

# Government corruption and Internet access diffusion: global evidence

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The relationship between Internet diffusion, voice and accountability, cultural dimension, corruption, and government effectiveness was investigated through a cross-country analysis of 117 countries from 2000 to 2014. Using Robust Path Analysis as a data analysis technique, it is concluded that, regardless of the effects of control variables, the diffusion of the Internet promotes lower levels of government corruption, occurring directly and indirectly through voice mediation and accountability, which, in turn, presents a strong direct relationship with government corruption. The focus on theoretical contribution reinforces the idea that the Internet is an important tool in the fight against corruption, as well as highlighting the role of cultural dimension, the relationship between voice and responsibility and government corruption, and, above all, incorporating government action into the theoretical model.

**Keywords:** government corruption; internet diffusion; voice and accountability; government effectiveness.

## Corrupção governamental e difusão do acesso à internet: evidências globais

Este artigo investiga as relações entre difusão da internet, voz e accountability, dimensão cultural, corrupção e eficácia governamental, por meio de análise entre países realizada com 117 nações no período de 2000 a 2014. Adotando a técnica de Análise Robusta de Caminho para a análise de dados, conclui-se que, independentemente dos efeitos das variáveis de controle, a difusão da internet promove menores níveis de corrupção governamental, uma relação que ocorre direta e indiretamente via mediação de voz e accountability, que, por sua vez, apresenta forte correlação com a corrupção governamental. A título de contribuição teórica, reforça-se a compreensão de que a internet constitui uma importante ferramenta de combate à corrupção, além de evidenciar o papel moderador da dimensão cultural na relação entre voz e accountability e corrupção governamental e, sobretudo, de incorporar a eficácia governamental ao modelo teórico.


**Palavras-chave:** corrupção governamental; difusão da internet; voz e accountability; eficácia governamental; dimensão cultural.

## Corrupción gubernamental y difusión del acceso a Internet: evidencias globales

Este artículo investiga las relaciones entre difusión de Internet, voz, rendición de cuentas, dimensión cultural, corrupción y efectividad gubernamental mediante el análisis de 117 países, de 2000 a 2014. Usando el Robust Path Analysis como técnica de análisis de datos, se concluye que, independientemente de los efectos de las variables de control, la difusión de Internet promueve niveles más bajos de corrupción gubernamental, relación que ocurren directa e indirectamente a través de la mediación vocal y la rendición de cuentas, lo que a su vez presenta una fuerte correlación con la corrupción gubernamental. Como aportación teórica, se refuerza la idea de que Internet es una herramienta importante en la lucha contra la corrupción, además de evidenciar el papel moderador de la dimensión cultural en la relación entre la voz, la rendición de cuentas y la corrupción gubernamental y, sobre todo, incorporar la eficacia gubernamental al modelo teórico.

**Palabras clave:** corrupción gubernamental; difusión de internet; voz y accountability; eficacia gubernamental; dimensión cultural.

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## 1. INTRODUCTION

Economic agents maximize utility by identifying investment options with the potential for higher economic returns. According to North (1990), however, the most lucrative alternatives in many countries are illegal activities such as bribery, kickbacks, and “favors” that distort the economy, leading to legal insecurity and minimizing trust in democratic institutions.

Government corruption represents the use of a position of power in government to obtain personal benefits, which violates the rules of the game (Jain, 2001). When this practice is widespread, in a context of high levels and permanent violation of norms, corruption becomes institutionalized and part of the social fabric (Garcia-Murillo, 2010).

The literature has shown the harmful effects of corruption on countries’ economic development, reducing market efficiency (corruption leads to increasing transactional costs, changes the standards and level of investments), as well as the quality, efficiency, and efficacy of public spending. This phenomenon hinders the creation and implementation of public policies and jeopardizes the functioning of rules to access a country’s resources and goods. Corruption, in this way, contributes to increasing poverty and social inequality (Jain, 2001; Kessing, Konrad, & Kotsogiannis, 2007; Mauro, 1995).

The literature has assumed that the development of countries requires, above all, good governance (Jain, 2001) and transparency, which is a crucial component in reducing government corruption and, consequently, strengthening the democratic process (Hill, 2003).

Thus, given the continuous development of Internet diffusion – as a relatively cheap communication vehicle, with high potential for penetration – the electronic government (e-government) has been adopted by many countries and used to access relevant information on the government’s action (Garcia-Murillo, 2010).

Internet diffusion allows citizens to access relevant information on government performance, sheds light on corruption cases, and makes it possible to denounce government officials’ abuse and corruption activities (anonymously and safely). The Internet, therefore, has played a crucial role in reducing corruption (Hill, 2003).

In this sense, academic studies have focused on understanding the relationship between Internet diffusion and corruption (Garcia-Murillo, 2010; Herrick, 2000; Kock & Gaskins, 2014; Lio, Liu, & Ou, 2011). Garcia-Murillo (2010), carried out a cross-country analysis of 170 countries and found that Internet diffusion has had a positive effect on reducing perceptions of corruption around the world. Lio et al. (2011), using a panel analysis with 70 countries from 1998 to 2005, noted that the spread of Internet access potentially contributes to reducing corruption.

The study by Kock and Gaskins (2014), worked with a sample of 24 Latin American countries and 23 sub-Saharan countries, from 2006 to 2010. The authors advanced on the comprehension of the relationship between internet diffusion and government corruption, observing the mediating role of voice and accountability. The study’s sampling and the period analyzed posed limitations to the findings since it did not broadly include the nations’ economic, social, and cultural heterogeneity.

This research advances based on the insights from work by Kock and Gaskins (2014). The main objective is to examine the relationships among Internet diffusion, voice and accountability, culture,

corruption, and government effectiveness, studying a more extensive and more diverse sample (117 countries), and expanding the period of analysis (2000 to 2014), encompassing the period of intensification of Internet use by the general population.

The research question guiding the study was:

- What are the relationships among Internet diffusion, voice and accountability, culture, corruption, and government effectiveness?

The research was framed based on specific goals designed to explore:

- Whether Internet diffusion plays a role as an exogenous construct of government corruption;
- The mediating role of voice and accountability regarding the relationship between Internet diffusion and government corruption;
- How does culture moderate the relationship between Internet diffusion and government corruption, and the relationship between voice and accountability and government corruption; and finally,
- The direct, indirect, and total effects of the constructs of the structural model on corruption.

When compared to the structural model by Kock and Gaskins (2014), this study advances by:

- Incorporating government effectiveness as an endogenous target variable. The theoretical model explains this variable based on government corruption; and
- Using a more robust and representative sample (15-year period and 117 countries from all continents).

The methodological contribution of this research lies in the empirical study about the nature of simultaneous relationships of dependence and independence between the analyzed constructs, in a period of intensification of Internet access, which represents a gap in the literature. In theoretical terms, the study a) reinforces the understanding that the Internet can be used as an essential tool to combat corruption; b) highlights the moderating role of culture in the relationship between voice and accountability and government corruption; and c) includes government effectiveness in the theoretical model. Finally, it is crucial to stress the relevance of the cultural and behavioral aspects – that surpass the traditional anti-corruption initiatives based necessarily on coercion – in establishing lasting anti-corruption strategies. Thus, this study aims to advance theoretical knowledge about the determinants of corruption.

## 2. LITERATURE REVIEW

### 2.1 Theories on corruption

According to Klitgaard (1988), corruption may be faced as a problem of asymmetric information and incentives, based on a principal-agent point of view. In this framework, the elected (principal)

official, given the practical inability to personally deliver most of the services the population demand, employs a wide range of civil servants (agents) who, on their behalf, offer public services to citizens/voters (principals).

This perspective presents a typical situation of informational asymmetry problems since agents have much more information about the execution of services when compared to the principal (voters). For Klitgaard (1988), corruption arises when agents use the position of intermediaries, exercising advantages derived from the power entrusted, acting in self-interest (Klitgaard, 1988).

Along these lines, Jain (2001) identifies three levels of government corruption:

- a) 'Grand corruption' is hard to identify and measure. It occurs at the highest levels of government, where officials seek to change policies or elements of the policy implementation in order to satisfy personal interests in detriment of the population's welfare;
- b) Bureaucratic corruption refers to acts practiced by appointed bureaucrats in their relations with their superior officials (such as requiring payments to perform tasks assigned by the political elite) or with the general public (such as accelerating or slowing down bureaucratic procedures, in exchange for payment); and
- c) Legislative corruption, which potentially occurs to the extent that legislators' voting behavior can be influenced either by lobbying or as a result of electoral ambitions.

Also, according to Jain (2001), there are three determinants for corruption to occur:

- a) Discretionary power;
- b) Value of economic rents; and
- c) Inefficient legal system.

Therefore, for corruption to occur, first, someone has to hold the discretionary power, which would include authority for drafting and implementing regulations. The second aspect is the gains associated with corruption practice, the benefits to be obtained with the discretionary power. Finally, the deterrents to corruption should offer a low probability of detection and sanction for the offense.

The three central determinants of corruption theorized by Jain (2001) can be included in the formula proposed by Klitgaard (1988):

- "Corruption = Monopoly + Discretion – Accountability"

Discretionary power is understood within the component 'discretion' (challenged by clarifying and making available the rules of the game, being transparent with citizens); the value of economic rents is related to the component 'monopoly' (which is reduced by fostering competition); finally, the deterrents to corruption may be understood within the component accountability (carried out through adequate performance measurement).

The traditional approach to fight corruption essentially involves increasing its costs (marginal analysis) “by strengthening laws, increasing the scrutiny capacity of institutions, reducing the discretion of public officials and increasing institutional transparency and accountability” (Zuniga, 2018).

For Zuniga (2018), this approach – which is advocated by both Klitgaard (1988) and Jain (2001) – shows elements of a finite anti-corruption strategy. The author theorizes corruption as an infinite game (with rules that constantly change according to the variations of the environment), where the purpose of players is to perpetuate the game indefinitely. Therefore, it is not possible to clearly identify winners or losers, and the players’ only option is to keep going or to give up when they run out of resources or lose the desire to continue playing.

In this way, corruption is continuously recreated by changing rules, extrapolating them, or taking on new forms/approaches as the world and the confrontation strategies evolve. An infinite player (corrupt) cannot be defeated because they are engaged in the endless endeavor of becoming better. Therefore, fighting this infinite game through finite anti-corruption strategies makes it unstable and causes frustration since new players will always emerge. The option for players is to keep playing the game until running out of resources or losing the will to continue (Zuniga, 2018).

Corrupt people do not necessarily aim to defeat competitors. Instead, they seek to perpetuate or reinforce a status quo to increase privileges or financial gains. Thus, anti-corruption strategies supported by coercive artifacts (the traditional approach of removing marginal benefits, for instance) tend to have temporary effects, and infinite approaches such as making value-based decisions are crucial in addressing this issue (Zuniga, 2018). Anti-corruption efforts must include fostering behavior (culture) change to establish and consolidate social accountability, perpetuating values opposed to what corruption represents (which is a medium and long term strategy).

The structural model proposed in this study maps the effects of Internet diffusion, the mediating role of voice and accountability, as well as the role of culture in government corruption. The model’s approach is aligned with the contributions by Zuniga (2018) and empirically investigates elements of the anti-corruption strategy adopting the ‘infinite game’ perspective. The study by Deming (2010), combines empirical observation, scientific literature review, concrete business experience, theoretical research, and comparative analysis of legal systems and jurisprudence. The author proposes a framework that integrates international best practices into anti-corruption policy. He argues that, given the perception of the internationalization of corruption practices, anti-corruption efforts have converged to develop an integrated criminal policy, which is based on three complementary elements:

- a) Hard and soft law;
- b) Public and private initiatives; and
- c) Preventive and punitive dimensions.

The hard law (traditional approach) has a binding nature. Criminalization is conceived through the imposition of mandatory boundaries (from the international community to states; and from

states to individuals). The soft law is more recent and adopts flexible and non-compulsory normative instruments, which allows the participation of all stakeholders in the transnational law-making process. The soft law is focused on convincing and on behavior/culture change, and its effectiveness is related to its persuasive and explanatory nature (Deming, 2010).

In addition to public measures against corruption, private sector self-regulation is growing, partly in response to the demands of international organizations (such as Global Compact, World Economic Forum, and G20), building a clear set of guidelines that converge in the idea that commercial corruption is no longer acceptable, and the task of addressing the problem is a shared responsibility between companies and governments. Finally, Deming (2010) highlights important efforts combining preventive and punitive measures. Punitive measures are resorts justified only if the preventive ones are already operative, especially, the ability to discourage other multinational corporations from committing crimes by defining both protected values and prohibited behaviors (cultural aspect).

Once again, the relevance of behavioral and cultural aspects to the effectiveness of anti-corruption strategies is demonstrated, which indicates the importance of civil society participation to inhibit corruption (promoting social accountability).

## 2.2 Brief review of the empirical literature

There is a keen interest in the literature to investigate how e-government influences corruption (Aladwani, 2016; Bertot, Jaeger, & Grimes, 2010; Elbahnasawy, 2014; S. Kim, H. J. Kim, & Lee, 2009). However, this literature review focuses on empirical studies investigating the specific relationship between Internet diffusion and corruption, as shown in Box 1.

### BOX 1 REVIEW OF THE EMPIRICAL LITERATURE ON INTERNET DIFFUSION AND CORRUPTION

Author	Objectives	Method	Main findings
Bailard (2009)	To explore the potential influence of cell phones on corruption in Africa.	The study used secondary data – including the Corruption Perception Index (CPI) issued by Transparency International – from 46 African countries, for the period between 1999 and 2006. The research adopted the multivariate technique of panel data with fixed effect.	The findings suggested a significant negative correlation between the degree of penetration of cell phones and the level of corruption perceived in the country. Also, the degree of cell phone coverage was significantly associated with the reduced perception of corruption at the individual level.

*Continue*



Author	Objectives	Method	Main findings
Garcia-Murillo (2010)	To measure the effect of Internet diffusion on government corruption, at the country level.	The study used secondary data from 170 countries, carrying out a transversal analysis. The author used the CPI of the Transparency International as a dependent variable, and multiple linear regression and partial least squares as the technique to analyze the data.	After the control of political and economic factors, the empirical findings suggested that Internet diffusion significantly contributed to reducing the perception of corruption all over the world. The authors suggested that governments should promote Internet diffusion as one of the many available tools to fight corruption.
Lio et al. (2011)	To estimate the effects of using the Internet to reduce corruption, based on a panel formed with 70 countries (studying the period from 1998 to 2005).	The authors used the following techniques to analyze data: Granger causality test, studying the relationship of causality between the use of Internet and corruption reduction; dynamic panel data models to estimate the effects of the use of Internet and corruption reduction (measured with the CPI).	After examining the direction of the causality (the study of endogeneity), the authors concluded that the effects of the Internet in reducing corruption are significant, but not substantial. In other words, the Internet has shown the capacity to reduce corruption, but its potential to do so is not yet totally explored.
Andersen, Bentzen, Dalgaard, and Selaya (2011)	To test the hypothesis that the Internet is a technology useful to control corruption.	The research used secondary data including CPI from Transparency International and carried out an analysis of countries adopting the technique of multivariate regression and two-stage least squares (2SLS).	The estimations suggested that the Internet has worked to reduce corruption in the USA and the rest of the world.
Goel, Nelson, and Naretta (2012)	To study the effect of Internet access on the perception of corruption incidence.	The research used the CPI from Transparency International as the dependent variable and the technique of multiple linear regression and partial least squares.	The results show that the number of searches (online) about corruption per capita was negatively correlated with the perception and the incidence of corruption.
Kock and Gaskins (2014)	To explore the relationship between Internet diffusion and the mediation of voice and accountability on government corruption, based on 24 countries in Latin America and 23 countries in Sub-Saharan Africa (in the period from 2006 to 2010).	The authors used secondary data (CPI and indicators produced by the World Bank), and the robust path analysis.	The results suggested that higher levels of Internet diffusion were associated with higher levels of voice and accountability. Also, the findings suggested the existence of mediation of voice and accountability in the relationship between Internet diffusion and government corruption.

*Continue*

Author	Objectives	Method	Main findings
Jha and Sarangi (2014)	To study the impact of multidirectional communication means on corruption, exploring the relationship between social media and corruption.	The sample was formed of 150 countries. The authors use the CPI of the Transparency International as a dependent variable, and multiple linear regression and partial least squares as the technique to analyze the data.	The results showed that Facebook penetration (a proxy for social media) had a negative impact on corruption; the effects of social media did not depend on freedom of the press (they had impact on corruption both in countries where there was free press and where there was not); and Internet diffusion negatively impacted corruption perception.

**Source:** Elaborated by the authors.

Box 1 shows that the literature has found empirical evidence of a negative relationship between Internet diffusion and government corruption, but the magnitude of this effect is still obscure. Lio et al. (2011), for example, conclude that, although significant, the effects of the Internet on reducing corruption are not very substantial, as some essential conditions must be pre-existing, such as a minimum level of democracy, a perception of crisis, a renewed ideology, and a political will. Kock and Gaskins (2014) argue that Internet diffusion does not have a direct effect on corruption, but an indirect effect, mediated by voice and accountability.

Also, Box 1 shows that, except Kock and Gaskins (2014), the studies have used multivariate multiple linear regression. These techniques, although allowing the identification of the proportion of variance of the dependent variable explained by the independent variables, restrict the understanding of the relationships among some explanatory variables when confronting a single dependent variable, in a single direction of causality (Nascimento & Macedo, 2016). Thus, it is difficult, for example, to map the indirect and total effects of independent variables and to identify mediating relationships.

Even when using the two-stage least squares (2SLS) technique (Andersen et al., 2011), there are potentially inconsistent estimators in the cases when an independent variable is correlated with the equation error term - “simultaneous equation bias” (Gujarati & Porter, 2011). This study, by using the multivariate robust path analysis technique, mitigates the problem arising from the need to capture multiples of dependency and independence, as well as the identification of the total effects (direct and indirect) that the exogenous exert on endogenous constructs, in addition to enabling the modeling of mediation relationships of specific constructs (such as voice and accountability in the relationship between internet diffusion and government corruption).

Finally, Box 1 exposes the recurrent strategy of using the Corruption Perceptions Index (CPI) (which is formulated and released annually by Transparency International), as a proxy for the level of corruption of nations. As reported below, this study also adopts this variable to examine government corruption.

The section below presents the development of the research hypotheses.



## 2.3 Hypotheses

When one party involved in a business transaction offers another party outstanding privileges, it is possible to say that there is corruption. When considering that governments have a range of activities that are directly controlled by individuals, it is possible to observe that these entities are the primary sources of corruption (Lio et al., 2011).

The media has played an important role in fighting corruption, initially from the traditional communication means (television and newspapers). According to Collier (2002, p. 15), “media is not only the primary purveyor of information to the public but also is the public monitor (watchdog) who reports public activities and initiates discourses on the topics most important to society.”

However, traditional communication means a) do not have the sufficient depth when covering corruption cases; b) have a relatively short service life; c) are primarily motivated by “newsworthiness” (Garcia-Murillo, 2010); and d) are linked to interests of powerful socioeconomic groups, as highlighted in studies such as Chomsky (1998), and Herman and Chomsky (2003). These links may lead to discretionary and sometimes ambiguous behavior when fighting corruption (Gore, 2008; Palast, 2004; Souza, 2015).

This scenario has been overshadowed by the advancement of the Internet, which is less susceptible to the problems of traditional media and is easy and cheap to access (Garcia-Murillo, 2010). Thus, it is possible to say that the popularization of the Internet and social media negatively affects government corruption, as they: a) provide the public with an anonymous channel of reporting abuse and corrupt activities; b) report and keep files of corruption cases; c) provide accurate information on government programs, standards, and services, potentially reducing the discretionary power of bureaucrats (Herrick, 2000).

If in traditional media, the corrupt officials count on the population’s lack of collective memory (Garcia-Murillo, 2010), which is not likely to happen with the Internet, it is possible to assume that the online world negatively influences government corruption. Consequently, the discretionary power of authorities to elaborate and manage regulations and potential benefits associated with such a power is reduced (Jain, 2001).

Based on this perspective and considering that corruption thrives in a highly secretive environment, Garcia-Murillo (2010) understands that Internet access has a direct and positive effect on reducing the perception of corruption worldwide. The Internet has an impact that is more relevant than the economic dimensions, proving to be important in any country, as it provides citizens with relevant information on government actions. Therefore, the first research hypothesis is:

**H<sub>1</sub>:** Internet diffusion has a negative and direct effect on government corruption.

The literature on corruption has indicated that an effective accountability system includes the obligation for civil servants to make public information, facts, and data about public activities available to citizens (Schedler, 1999). There is also evidence that Internet diffusion is positively related to the effectiveness of processes of collecting information, political participation, and support for democratic principles (Cuillier & Piotrowski, 2009; Katz, Rice, & Aspden, 2001; Pierce & Lovrich, 2003). It is fair to theorize, therefore, that the highest (and best) level of government disclosure is the one that fosters people’s participation through successfully accessing the information.

This theoretical relationship expected in the association among the Internet diffusion and voice and accountability is based on the gratification theory. The theory suggests that the ability to seek and collect information gives people a sense of control and promotes interest and effectiveness in the search for new information (Cuillier & Piotrowski, 2009). When offering users an effective channel through which to pursue specific information anytime and anywhere actively (thereby meeting personal needs for information control), Internet diffusion potentially contributes to increasing political knowledge, greater political participation, and political effectiveness (Kenski & Stroud, 2006; Pierce & Lovrich, 2003). The increasing access to the Internet has allowed the population to demand accountability from public officials. This phenomenon is corroborated by Jakopin and Klein (2011), in a study that showed empirical evidence that Internet diffusion is a predictor of voice and accountability.

In this line, the second research hypothesis is:

**H<sub>2</sub>:** Internet diffusion has a positive and direct effect on voice and accountability.

Online access has promoted knowledge and political participation. Citizens are more aware and active in choosing the government and demand for transparency and accountability, which are key measures to reduce corruption (Hill, 2003). Public engagement in choosing the government, in a context of freedom of expression, association, and freedom of the press, creates a conducive environment to fight government corruption.

Moreover, greater accountability leads voters to reward or punish politicians by extending or ending their mandates. This dynamic tends to promote that politicians seek long-term rewards (re-election) rather than short-term benefits obtained through corruption practices (Crisp, Potter, Olivella, & Mishler, 2011).

Along these lines, Sung (2012) and Kock and Gaskins (2014) found a negative association between voice and accountability and government corruption.

Therefore, the third research hypothesis is:

**H<sub>3</sub>:** Voice and accountability have a direct and adverse effect on government corruption.

The literature shows that Internet-based communication technology usually exerts common effects through secondary variables (Kock & Deluca, 2007), demonstrating the existence of a causal association between Internet diffusion and voice and accountability (Jakopin & Klein, 2011), the latter playing a critical role in reducing government corruption (Rothstein, 2011).

Some countries with non-democratic tendencies may limit the free movement of online information by blocking access to websites (especially websites of the international press) and other services such as search engines and social media. This is the case of China, for example, that has a history of blocking US search engines Google, Yahoo!, and Windows Live Search. The degree to which citizens participate in the choice of government, the existence of freedom of expression, association, and freedom of the press (observed in this study by the aspects' voice' and 'accountability') are elements that may have a significant relationship with the Internet diffusion and the perception of corruption.

Thus, Internet diffusion may influence government corruption, especially indirectly, by allowing citizens to actively participate in the governance of the country (Kock & Gaskins, 2014).

Thus, the fourth hypothesis is:

**H<sub>4</sub>:** Voice and accountability have a mediating effect on the relationship between internet diffusion and government corruption.

The expectation is an intensification of the relationship between internet diffusion and government corruption, observed by high levels of voice and accountability.

Corruption negatively affects the economic development of nations by increasing transaction costs. Corrupt practices reduce: a) business incentives, changing the standards and level of investments (affecting foreign investment); b) the quality and efficiency of public spending; and c) the successful implementation of public policies and rules of access to resources and goods within a country (Kessing et al., 2007; Jain, 2001; Mauro, 1995). The scenario of reducing corruption may lead to an increase in the quality of public policies and services (government effectiveness) and trusting the government's commitment to such policies.

From this perspective, the fifth research hypothesis is:

**H<sub>5</sub>:** Government corruption has a direct and adverse effect on government effectiveness.

According to Hodgson and Jiang (2007), in addition to the deleterious impacts on economic growth and development, and the negative impact on the initiatives aimed at overcoming social issues, corruption entails important social costs, such as reducing morale and citizen confidence, making the fight against corruption even more difficult.

A context of tolerance to corruption in society may result from a culture where the lack of resources limits preferences. In this regard, tolerance to corruption may be faced as a survival strategy (Filgueiras, 2009) and, therefore, it is related to culture.

From this perspective, culture plays a fundamental role in the modeling of government corruption. Based on this conclusion, Kock and Gaskins (2014) tested the cultural dimension at level 1, "power distance," based on the framework outlined by Hofstede (2001), as a moderating variable of the relations between internet diffusion and voice and accountability, as well as between voice and accountability and government corruption (which is a significant relationship).

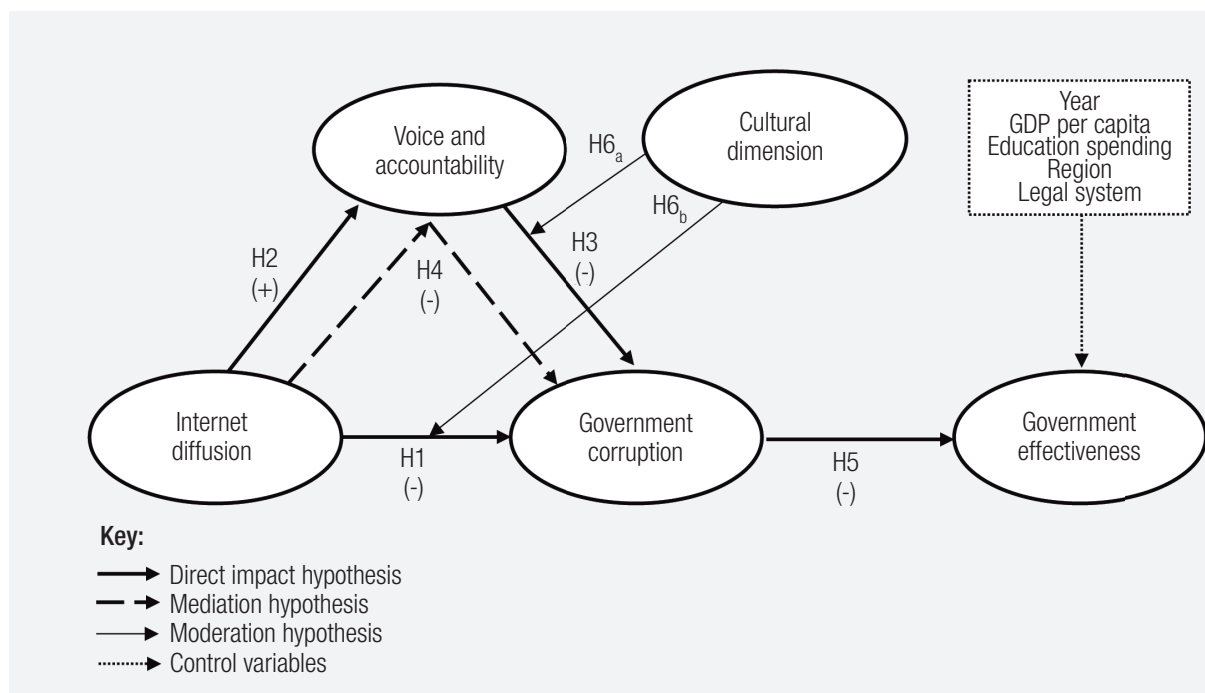
Considering that this study expands the scope of the research by Kock and Gaskins (2014), the study tested whether the cultural dimension has moderating effects on the relations between Internet diffusion and voice and accountability, as well as between voice and accountability and government corruption.

Given the above, the following research hypotheses are formulated:

- **H<sub>6a</sub>:** The higher the cultural dimension, the greater the impact of Internet diffusion on government corruption.
- **H<sub>6b</sub>:** The higher the cultural dimension, the greater the impact of voice and accountability on government corruption.

Figure 1 illustrates the proposed structural model with the respective research hypotheses and the expected types of relationships.

**FIGURE 1** STRUCTURAL MODEL AND FORMULATED HYPOTHESES



**Source:** Elaborated by the authors.

When compared with the structural model proposed by Kock and Gaskins (2014), the model presented in this study is more advanced because it incorporates government effectiveness as a final endogenous variable, explained by government corruption.

The proposed structural model has continuous arrows representing direct impact relationships, and negative symbols (-) indicate that negative and direct relationships are expected in the relationships between Internet diffusion and government corruption ( $H_1$ ), “voice and accountability” and corruption ( $H_3$ ), and “government corruption” and “government effectiveness” ( $H_5$ ). The positive symbol (+) indicates the expected behavior of a positive and direct relationship between “internet diffusion” and “voice and accountability” ( $H_2$ ). The negative symbol (-) for the mediating role of “voice and accountability” in the relationship between Internet diffusion and government corruption ( $H_4$ ) shows the expectation of intensification of the relationship between Internet diffusion and government corruption in the scenario of high levels of “voice and accountability.” Finally, two possible moderating relationships (with thinner continuous arrows) of “culture” in the relations between internet diffusion and government corruption ( $H6a$ ) and “voice and accountability” and “government corruption” ( $H6b$ ).

Given the interest observed in the literature in mapping relationships free of the systematic effect of other variables (Hair, Black, Babin, Anderson, & Tatham, 2009), five control variables (listed within the rectangle) were inserted into the structural model: a) year; b) gross domestic product (GDP) per capita; c) education spending; d) region; and e) legal system.

### 3. METHODOLOGY

This is a quantitative study analyzing secondary data. Internet diffusion was identified by the number of Internet users per 100 inhabitants of each country, collected from the World Bank's World Development Indicators (WDI) database. Internet users were considered as individuals who accessed the web through various means (via computers, cell phones, game machines, digital TV, among others) in the last 12 months.

Voice and accountability were measured using the index developed by Kaufmann, Kraay, and Mastruzzi (2011), also available from the World Bank's database. The index captures the perception of: a) freedom of expression; b) freedom of association; c) freedom of the press; and d) the extent to which citizens are able to participate in the choice of their government. The estimated score approximates the normal distribution, ranging from -2.5 to 2.5, and the closer to 2.5, the more intense the voice and accountability.

Because government corruption can occur in different forms, and normally in secrecy, there is an inherent difficulty regarding measurement. The literature usually adopts the individuals' perception of corruption as an indirect metric (Jain, 2001). This study, therefore, adopts the example of the empirical literature (Andersen et al., 2011; Bailard, 2009; Garcia-Murillo, 2010; Goel et al., 2012; Kock & Gaskins, 2014; Jha & Sarangi, 2014; Lio et al., 2011) and uses as an operational measure of government corruption the Corruption Perception Index (CPI), issued by Transparency International. This index aggregates data from different sources demonstrates the perceptions of business people and experts about the level of corruption in the public sector. The CPI presents values from 0 to 10 (where 0 means the highest corruption level perceived). As in Kock and Gaskins (2014), the index was multiplied by - 1, to avoid misinterpretation of the relationships between variables.

Government effectiveness was measured using the index proposed by Kaufmann et al. (2011), which captures: a) the perception of the quality of public services and the degree of its independence from political pressures; b) the quality of public policy formulation and implementation; and c) the credibility of the government's commitment to such policies. The estimated score in the aggregate indicator also approximates the normal distribution (ranging from -2.5 to 2.5), and the peak of government effectiveness is represented by the score 2.5.

Finally, the cultural dimension was observed by using the Power Distance Index (PDI), developed by Hofstede (2001). The indicator expresses the degree to which less powerful members of a society accept and expect power to be distributed less unevenly. According to the author, citizens of societies with a high degree of power distance (values closer to 100) accept a static hierarchical order in which every citizen has a definite place with little or no questioning. However, in societies with low power distances (values closer to 0), citizens strive to distribute power evenly.

To consolidate the understanding of the variables worked in this study, the constitutive and operational definitions of each variable included in the proposed structural model are reported in Box 2.

**BOX 2 OPERATIONAL AND CONSTITUTIVE DEFINITIONS OF THE VARIABLES**

Construct	Constitutive definition	Operational definition
Government corruption	The degree in which the authority of a public position is used for personal gains, violating the rules of the game (Jain, 2001).	Corruption Perceptions Index (CPI) issued by Transparency International
Voice and accountability	The degree in which citizens are trustworthy to participate in the country's governance.	Voice and Accountability index, issued by the World Bank
Internet diffusion	The degree of the population's access to the Internet in each country.	World Development Index (WDI), World Bank
Government effectiveness	The quality of public policies and services, and the credibility of the government's commitment to such policies.	Government Effectiveness Index (GEI), issued by the World Bank
Power Distance Index – PDI	The degree in which the less powerful members of a society accept and expect power to be distributed more equally.	PDI, developed by Hofstede (2001)

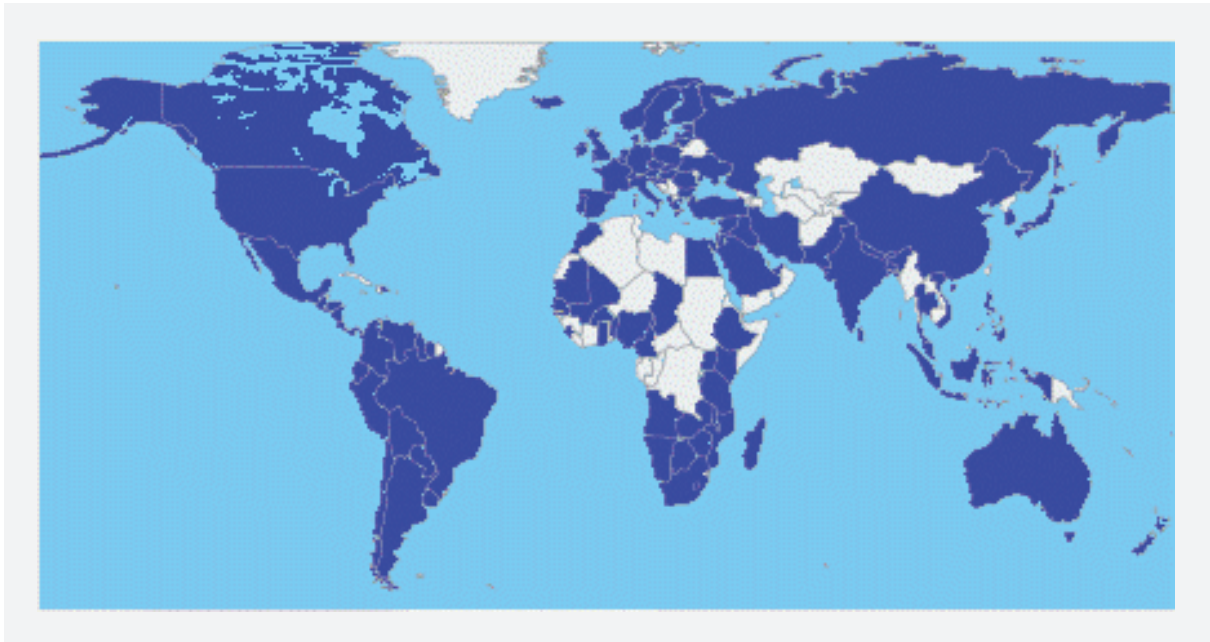
**Source:** Elaborated by the authors.

In addition to the variables of interest, five control variables were included: a) year; b) GDP per capita; c) education spending; d) region (1. Africa/Middle East; 2. Latin America/Caribbean; 3. Asia/Middle East/Oceania; 4. North America; and 5. Europe), and e) legal system (1. Code Law; and 2. Common-Law). GDP per capita presented in current US dollars was retrieved from the World Bank's WDI database. Education spending was calculated as the share (%) of education spending against the total government spending. This data was also collected from the World Bank's WDI database.

Data include 118 countries (33 from Africa; 23 from Latin America and Caribbean; 24 from Asia, Middle East, and Oceania; 3 from North America; and 35 from Europe) over the 15-year period (2000-2014), totaling 1,755 observations. The period analyzed was chosen because it includes greater intensification of internet use (in the year 2000, only 8.5% of the world population used the internet, reaching more than 45% in the year 2014), an increase that was also observed in remote areas of underdeveloped countries.

Figure 2 illustrates the countries covered in this survey (highlighted in black).



**FIGURE 2** COUNTRIES INCLUDED IN THE SAMPLE

**Source:** Elaborated by the authors.

According to the World Bank, the total population in the 117 countries researched was 6,697,927,232 inhabitants in 2016, i.e., 91.17% of the world's population. Therefore, it is possible to say that this is a global study.

The technique for data analysis followed the study by Kock and Gaskins (2014), adopting the robust path analysis. The technique allows observing multiple relationships of dependence and independence, the mediation effect, and the estimation of p-values via non-parametric procedures – which is an important aspect since some variables of the model are not normally distributed.

The missing values were treated by imputing the mean of each variable. Although this procedure reduces the variability of the data and, consequentially, the possibility of obtaining significant relationships (Hair et al., 2009), the structural model was re-estimated after the elimination of the missing values (the procedure is reported later in the article). It is understood, therefore, that the approach adopted does not constitute a limitation of the study.

## 4. ANALYSIS AND DISCUSSION

### 4.1 Descriptive statistics and validation of the model

The descriptive statistics of each variable for the total period of analysis are reported below (Table 1).

**TABLE 1** DESCRIPTIVE STATISTICS FOR THE PERIOD FROM 2000 AND 2014

Constructs	Mean	Median	Mode	Standard deviation	Kurtosis	Skewness	Range
Internet diffusion	30.63	21.42	70.00	28.40	-0.89	0.66	98.15
Voice and <i>accountability</i>	0.19	0.14	0.03	0.90	-0.90	-0.16	3.87
Government accountability	-4.61	-3.80	-2.50	2.25	-0.66	-0.76	9.60
Government efficiency	0.24	0.02	-	0.97	-0.90	0.39	4.31
Cultural dimension - power distance	64.19	68.00	70.00	20.86	-0.43	-0.48	89.00

**Source:** Elaborated by the authors.

The Internet diffusion series presented a relatively low mean when considering the entire period of the analysis (30.64 internet users per 100 inhabitants), with significant data range. Analyzing the series year by year, there was an essential evolution of internet diffusion in the countries of the sample (from 10.71 in 2000 to 50.06 internet users per 100 inhabitants in 2014).

The mean for voice and accountability (0.19 on a scale from -2.5 to 2.5) indicated an intermediate level of perception of freedom of expression, association, and freedom of the press. Regarding government corruption, the mean -4.61 (where -10 is the perception of no corruption) showed a significant level of perception of corruption in the countries studied.

Government effectiveness obtained a mean of 0.24 in a range from -2.5 to 2.5 showing an intermediate level of perception regarding a) quality of public services and government independence from political pressure; b) success of the countries in formulating and implementing public policies; and c) credibility in the government's commitment to public policies and services. As for data dispersion, voice and accountability and government effectiveness presented higher coefficients of variation (4.88 and 3.98, respectively).

A power distance of 64.19 indicates that the sample had a high power distance in most observations. Finally, except for government effectiveness, all other series had platykurtic distributions (relatively scattered observations around the mean), with a concentration of observations below the mean (positive skewness).

Regarding the analysis of the correlations between the constructs, four of them were moderately correlated in the structural model (mean 0.53, significant at 0.001). Vertical and horizontal collinearity analysis was performed to evaluate excessive collinearity between the constructs, resulting in no collinearity problems.

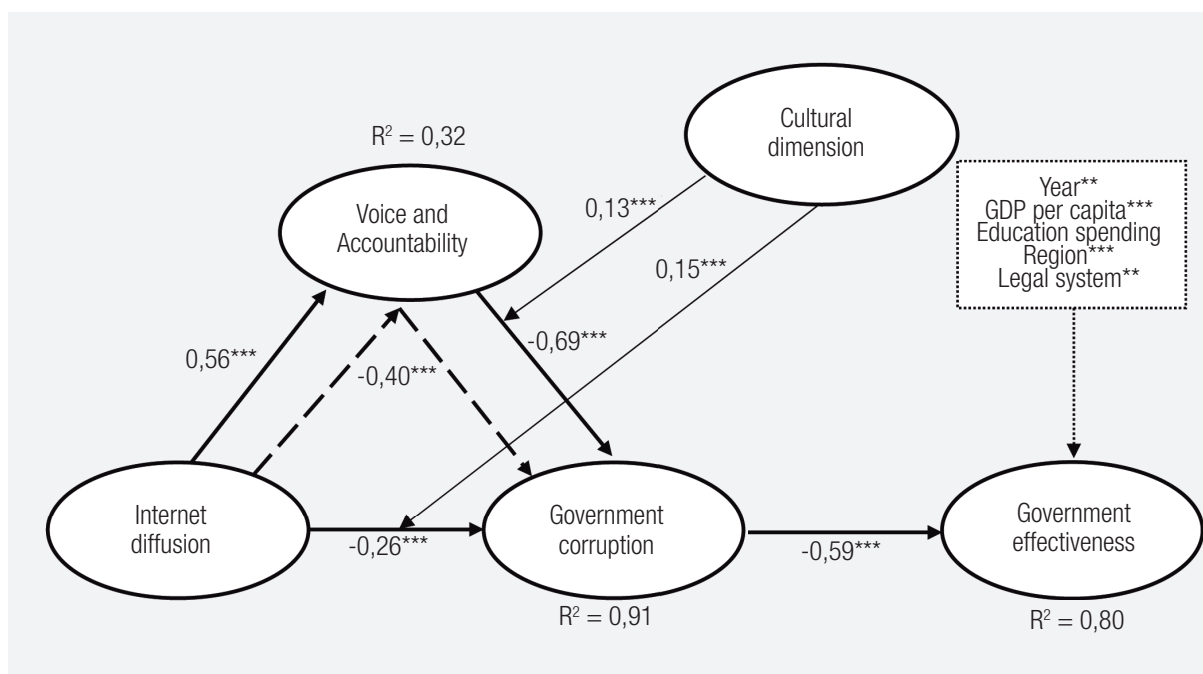
The predictive importance associated with each endogenous variable of the path model was assessed using Stone-Geisser  $Q^2$  coefficients. According to Chin (1998), the model has predictive relevance when values for  $Q^2$  are higher than 0. Thus, the  $Q^2$  values 0.319, 0.742, and 0.793 for voice and accountability, government corruption, and government effectiveness, respectively, showed that the theoretical model proposed had an acceptable level of predictive validity.

At this stage of the research, it is possible to conclude that the measures used, presented no collinearity problems, and had an acceptable level of predictive validity, thus confirming the assumptions of the robust path analysis technique.

### 4.2 Analysis of the hypotheses

After evaluating the assumptions of the robust path analysis technique, Figure 3 demonstrates the results obtained for the structural model proposed.

**FIGURE 3 RESULTS OF THE STRUCTURAL MODEL PROPOSED**



**Source:** Elaborated by the authors.

**Notes:** \*\*\* statistically significant at 0.001; Average path coefficient - APC = 0.259 ( $p < 0.001$ ); Average R-squared - ARS = 0.674 ( $p < 0.001$ ); Average adjusted R-squared - AARS = 0.674 ( $p < 0.001$ ); Average block VIF - AVIF = 2.291, acceptable if  $\leq 5$ , ideally  $\leq 3.3$ ; Average full collinearity VIF - AFVIF = 3.089, acceptable if  $\leq 5$ , ideally  $\leq 3.3$ ; Tenenhaus GoF - GoF = 0.798, small  $\geq 0.1$ , medium  $\geq 0.25$  and large  $\geq 0.36$ ; Simpson's paradox ratio - SPR = 0.909, acceptable if  $\geq 0.7$ , ideally = 1; R-squared contribution ratio - RSCR = 0.999, acceptable if  $\geq 0.9$ , ideally = 1; Statistical suppression ratio - SSR = 0.909, acceptable if  $\geq 0.7$ ; Nonlinear bivariate causality direction ratio - NLBCDR = 0.864, acceptable if  $\geq 0.7$ . Estimation: algorithm of external model analysis: robust path analysis; Standard algorithm of internal model analysis: Warp3; Resampling methods used in the analysis: bootstrapping.

Based on the measures of the model's goodness of fit it is possible to observe its good global predictive and explanatory capacity (APC, ARS, AARS and GoF), the absence of multicollinearity problems – either within the latent variable blocks or in the model as a whole (AVIF and AFVIF), which reinforces the idea that there were no collinearity problems in the model – the absence of Simpson's paradox ( $SPR \geq 0,9$  and  $RSCR \geq 0,9$ ) and cases of statistical suppression ( $SSR \geq 0,7$ ), and the adequacy of directions predicted for the causal relationships of the model arising from the

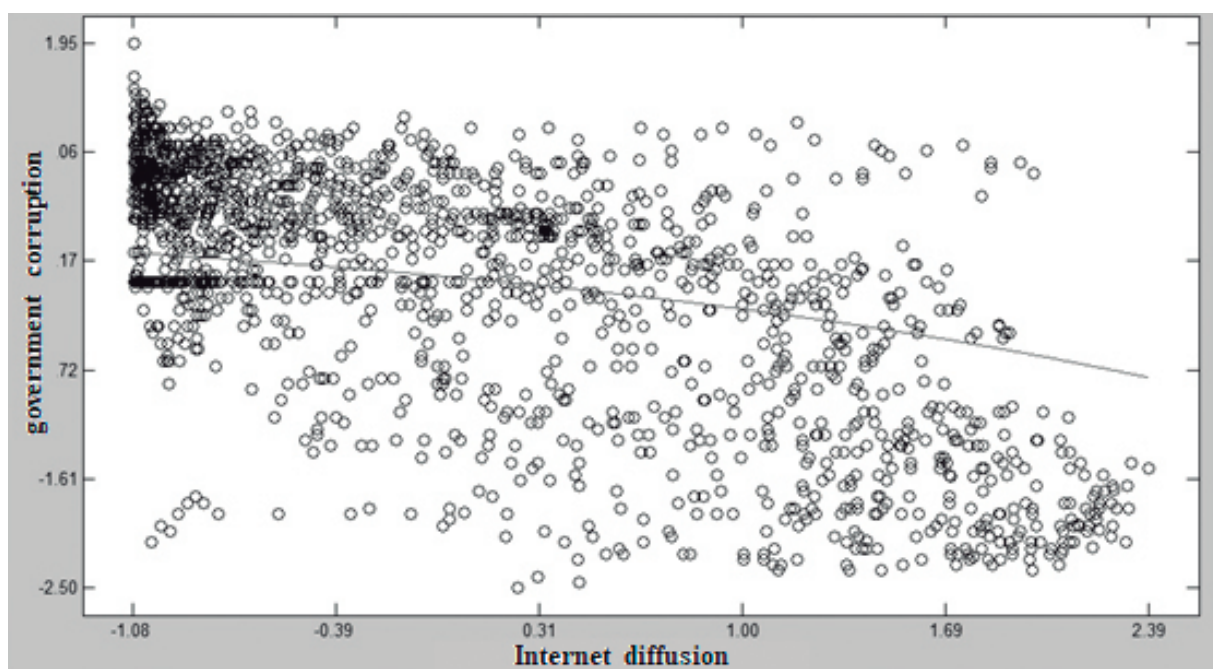
estimation of nonlinear coefficients ( $NLBCDR \geq 0,7$ ). Therefore, the structural model proposed had an excellent level of fit.

Regardless of the effect of the control variables in this study, the structural model showed excellent performance for the endogenous constructs, explaining over 91% of the variance of government corruption and approximately 80% of the construct 'government effectiveness.' The analysis of the sizes and significance of the external model path coefficients found that voice and accountability had a stronger effect on government corruption ( $\beta = -0.69, p < 0.001$ ) when compared to the Internet diffusion ( $\beta = -0.26; p < 0.001$ ).

After controlling for the effects of the variables "year," "GDP per capita," "education spending," "region," and "legal system," it was observed that greater Internet diffusion leads to lower levels of government corruption ( $\beta = -0.26; p < 0.001; f^2 = 0.04$ ), showing an effect of medium size ( $0.04 \geq 0.02 \leq 0.15$ ) (Hair et al., 2009), therefore, corroborating  $H_1$ .

Figure 4 presents the relationship between Internet diffusion and government corruption.

**FIGURE 4** RELATIONSHIP BETWEEN INTERNET DIFFUSION AND GOVERNMENT CORRUPTION



**Source:** Elaborated by the authors.

**Notes:** Vertical axis (y) = *government corruption*; Horizontal axis (x) = *Internet diffusion*. The values along the axis are standardized.

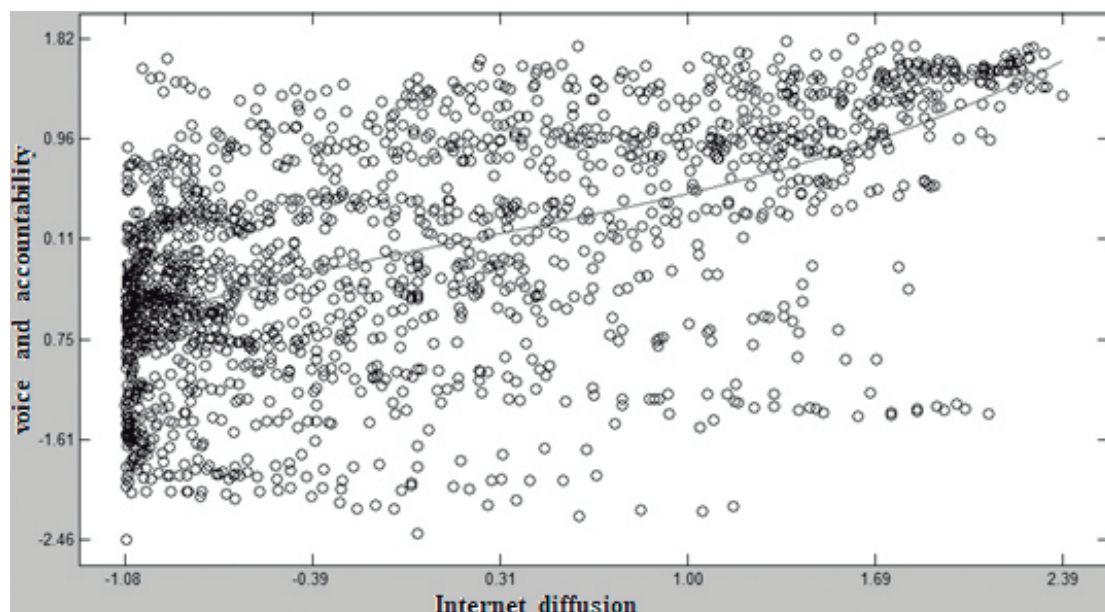
Figure 4 shows that, as Internet diffusion increased, government corruption reduced, in a behavior that was almost uniform across the various levels of Internet diffusion. As Internet diffusion presented a standard deviation of 28.40 users per group of 100 inhabitants, it is expected that, for each increase of 28.40 Internet users per group of 100 inhabitants, there is a reduction of 26% in the

level of corruption (standardized  $\beta$  coefficient of the path between Internet diffusion and government corruption) in a given country. This direct negative relationship between Internet diffusion and government corruption corroborated the findings of previous empirical literature (Andersen et al., 2011; Bailard, 2009; Garcia-Murillo, 2010; Goel et al., 2012; Kock & Gaskins, 2014; Jha & Sarangi, 2014; Lio et al., 2011), reinforcing the importance of governments promoting Internet diffusion as one of the effective anti-corruption strategies.

Lourenço, Nascimento, Sauerbronn, and Macedo (2017, p. 30, our translation), analyzed social, economic, and financial, social accountability, pedagogical and structural determinants of the Brazilian Basic Education Development Index (IDEB). The authors found that “Brazil does not have a society engaged in social accountability, as observed in other countries.” In this regard, the relevance of citizens’ participation in monitoring public performance is in line with insights from the gratification theory. The theory says that success in the process of information gathering offers citizens a sense of control, promoting presence and effectiveness in their activity of searching new information (Cuillier & Piotrowski, 2009). Thus, promoting Internet diffusion (observing that the Internet is an effective channel for active information search, anytime and anywhere) contributes significantly to achieve greater political participation and efficiency, efficacy, economy, and effectiveness of public spending (Kenski & Stroud, 2006), which leads to more social accountability.

Back to the analysis of the structural model (Figure 3), Internet diffusion had a direct and positive effect on voice and accountability ( $\beta = 0.56$ ;  $p < 0.001$ ), confirming  $H_2$ . Figure 5 helps to understand this nonlinear relationship.

**FIGURE 5** RELATIONSHIP BETWEEN INTERNET DIFFUSION AND VOICE AND ACCOUNTABILITY



**Source:** Elaborated by the authors.

**Notes:** Vertical axis (y) = voice and accountability; Horizontal axis (x) = Internet diffusion. The values along the axis are standardized.



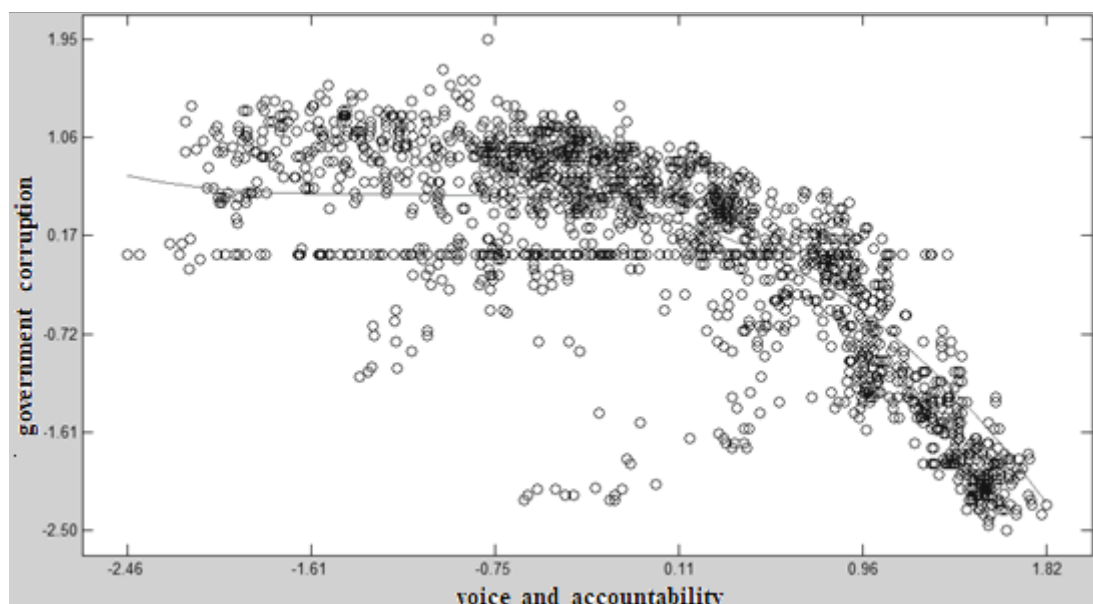
Figure 5, demonstrates that the increase in Internet diffusion variation occurred in approximately 3.49 standard deviations, ranging from -1.08 to 2.39. As the standard deviation of Internet diffusion was 28.40 users per group of 100 inhabitants, the conclusion is that for each increase of 28.40 Internet users per group of 100 inhabitants, there is an average increase of approximately, 56% (standardized  $\beta$  coefficient of the relationship) on voice and accountability. For example, Iceland, which in 2014 had the highest Internet diffusion level of the series (98.16 Internet users per group of 100 inhabitants) is likely to have a voice and accountability level about 191% higher than Burundi, which presented for the same year of 2014, a rate of 1.38 Internet users per group of 100 inhabitants.

This direct and positive relationship between Internet diffusion and voice and accountability suggests that increased Internet access leads to higher levels of political engagement and democratic participation (Kenski & Stroud, 2006; Pierce & Lovrich, 2003), enabling more people to demand for higher and better accountability from public agents, who respond by improving their deliveries as citizens actively participate in the country's governance.

Figure 5 showed that higher levels of voice and accountability were associated with lower levels of government corruption ( $\beta = -0.69$ ;  $p < 0.001$ ,  $f^2 = 0.96$ ). As for size, this was a significant effect ( $f^2 = 0.35$ ) (Hair et al., 2009), corroborating  $H_3$ .

This relationship between voice and accountability and government corruption is reported in Figure 6.

**FIGURE 6** RELATIONSHIP BETWEEN VOICE AND ACCOUNTABILITY AND GOVERNMENT CORRUPTION



**Source:** Elaborated by the authors.

**Notes:** Vertical axis (y) = government corruption; Horizontal axis (x) = voice and accountability. The values along the axis are standardized.



As in the study by Kock and Gaskins (2014), the negative relationship between voice and accountability and government corruption was especially intensified after 0.11 standard deviations of voice and accountability (in the range from -2.46 to 0.11 standard deviations of voice and accountability, the negative variation of government corruption was relatively small). From this point, the relationship increased, showing a behavior close to linear and indicating that in countries with high levels of voice and accountability, a substantial reduction in the level of government corruption is expected.

The results indicate that in countries with high levels of voice and accountability, citizens are more empowered to react to poor public management practices, including government corruption. The greater scrutiny power over public accounts because of the widespread access to the Internet allows increasing the pressure for government accountability, which, according to Hill (2003), has a crucial role in reducing corruption.

Higher citizen engagement and the potential of reaction lead public officials to fear punishment for their performance. Therefore, they tend to avoid corruption, thinking of maximizing utility (reelection). In this regard, given the monitoring and disciplinary role of people's participation, the willingness of the population to effectively engage in the country's governance is a relevant element in the anti-corruption strategy.

Figure 5, also showed that the mediating effect of voice and accountability on the relationship between Internet diffusion and government corruption was positive and statistically significant ( $\beta = -0.40$ ;  $p < 0.001$ ,  $f^2 = 0.612$ ), showing a partial mediation (the variance accounted for - VAF 0.63  $\leq$  0.80), and a significant size effect ( $0.612 \geq 0.350$ ).  $H_4$ , therefore, was confirmed. So, in addition to the direct relationship between Internet diffusion and government corruption, there was a relationship partially mediated by voice and accountability.

The findings support the statement that a nation with an intermediate level of corruption is expected to reduce the level of government corruption in 40% mediated by an increase in voice and accountability, for each increase of 15 Internet users per group of 100 inhabitants (Kock & Gaskins, 2014).

Kock and Gaskins (2014), working with South American and African countries, found that there was a relationship between total voice and accountability mediation in the relationship between Internet diffusion and government corruption. The authors worked with a relatively homogeneous sample, formed mainly of developing countries. This study here, however, observed a partial mediation, which captured the mediating role of voice and accountability when examining a sample of countries from all over the globe (more heterogeneous sample).

As for the cultural dimension of the structural model (Figure 3), it played a moderating role in the relationship between Internet diffusion and government corruption ( $\beta = 0.15$ ;  $p < 0.001$ ) and between voice and accountability and government corruption ( $\beta = 0.13$ ;  $p < 0.001$ ), thus corroborating H6a and H6b. Figures 7 and 8 help to understand how the cultural dimension moderated the relationship between Internet diffusion and government corruption and between voice and accountability and government corruption.

Figure 7 demonstrates that high levels of voice and accountability (in the range from 1.82 to 0.96 standard deviations) and low power distance (from -2.76 to -1.84 standard deviations) were associated with low levels of government corruption (range from -1.91 to -1.30 standard deviations). This finding indicated that scenarios where citizens can effectively participate by choosing their government – with higher levels of freedom of expression, association, and press, as well as higher engagement in power distribution – there is a tendency for public authorities to avoid using the power of public office for

personal gain in a way that violates the rules of the game, i.e., the conditions are not favorable for government corruption.

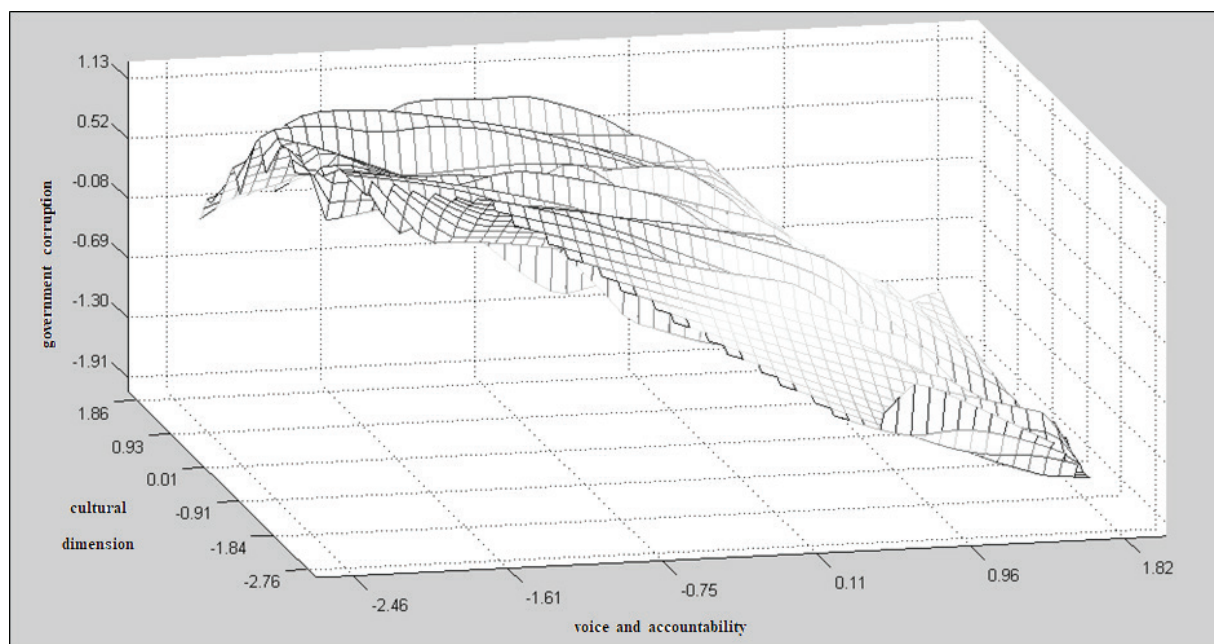
Regarding the moderation of the cultural dimension regarding the relationship between Internet diffusion and government corruption (Figure 8), high levels of Internet diffusion (range from 2.39 to 1.69 standard deviations) and low power distance (range from -2.76 to -1.84 standard deviations) were associated with low levels of government corruption (range from -1.74 to -1.19 standard deviations). In a scenario of greater diffusion and greater engagement of people in the distribution of power, consequently, the expectation is to observe lower levels of government corruption.

The findings provide empirical evidence that anti-corruption mechanisms that transcend the traditional coercive aspect (such as the removal of marginal “benefits” of corruption) have essential effects on mitigating government corruption.

In other words, evidence shows the importance of promoting a change in behavior (culture) in order to establish or consolidate permanent practices of social accountability, perpetuating values opposed to what corruption represents – a medium and long term strategy (Zuniga, 2018).

Thus, the “culture of corruption” persists in some countries where individuals have not internalized anti-corruption efforts, i.e., the impact of these efforts on their decision to engage in or refrain from corruption is weak (Barr & Serra, 2010). In Brasil, the discourse of “apology” to corruption has an essential historical background (Lima & Santos, 2018), the permanent reduction in government corruption largely depend on the gradual change in behavior (culture) of the population (perpetuation of values opposite to what corruption represents).

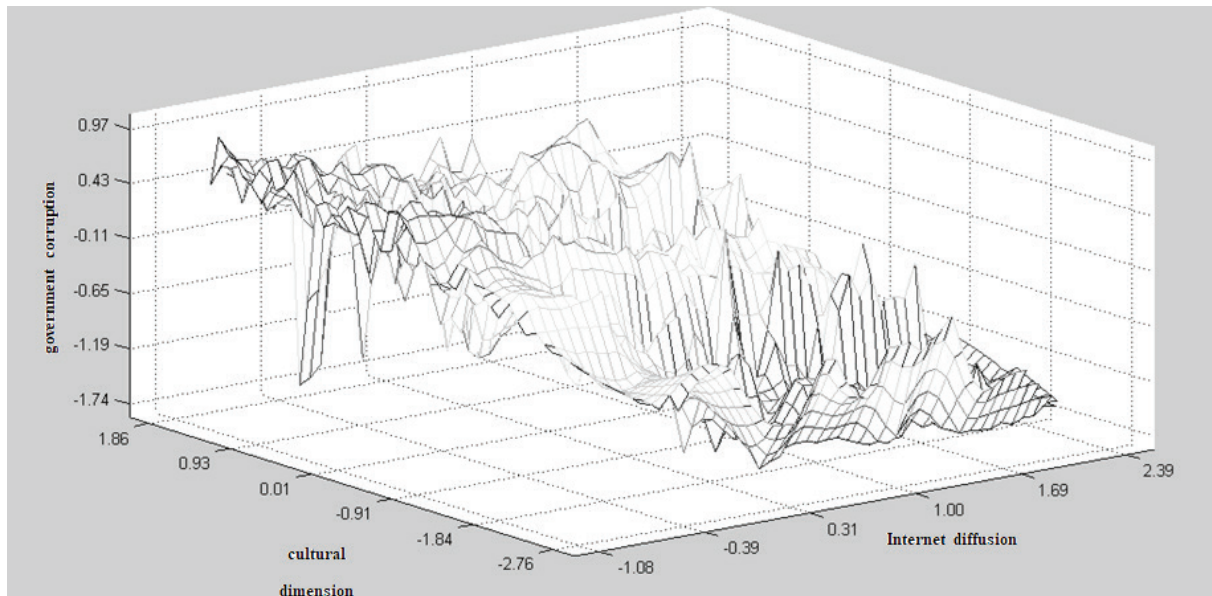
**FIGURE 7** MODERATION OF THE CULTURAL DIMENSION IN THE RELATIONSHIP BETWEEN VOICE AND ACCOUNTABILITY AND GOVERNMENT CORRUPTION



**Source:** Elaborated by the authors.

**Notes:** The values are standardized.

**FIGURE 8** MODERATION OF THE CULTURAL DIMENSION IN THE RELATIONSHIP BETWEEN INTERNET DIFFUSION AND GOVERNMENT CORRUPTION



**Source:** Elaborated by the authors.

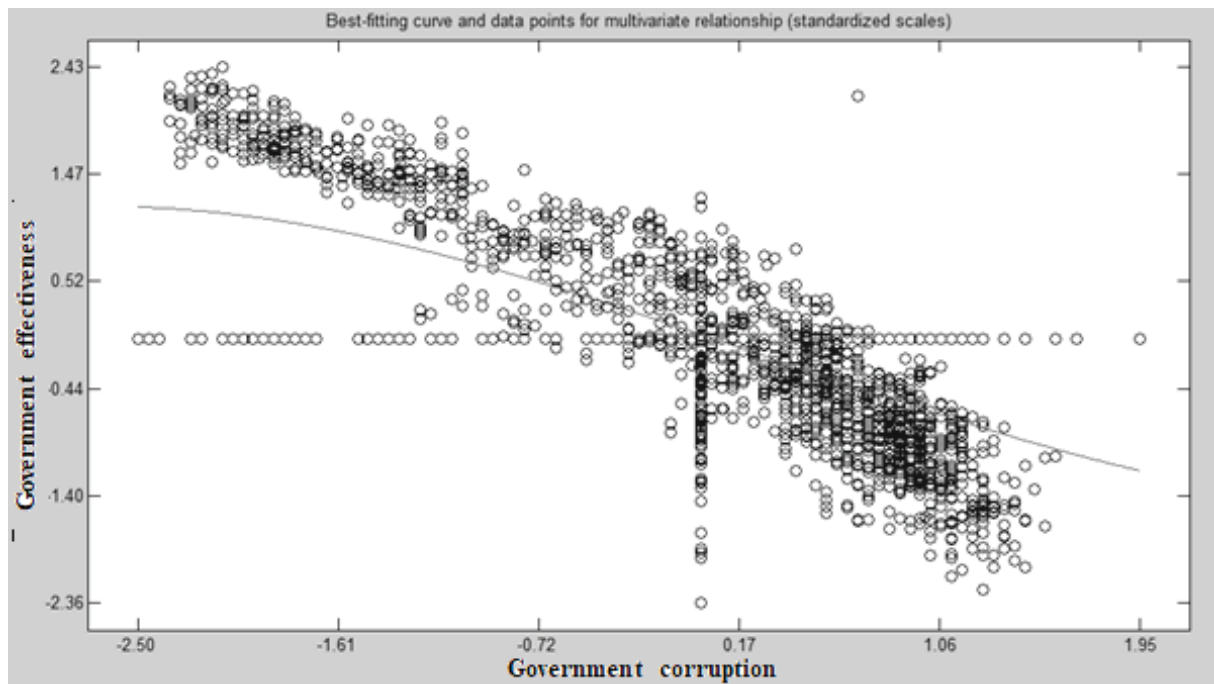
**Notes:** The values are standardized.

Finally, concluding the analysis of Figure 3, there was a negative relationship between government corruption and government effectiveness ( $\beta = -0.59$ ;  $p < 0.001$ ), corroborating  $H_5$ . Figure 9 shows the behavior of the relationship between government corruption and government effectiveness.

The negative relationship between government corruption and government effectiveness occurred at any point in the horizontal axis, to a greater or lesser extent. This behavior suggests that whenever there is a reduction in the level of government corruption, government effectiveness is expected to increase.

The study revealed a disturbing global context marked by, on the one hand, moderate levels of freedom of the press, expression, and association, as well as moderate levels of government effectiveness and Internet diffusion; on the other hand, the levels of perceived corruption were relatively high. The relationships observed among the variables point out that policymakers and international organizations engaged in promoting democracy and the economic development of nations should design strategies to advance Internet diffusion, particularly accompanied by greater accountability and citizen engagement in democratic processes and the equitable power distribution, consequently improving government effectiveness.

Particularly in Brazil, there is a persistent perception of a moderate level of corruption (average of -3.84 in the period), worsening between 2014 and 2015 (-4.3 and -4.2 respectively), which resulted in this last year, the 76<sup>th</sup> place among 168 nations. According to Transparency International, although significant advances have been noted in the area of anti-corruption measures adopting a traditional coercive approach, there is little empirical evidence about an effective interest to fight corruption in the country permanently.

**FIGURE 9** RELATIONSHIP BETWEEN GOVERNMENT CORRUPTION AND GOVERNMENT EFFECTIVENESS

**Source:** Elaborated by the authors.

**Notes:** Vertical axis (y) = *government corruption*; Horizontal axis (x) = *voice and accountability*. The values along the axis are standardized.

The evidence presented in this study shows that, to reverse this scenario, it is important to advance in the activities in place to fight corruption such as the Operation Car Wash (Angélico, 2017), but also to reinforce initiatives to a) democratize Internet access, such as the broadband expansion plan, considering the vital role played by Internet diffusion in the fight against corruption; and b) fostering the gradual behavioral/cultural change (infinite game strategy), to establish and consolidate social accountability.

As mentioned at the end of the third section of this article, the structural model was re-estimated, removing missing values and using, instead of the Warp3 algorithm (which captures nonlinear relationships), the Linear algorithm for estimating the internal model. In both approaches tested, no relevant differences were noted regarding the quality of the estimation (total variance explained by endogenous constructs, positivity or negativity and magnitude of estimated coefficients, moderation, and mediation relationships, among others), which confirms the adequacy of the relationships investigated in this study.

**TABLE 2** CORRELATIONS AMONG THE CONSTRUCTS

	Internet diffusion	Voice and accountability	Government corruption	Government efficiency	Cultural dimension
Internet diffusion	1.000	0.561***	-0.677***	0.709***	-0.488***
Voice and accountability	0.561***	1.000	-0.742***	0.749***	-0.596***
Government corruption	-0.677***	-0.742***	1.000	-0.866***	0.585***
Government efficiency	0.709***	0.749***	-0.866***	1.000	-0.513***
Cultural dimension	-0.488***	-0.596***	0.585***	-0.513***	1.000

Source: Elaborated by the authors.

Note: \*\*\* significant at 0.001.

## 5. FINAL CONSIDERATIONS

In endemic cases, corruption erodes people’s faith in democratic values, substantially reducing trust in politicians, and making citizens passive and skeptical about participating in the competitive democratic process (Garcia-Murillo, 2010). The study revealed empirical data showing, regardless of the effects of control variables, a direct relationship between Internet diffusion and lower levels of government corruption (confirming  $H_1$ ). Also, it showed an indirect relationship between Internet diffusion and government corruption, mediated through voice and accountability (confirming  $H_4$ ), which in turn had a strong direct relationship with government corruption (as stated in  $H_3$ ). As for the relationship between Internet diffusion and voice and accountability, the study found a direct and positive effect, corroborating  $H_2$ .

Additionally, the research found that culture plays a moderating role in the relationship between Internet diffusion and government corruption, and between voice and accountability and government corruption ( $H_{6a}$  and  $H_{6b}$ ). Finally, a negative relationship between government corruption and government effectiveness was noted, corroborating  $H_5$ .

These results are crucial for policymakers since they provided evidence of the effects of Internet diffusion to advance democracy and improve government effectiveness. The findings showed the importance of pursuing, at the same time, policies increasing accountability and creating an environment that fosters freedom of the press, expression, and association, promoting citizen participation and engagement to elect governments and to obtain equitable power distribution.

Another relevant result of the research is the prominent role of non-coercive mechanisms (different from the traditional approach) to mitigate government corruption, such as behavioral/cultural aspects. The empirical findings confirmed the importance of citizens’ active participation to establish and consolidate social accountability and advance in fighting corruption.



Thus, in addition to addressing the elements of the traditional anti-corruption approach (Klitgaard, 1988), i.e., monopoly, discretion, and accountability, activities to fight corruption should develop long-term initiatives, beyond concrete and necessary measures based on punishment. Fighting corruption must also focus on a preventive approach supported by values opposed to the ones that reinforce corrupt behavior.

In this regard, this study expands the knowledge about the determinants of corruption and contributes to the empirical literature that investigates how corruption impacts the economic development of nations.

Finally, learning about the determinants of corruption is crucial to design anti-corruption strategies (Jain, 2001). Based on the findings of this research, further studies may include other control variables, such as computer literacy, in addition to expanding the sample to maximize data heterogeneity. Also, future research may seek to understand better the relationships observed in this study, particularly the mediating role of voice and accountability regarding the relationship between Internet diffusion and government corruption.



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