one hand, S₁ indicates that to a portion of the sample, simply having compliance knowledge was enough for them to have compliance intentions, and their perception of formal and informal ethics management was indifferent. On the other hand, S₂ reveals that the presence of formal and informal ethics management, regardless of compliance knowledge, leads a portion of the sample to have high levels of compliance intentions. This indicates that absorbing knowledge about compliance is important, but mainly indicates that when there (still) is no presence of this specific type of knowledge, ethics management must be present in a combined manner (formal and informal pathways).

5 CONCLUSIONS

The study's aim was to identify the influence of ethics management (formal and informal) on compliance knowledge and intentions in employees of oil refineries with compliance programs. It is possible to conclude that formal and informal ethics management (together) boost the employees' compliance knowledge and, consequently, contribute to their compliance intentions. While formal ethics management mainly affects compliance knowledge, and later has an indirect effect on compliance intentions, informal ethics management acts directly on compliance intentions. In other words, formal ethics management mainly contributes to employees learning and knowing about compliance issues, while informal management mainly acts to guarantee that the employees will have a stronger propension to act ethically. Furthermore, the presence of compliance knowledge or formal and informal ethics management are two equally sufficient solutions for the employees to have high compliance intentions.

Theoretically, the study contributes to the understanding of the consequences of (formal and informal) ethics management in organizations (Khaltar & Moon, 2020), especially in the context of oil refineries that implemented compliance programs to legitimize themselves and follow new standards stemming from concerns about corporate scandals. The study also contributes to the search for elements that facilitate and promote compliance knowledge and intentions (Kim & Kim, 2017), in this case, ethics management. Regarding the practical aspects of these organizations, the findings reveal that formal and informal ethics management strengthen and intensify the improvement of compliance policy comprehension by employees, leading to the intention and applicability of compliance in their daily activities. Ethics management (formal and informal) linked to compliance knowledge improves capability and reputability in decision-making helping individuals to exert their ethical conscience and sensibility. Once instructed in accordance with the organization's expectations, employees are more prone to act ethically and in conformity with organizational values and principles. Thus, the formal and informal mechanisms of communicating and disseminating knowledge about compliance policies and controls are demonstrated to the managers as efficacious tools to promote ethical conduct and individual compliance.

This study is not without its limitations. Firstly, the sample is not probabilistic, which requires caution

when extrapolating the conclusions. Considering this, new studies can concentrate on single entity surveys or other strategies to make the sample probabilistic. Secondly, all the data were collected from one survey, so there was no triangulation with other sources. An inherent consequence to this is that only subjective measurements were used, without the inclusion of any measurements with a more objective character. As such, new studies can use data from archives or obtained via interviews (such as rewards and punishment systems and metrics applied to employees based on ethical behaviors). Additionally, the study includes a series of control variables (age, gender, time spent at the company, and position) but other variables can be controlled (such as educational status and religion). Regarding the study's model, the study only considers the perspective of ethical management; thus, new studies can focus on the effects of other managerial control systems linked to ethical aspects. Finally, besides the effects of formal and informal ethics management on compliance knowledge and intentions, new studies can focus on the effects perceived by the employees, such as work engagement and satisfaction, organizational identification and citizenship, and productivity, among others.

REFERENCES

- Assi, M. A. (2017). *Governança, riscos e compliance: mudando a conduta nos negócios*. (1. ed.). São Paulo: Saint Paul.
- Bellora-Bienengräber, L., Radtke, R. R., & Widener, S.K. (2022). Counterproductive work behaviors and work climate: The role of an ethically focused management control system and peers' self-focused behavior. *Accounting, Organizations and Society*, 96, 1-21. <https://doi.org/10.1016/j.aos.2021.101275>
- Brenner, S. N. (1992). Ethics programs and their dimensions. *Journal of Business Ethics*, 11(5-6), 391-399. <https://doi.org/10.1007/bf00870551>
- Castro, P. R., Amaral, J. V., & Guerreiro, R. (2019). Adherence to the compliance program of Brazil's anti-corruption law and internal controls implementation. *Revista Contabilidade & Finanças*, 30(80), 186-201. <https://doi.org/10.1590/1808-057x201806780>
- Cohen, J. (1988). *Statistical power analysis for the behavioral sciences*. (2. ed.). New York: Psychology Press.
- Crespo, N. F., Curado, C., Oliveira, M., & Muñoz-Pascual, L. (2021). Entrepreneurial capital leveraging innovation in micro firms: A mixed-methods perspective. *Journal of Business Research*, 123, 333-342. <https://doi.org/10.1016/j.jbusres.2020.10.001>
- Cruz, A. P. C. da, Frare, A. B., Accadrolli, M. C., & Horz, V. (2022). Effects of informal controls and psychological empowerment on job satisfaction. *Revista Contabilidade & Finanças*, 33(88), 29-45. <https://doi.org/10.1590/1808-057x202114660>
- Falkenberg, L., & Herremans, I. (1995). Ethical behaviours in organizations: Directed by the formal or informal systems?. *Journal of Business Ethics*, 14(2), 133-143. <https://doi.org/10.1007/BF00872018>
- Ferrell, O. C., Fraedrich, J., & Ferrell, L. (2017). *Business ethics: Ethical decision making and cases*. (11.ed.). Boston: Cengage Learning.
- Ferrell, O. C., LeClair, D. T., & Ferrell, L. (1998). The federal sentencing guidelines for organizations: A framework for ethical compliance. *Journal of Business Ethics*, 17(4), 353-363. <https://doi.org/10.1023/A:1005786809479>
- Frare, A. B., & Beuren, I. M. (2021). Job autonomy, unscripted agility and ambidextrous innovation: analysis of Brazilian startups in times of the Covid-19 pandemic. *Revista de Gestão*, 28(3), 263-278. <https://doi.org/10.1108/REG-01-2021-0005>
- Frare, A. B., Cruz, A. P. C. da, Lavarda, C. E. F., & Akroyd, C. (2022). Packages of management control systems, entrepreneurial orientation, and performance in Brazilian startups. *Journal of Accounting & Organizational Change*, 18(5), 643-665. <https://doi.org/10.1108/JAOC-04-2021-0052>
- Hair Jr., J. F., Hult, G. T. M., Ringle, C. M., & Sarstedt, M. (2017). *A primer on partial least squares structural equation modeling (PLS-SEM)*. (2. ed.). Los Angeles: Sage.
- Hair Jr., J. F., Risher, J. J., Sarstedt, M., & Ringle, C. M. (2019). When to use and how to report the results of PLS-SEM. *European Business Review*, 31(1), 2-24. <https://doi.org/10.1108/EBR-11-2018-0203>
- Hauser, C. (2020). From preaching to behavioral change: Fostering ethics and compliance learning in the workplace. *Journal of Business Ethics*, 162(4), 835-855. <https://doi.org/10.1007/s10551-019-04364-9>

- Hofeditz, M., Nienaber, A. M., Dysvik, A., & Schewe, G. (2017). "Want to" versus "have to": Intrinsic and extrinsic motivators as predictors of compliance behavior intention. *Human Resource Management*, 56(1), 25-49. <https://doi.org/10.1002/hrm.21774>
- Jannat, T., Alam, S. S., Ho, Y. H., Omar, N. A., & Lin, C. Y. (2021). Can corporate ethics programs reduce unethical behavior? Threat appraisal or coping appraisal. *Journal of Business Ethics*, 176, 37–53. <https://doi.org/10.1007/s10551-020-04726-8>
- Kim, S. S. & Kim, Y. J. (2017). The effect of compliance knowledge and compliance support systems on information security compliance behavior. *Journal of Knowledge Management*, 21(4), 986-1010. <https://doi.org/10.1108/JKM-08-2016-0353>
- Kim, S. S. (2020). The continuance usage of compliance support system: does surveillance concern matter? *Journal of Enterprise Information Management*, 33(6), 1491-1510. <https://doi.org/10.1108/JEIM-07-2019-0196>
- Kim, S. S., & Kim, Y. J. (2022). Augmented compliance intention through the appropriation of compliance support systems. *Behaviour & Information Technology*, 41(15), 3264-3280. <https://doi.org/10.1080/0144929X.2021.1978550>
- Khaltar, O., & Moon, M. J. (2020). Effects of ethics and performance management on organizational performance in the public sector. *Public Integrity*, 22(4), 372-394. <https://doi.org/10.1080/10999922.2019.1615163>
- Klein, L., Beuren, I. M., & Dal Vesco, D. (2019). Effects of the management control system in unethical behaviors. *RAUSP Management Journal*, 54, 54-76. <https://doi.org/10.1108/RAUSP-06-2018-0036>
- Lašáková, A., Remišová, A., & Bohinská, A. (2021). Best practices in ethics management: Insights from a qualitative study in Slovakia. *Business Ethics, the Environment & Responsibility*, 30(1), 54-75. <https://doi.org/10.1111/beer.12316>
- Mannes, S., Frare, A. B., & Beuren, I. M. (2021). Effects of using static and flexible budgets on process and product innovation. *Revista de Contabilidade e Organizações*, 15, 1-13. <http://dx.doi.org/10.11606/issn.1982-6486.rco.2021.180829>
- Medeiros, C. R. de O., & Silveira, R. A. da. (2017). Petrobrás in the webs of corruption: discursive mechanisms of the Brazilian media in Operation Car Wash coverage. *Revista de Contabilidade e Organizações*, 11(31), 11-20. <http://dx.doi.org/10.11606/rco.v11i31.134817>
- Menzel, D. C. (2012). *Ethics management for public administrators: Leading and building organizations of integrity*. New York, NY: M.E. Sharpe. <https://doi.org/10.4324/9781315704500>
- Monteiro, J. J., Bortoluzzi, D. A., Lunkes, R. J., & Rosa, F. S. (2021). The influence of the ethical climate on procedural justice and organizational commitment: the interaction of budgetary participation. *Revista de Contabilidade e Organizações*, 15, 1-14. <https://doi.org/10.11606/issn.1982-6486.rco.2021.174754>
- Monteiro, J., Malagueño, R., Lunkes, R. J., & Santos, E. A. dos. (2022). The effectiveness of value-and calculation-based management controls in hotels. *International Journal of Hospitality Management*, 102, 1-11. <https://doi.org/10.1016/j.ijhm.2022.103156>
- Morris, M. H., Schindehutte, M., Walton, J., & Allen, J. (2002). The ethical context of entrepreneurship: Proposing and testing a developmental framework. *Journal of Business Ethics*, 40(4), 331–361. <https://doi.org/10.1023/A:1020822329030>
- Nohria, N., & Ghoshal, S. (1994). Differentiated fit and shared values: Alternatives for managing headquarters-subsidiary relations. *Strategic Management Journal*, 15(6), 491-502. <https://doi.org/10.1002/smj.4250150606>
- Ouchi, W. G. (1980). Markets, bureaucracies, and clans. *Administrative Science Quarterly*, 25(1) 129-141. <https://doi.org/10.2307/2392231>
- Podsakoff, P. M., MacKenzie, S. B., Lee, J. Y., & Podsakoff, N. P. (2003). Common method biases in behavioral research: a critical review of the literature and recommended remedies. *Journal of Applied Psychology*, 88(5), 879-903. <https://doi.org/10.1037/0021-9010.88.5.879>
- Ragin, C. C. (2000). *Fuzzy-set social science*. Chicago, EUA: University of Chicago Press.
- Ragin, C. C. (2008). *Redesigning social inquiry: Fuzzy sets and beyond*. Chicago, EUA: University of Chicago Press.
- Rajab, M., & Eydgahi, A. (2019). Evaluating the explanatory power of theoretical frameworks on intention to

- comply with information security policies in higher education. *Computers & Security*, 80, 211-223. <https://doi.org/10.1016/j.cose.2018.09.016>
- Remišová, A., Lašáková, A., & Kirchmayer, Z. (2019). Influence of formal ethics program components on managerial ethical behavior. *Journal of Business Ethics*, 160(1), 151-166. <https://doi.org/10.1007/s10551-018-3832-3>
- Safa, N. S., Von Solms, R., & Furnell, S. (2016). Information security policy compliance model in organizations. *Computers & Security*, 56, 70-82. <https://doi.org/10.1016/j.cose.2015.10.006>
- Silva, G. R. da, & Sousa, R. G. de (2017). A influência do canal de denúncia anônima na detecção de fraudes contábeis em organizações. *Revista de Contabilidade e Organizações*, 11(30), 46-56. <https://doi.org/10.11606/rco.v11i30.134372>
- Silva, R. R. da, Santos, R. C. dos, Sousa, A. M. R., Orso, L. É., & Khatib, S. F. A. (2021). Code of ethics and conduct in the light of corporate governance: the stakeholders' perspective. *Revista de Administração da UFMS*, 14(2), 405-422. <https://doi.org/10.5902/1983465954702>
- Souza, T. R. de., Filardi, F., & Irigaray, H. A. R. (2020). Compliance in the oil and gas industry: the perception of managers. *Revista Eletrônica de Estratégia e Negócios*, 13(2), 129-167. <https://doi.org/10.19177/reen.v13e22020129-166>
- Stacchezzini, R., Rossignoli, F., & Corbella, S. (2020). Corporate governance in practice: the role of practitioners' understanding in implementing compliance programs. *Accounting, Auditing & Accountability Journal*, 33(4), 887-911. <https://doi.org/10.1108/AAAJ-08-2016-2685>
- Stöber, T., Kotzian, P., & Weißenberger, B. E. (2019). Design matters: on the impact of compliance program design on corporate ethics. *Business Research*, 12(2), 383-424. <https://doi.org/10.1007/s40685-018-0075-1>
- Treviño, L. K., & Brown, M. E. (2004). Managing to be ethical: Debunking five business ethics myths. *Academy of Management Executive*, 18(2), 69-81. <https://doi.org/10.5465/AME.2004.13837400>
- Voss, B., Carter, D. B., & Warren, R. (2022). A car wash: post-truth politics, Petrobras and ethics of the real. *Accounting, Auditing & Accountability Journal*. Ahead-of-print. <https://doi.org/10.1108/AAAJ-03-2020-4460>
- Weaver, G. R., & Treviño, L. K. (1999). Compliance and value oriented ethics programs: Influences on employees' attitudes and behavior. *Business Ethics Quarterly*, 9(2), 315-335. <https://doi.org/10.2307/3857477>
- Weaver, G. R., Treviño, L. K., & Cochran, P. L. (1999). Corporate ethics programs as control systems: Influences of executive commitment and environmental factors. *Academy of Management Journal*, 42(1), 41-57. <https://doi.org/10.5465/256873>
- Weber, J., & Wasieleski, D. M. (2013). Corporate ethics and compliance programs: A report, analysis and critique. *Journal of Business Ethics*, 112(4), 609-626. <https://doi.org/10.1007/s10551-012-1561-6>
- Whitehead, M., & Belghitar, Y. (2022). Responding to a corruption crisis through disclosure and remedial action: The case of Petrobras. *The British Accounting Review*, 54(5), 101119. <https://doi.org/10.1016/j.bar.2022.101119>

How to cite this paper

Horz, V., Frare, A. B., Cruz, A. P. C., & Barbosa, M. A. G. (2023). Compliance programs and ethics management in oil refineries: is there an effect on the compliance knowledge and intentions of employees?. *Revista de Contabilidade e Organizações*, 17:e200550. DOI: <http://dx.doi.org/10.11606/issn.1982-6486.rco.2023.200550>

APPENDIX A. Research instrument

Formal ethics management

1. The organization has whistleblower protection programs / regulations.
2. The organization has a code of ethics / standard of conduct.
3. The organization provides training on the subject of compliance / ethics.

Informal ethics management

4. Following laws or codes of ethics are a major consideration when making decisions.
5. People are guided by a sense of right and wrong.
6. Compliance with rules and procedures is taken seriously.
7. Decisions and actions are based on what's best for everyone.

Compliance knowledge

8. I know what laws and regulations are related to my role / task.
9. I better understand the laws and regulations that are related to my role / task.
10. I understand when relevant laws and regulations are enacted / amended.
11. I better understand what is enacted / amended in those laws and regulations related to my role / task.
12. I better understand how to perform compliance self-assessment on my work / role.
13. I better understand the limitations of the laws and regulations that are related with my role / task have.
14. I better understand compliance practice processes that are related to my role / task.

Compliance intention

15. I intend to comply with the laws and regulations that are related to my role / task.
16. I will continue to comply with the laws and regulations that are related to my role / task.
17. I will encourage people around me to comply with laws and regulations.
18. I fulfill my obligation to uphold the laws and regulations that are related to my role / task.
19. I try not to violate the laws and regulations that are related to my role / task.