

DIGITALIZATION AND CORRUPTION: THE MODERATING EFFECT OF ETHICAL BEHAVIOR OF FIRMS

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Abstract

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This study contributes to the growing literature on digital governance and anti-corruption by examining the relationship between digitalization and corruption, and assessing whether firms' ethical behavior moderates this relationship. The sample consists of 114 countries from 2016. Proxies for digitalization are derived from the World Bank's Digital Adoption Index (DAI) for 2016, while the remaining variables are sourced from the Global Competitiveness Report of the same year. The results reveal a negative and significant association between the overall digitalization score and sub-scores dealing with digitalization adoption by businesses, people, government, and corruption. Additional results show that digitalization is highly effective in reducing corruption for countries characterized by high ethical behavior of firms compared to countries characterized by low ethical behavior of firms. This research advances the literature by demonstrating the dual role of digitalization and firms' ethical behavior in combating corruption. It provides policymakers with empirical evidence supporting the adoption of digital technologies and the promotion of corporate ethical practices as effective anti-corruption strategies.

Keywords: Digitalization, Corruption, Ethical Behavior of Firms

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1. INTRODUCTION

Today, the term “digitalization” is pervasive in the discussions of various stakeholders within society and the global economy (Brenner & Hartl, 2021). Digitalization refers to how the application of information and communications technology transforms an organization's business model, encompassing the development of new or enhanced methods for delivering services, facilitating communication, and improving the quality of offerings (Brenner & Hartl, 2021).

The motivation for this study stems from the growing concern about corruption as a persistent obstacle to economic development and social welfare worldwide (Rose-Ackerman & Palifka, 2016), coupled with the rapid adoption of digital technologies that could potentially curb corrupt practices (Brenner & Hartl, 2021; Uyar et al., 2021). Despite increasing attention on digitalization and

governance, there is still limited empirical evidence on how digitalization interacts with the ethical behavior of firms to influence corruption (Khelil et al., 2023; Almaleeh, 2021). Understanding this relationship is crucial for designing effective anti-corruption strategies and digital policies.

Due to its importance, the economic implications of digitalization have been the focus of numerous recent studies. For instance, Khelif and Chaieb (2025) have examined the relationship between Hofstede's cultural dimensions and the adoption of digitalization. Brenner and Hartl (2021) investigate the connection between digitalization and social sustainability, while Uyar et al. (2021), Alm (2021), and Yamen et al. (2023) analyze the effects of digitalization on tax evasion. Additionally, Khelil et al. (2023) explore the relationship between digitalization and money laundering. Other researchers, including Gulin et al. (2019), Knudsen (2020), Almaleeh (2021), and

Tiberius and Hirth (2019), examine the impact of digitalization on the accounting and auditing professions.

However, existing studies do not explicitly examine the role of firms' ethical behavior as a potential moderating factor in the relationship between digitalization and corruption. This research gap motivates our study and sets the stage for addressing the following major research question:

RQ: Does digitalization reduce corruption, and is this effect strengthened in countries where firms demonstrate high ethical standards?

The objective of this study is to explore the relationship between digitalization and corruption and to test whether the ethical behavior of firms moderates this association. We anticipate that digitalization is negatively correlated with corruption, and that this correlation is stronger in countries characterized by high ethical behavior of firms.

Using a sample of 114 countries from 2016, this paper provides evidence that digitalization is negatively associated with corruption. This negative relationship remains significant and robust across various proxies for digitalization, including the overall digitalization index, as well as sub-indices measuring digitalization by businesses, individuals, and governments.

When analyzing the moderating effect of firms' ethical behavior, the negative and significant relationship between the overall digitalization score (and sub-scores related to digitalization adoption by businesses, individuals, and governments) and corruption remains stable in sub-samples characterized by high ethical behavior. In contrast, this relationship becomes insignificant for settings characterized by low ethical behavior of firms.

By addressing this gap, our findings contribute to the literature on digital governance and anti-corruption by highlighting the interplay between technological adoption and ethical business practices.

These findings are crucial for policymakers as they highlight the positive impact of digitalization in combating corruption. More importantly, the effectiveness of government digitalization efforts in reducing corruption depends on a genuine commitment to uphold business ethics. Therefore, adopting legislation that enforces ethical standards, alongside strengthening digitalization efforts, can serve as a powerful tool to reduce the prevalence of illicit transactions in the shadow economy and financial crimes.

The remainder of the essay is structured as follows. Section 2 elaborates on the theoretical foundations of the relationship between digitalization and corruption, and how the ethical behavior of firms may moderate this relationship. Section 3 presents the research methodology. Section 4 provides the empirical results of the study. Finally, Section 5 concludes the paper.

2. LITERATURE REVIEW AND HYPOTHESES DEVELOPMENT

2.1. Digitalization and corruption

Digital technologies have significantly enhanced the ability of government authorities to collect and process data. With the capacity to gather vast amounts of real-time data, governments can make informed decisions based on accurate and up-to-date information (Kitsios et al., 2020). Moreover,

digital technologies have made information dissemination more accessible and widespread.

According to modernization theory, modern societies reap benefits from emerging technologies (Nam, 2018). For example, automated financial management systems streamline government financial operations by automating processes such as budgeting, purchasing, and payment processing, often with minimal human involvement. This automation helps reduce the risk of dishonest practices, such as embezzlement or bribery.

Furthermore, by digitizing administrative processes, governments can improve transparency and accountability (Agostino et al., 2022). This increased transparency serves as a deterrent to corrupt behavior, making it more difficult for officials to engage in illicit activities while also curbing the scope of the black economy (Khelil et al., 2023).

Additionally, automated financial management systems create an audit trail that aids in oversight and the detection of irregularities. These systems log every transaction, facilitating the identification of discrepancies or suspicious patterns that may suggest corruption (Kitsios et al., 2020).

Corruption is regarded as one of the major challenges confronting many countries globally, as high levels of corruption can hinder governments from effectively carrying out their essential functions (Yamen et al., 2023). According to Andreoni et al. (1998), corruption is defined as a situation in which one party usually offers a sum of money or provides a service in return for an illegal act committed by a public official.

For instance, in the area of taxation, Yamen et al. (2023) conducted a cross-country analysis that revealed a negative relationship between digitization and tax evasion. This negative association is particularly evident in environments with low levels of corruption. Kitsios et al. (2020) documented that digitalization reduces cross-border trade tax fraud by enhancing governments' capabilities in information collection and processing. Alm (2021) examined the impact of digitization on tax evasion and argued that technological advancements facilitate a freer flow of information to governments, thereby strengthening their ability to address tax evasion effectively.

Hamilton and Stekelberg (2017) discovered that information technology significantly influences corporate tax outcomes. They came to the conclusion that businesses with superior information technology could reduce tax risk while avoiding more taxes than competitors.

Within the financial sector, financial institutions have begun to utilize machine learning technologies to find anomalies in transactions to detect and decrease fraud and money laundering (Alam et al., 2019). According to Meiryani et al. (2023), the implementation of electronic Know Your Customer (KYC) procedures and transaction monitoring in the banking sector has led to a reduction in the risk of money laundering. Empirical evidence from a cross-country analysis by Khelil et al. (2023) demonstrate that digitalization is negatively associated with money laundering, emphasizing that countries with robust auditing and accounting infrastructures can enhance the role of auditors in preventing money laundering crimes, thereby contributing to lower levels of such illicit activities.

Amara et al. (2020) provide evidence that corruption contributes to elevated levels of money laundering within a country. Additionally, Amara and Khlif (2018) demonstrate that corruption moderates the relationship between money laundering and tax evasion, indicating that the positive association between these two variables is more pronounced in highly corrupt environments.

Also recently, Umeanwe (2025) emphasizes that digital technologies such as big data analytics, blockchain, artificial intelligence, and e-governance platforms are powerful tools for enhancing transparency, optimizing administrative processes, and promoting citizen engagement. They thus help reduce bureaucratic inefficiencies and limit opportunities for corruption, contributing to the emergence of a responsibility-based environment. However, the author notes that the rapid pace of technological developments generates new governance challenges, particularly regarding equitable access, privacy protection, and the digital divide, which may exclude certain segments of the population. By analyzing case studies, policy frameworks, and emerging trends, Umeanwe (2025) highlights the ambivalent nature of the digital age: while it presents new risks of corruption, it also offers a major opportunity to strengthen governance. He concludes on the importance of aligning technological innovation with principles of good governance to develop transparent, inclusive, and resilient systems capable of adapting to the rapid transformations of the digital landscape.

Therefore, the first hypothesis of this study is formulated as follows:

H1: Digitalization is negatively associated with corruption.

2.2. The moderating effect of the ethical behavior of firms

The ethical behavior of firms can influence both corruption and digitalization efforts within a country. On one hand, stringent regulations and sanctions imposed by the government can significantly enhance digitalization initiatives and help reduce financial crimes (Benkraiem et al., 2021). On the other hand, noncoercive mechanisms, particularly business ethics, can play a crucial role in curbing corruption (Bird & Davis-Nozemack, 2018). For example, corrupt behavior may be mitigated by ethical beliefs, intrinsic motivations, or social influences such as the prevailing values, norms, and morals within a country (Alm & Torgler, 2006). This can foster a social identity among individuals, encouraging them to refrain from engaging in corrupt practices.

Conversely, the concept of business ethics “acquires special significance concerning the new processes occurring in the realm of open innovation and digitalization” (Roša & Lobanova, 2022). Bag et al. (2023) contend that digital technologies, such as big data and blockchain, are analyzed and handled by humans, and the absence of business ethics can result in severe consequences, including erroneous decision-making and the misuse of technology for illegal purposes. Consequently, it is anticipated that business ethics within a country will be pivotal for the effective implementation and success of digitalization initiatives.

Building on these two predictions, it is anticipated that the ethical behavior of firms will influence both digitalization efforts and corruption. Thus, the ethical behavior of firms may moderate

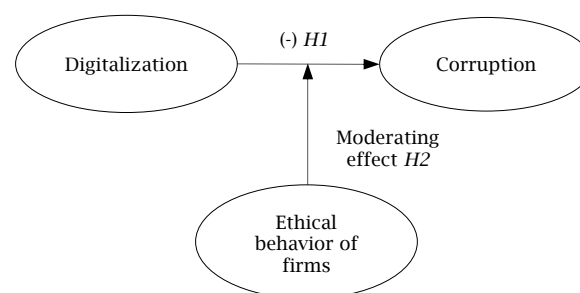
the negative relationship between digitalization and corruption. More specifically, it is expected that this negative association will be more pronounced in contexts characterized by high ethical behavior among firms, while it will be less significant in countries with low ethical behavior.

Therefore, the second hypothesis of this study is formulated as follows:

H2: The negative association between digitalization and corruption is more (less) prevailing in countries characterised by high (low) ethical behavior of firms.

Figure 1 illustrates the conceptual framework for the associations explored in this paper.

Figure 1. Conceptual framework



3. RESEARCH DESIGN

In this study, data are collected from two sources: the World Bank for digitalization adoption and the Global Competitiveness Report for corruption, along with other moderating and control variables.

3.1. Sample

The digitalization adoption index provided by the World Bank covers 180 countries, while the Global Competitiveness Report for 2016 includes 144 countries. Because not all countries appear in both datasets, 30 countries were excluded, resulting in a final sample of 114 countries for the year 2016.

3.2. Dependent variable: Corruption

In the Global Competitiveness Report for 2016, corruption levels are measured as the most problematic factor for doing business, expressed as a percentage. Respondents were provided with a list of 16 factors and asked to select and rank the five most problematic factors, with rankings from 1 (most problematic) to 5. The results were then tabulated and weighted based on the rankings assigned by the respondents. A score of zero was recorded for Finland, France, Japan, New Zealand, and the Netherlands, while the highest score, 23.600, was noted for Albania.

3.3. Test variable: Digitalization

The World Bank has developed a comprehensive Digital Adoption Index (DAI) along with three sub-indices to assess the level of digitalization within a country. These sub-indices include: 1) the adoption of digitalization by businesses (DAIB), which covers factors such as business websites, secure servers, download speed, and network coverage (Yamen et al., 2023); 2) the adoption of digitalization by individuals (DAIP), which includes metrics like mobile access and internet availability at home

(Yamen et al., 2023); and 3) the adoption of digitalization by governments (*DAIG*), which encompasses essential administrative systems, online public services, and digital identification (Yamen et al., 2023). Singapore records the highest DAI score at 0.870, while Burkina Faso has the lowest score at 0.224.

3.4. The moderating variable: Ethical behavior of firms

The ethical behavior of firms is rated on a scale from “1”, representing an extremely poor level of corporate ethics, to “7”, indicating an excellent level of corporate ethics in interactions with public officials, politicians, and other companies. The lowest score recorded is 2.500 for Mauritania, while the highest score is 6.300 for Sweden. The median score for ethical behavior among firms in the sample is 3.800.

3.5. Control variables

On one hand, a higher level of investor protection can reduce the prevalence of illegal activities and financial crimes (Amara et al., 2020). On the other hand, larger market sizes may contribute to a decrease in the shadow economy within a country (Amara & Khelif, 2018), potentially leading to lower levels of corruption. Additionally, policy instability can result in weak legal enforcement, increasing the likelihood of financial crimes (Amara et al., 2020). Finally, judicial independence is crucial for enforcing strict penalties on financial crimes, which can help diminish corrupt activities within a country (Vaithilingam & Nair, 2007). Table 1 presents further details regarding the definitions of each variable and the sources from which the data were collected.

Table 1. Data description and sources

Variables	Description	Source
<i>CORR</i>	The weight of corruption as the most problematic factor in doing business (a percentage). From a list of 16 factors, respondents were asked to select the five most problematic and rank them from 1 (most problematic) to 5. The results were then tabulated and weighted according to the ranking assigned by respondents (Schwab, 2017).	Schwab (2017)
<i>DAI</i>	Digital adoption index.	World Bank Group (n.d.).
<i>DAIB</i>	Digitalization adoption by businesses.	
<i>DAIP</i>	Digitalization adoption by people.	
<i>DAIG</i>	Digitalization adoption by the government.	
<i>EBOF</i>	In your country, how do you rate the corporate ethics of companies (ethical behavior in interactions with public officials, politicians, and other firms)? (1 = extremely poor among the worst in the world; 7 = excellent among the best in the world).	Schwab (2017)
<i>INVPRO</i>	Strength of investor protection is a combination of the extent of disclosure index (transparency of transactions), the extent of director liability index (liability for self-dealing), and the ease of shareholder suit index (shareholders' ability to sue officers and directors for misconduct).	Schwab (2017)
<i>PI</i>	Policy instability in an index ranging from 0 to 30.	Schwab (2017)
<i>MS</i>	The size of the national domestic and foreign market in an index ranging from 0 to 7.	Schwab (2017)
<i>JUDI</i>	Judicial independence is a measure of how in your country to what extent is the judiciary independent from influences of members of government, citizens, or firms (1 = heavily influenced; 7 = entirely independent).	Schwab (2017)

3.6. Model specification

To investigate the relationship between digitalization and corruption (*H1*), the following regression models are implemented for Model 1:

$$CORR_i = \alpha_0 + \alpha_1 DAI + \alpha_2 EBOF_i + \alpha_3 INVPRO_i + \alpha_4 PI_i + \alpha_5 MS_i + \alpha_6 JUDI_i + \varepsilon_i \quad (1)$$

$$CORR_i = \alpha_0 + \alpha_1 DAIB + \alpha_2 EBOF_i + \alpha_3 INVPRO_i + \alpha_4 PI_i + \alpha_5 MS_i + \alpha_6 JUDI_i + \varepsilon_i \quad (2)$$

$$CORR_i = \alpha_0 + \alpha_1 DAIP + \alpha_2 EBOF_i + \alpha_3 INVPRO_i + \alpha_4 PI_i + \alpha_5 MS_i + \alpha_6 JUDI_i + \varepsilon_i \quad (3)$$

$$CORR_i = \alpha_0 + \alpha_1 DAIG + \alpha_2 EBOF_i + \alpha_3 INVPRO_i + \alpha_4 PI_i + \alpha_5 MS_i + \alpha_6 JUDI_i + \varepsilon_i \quad (4)$$

where:

- Dependent variable: *CORR* = the level of corruption in a country;
- Independent variables:
 - *DAI* = overall digital adoption index;
 - *DAIB* = the digitalization adoption by business;
 - *DAIP* = the digitalization adoption by people;
 - *DAIG* = the digitalization adoption by the government.
- Moderating variables: *EBOF* = ethical behavior of firms in a country;
- Control variables:
 - *INVPRO* = strength of investor protection score;
 - *PI* = the degree of policy instability in one country;
 - *MS* = the market size in one country;

- *JUDI* = the level of judicial independence in a country.

To investigate the moderating effect of firms' ethical behavior on the relationship between digitalization and corruption, a sub-sample analysis is conducted by dividing the overall sample into two groups: one with low ethical behavior and the other with high ethical behavior, based on the median score of 3.800 for this variable. *H2* posits that a more pronounced negative association between digitalization and corruption will be observed in countries characterized by high ethical behavior among firms compared to those with low business ethics. To test *H2*, the following models are derived from the previous models, excluding the moderating variable (Model 2).

$$CORR_i = \alpha_0 + \alpha_1 DAI + \alpha_2 INVPRO_i + \alpha_3 PI_i + \alpha_4 MS_i + \alpha_5 JUDI_i + \varepsilon_i \quad (5)$$

$$CORR_i = \alpha_0 + \alpha_1 DAIB + \alpha_2 INVPRO_i + \alpha_3 PI_i + \alpha_4 MS_i + \alpha_5 JUDI_i + \varepsilon_i \quad (6)$$

$$CORR_i = \alpha_0 + \alpha_1 DAIP + \alpha_2 INVPRO_i + \alpha_3 PI_i + \alpha_4 MS_i + \alpha_5 JUDI_i + \varepsilon_i \quad (7)$$

$$CORR_i = \alpha_0 + \alpha_1 DAIG + \alpha_2 INVPRO_i + \alpha_3 PI_i + \alpha_4 MS_i + \alpha_5 JUDI_i + \varepsilon_i \quad (8)$$

4. EMPIRICAL FINDINGS

4.1. Descriptive statistics

Corruption has a mean score of 9.335, with values ranging from 0 to 23.600. The overall digitalization index has a mean of 0.589, while the sub-indices for business (DAIB), individuals (DAIP), and government (DAIG) have mean scores of 0.627, 0.522, and 0.617,

respectively. The ethical behavior of firms has a mean of 4.081, with values ranging from 2.500 to 6.300. The remaining control variables (strength of investor protection, policy instability, market size, and judicial independence) have mean scores of 5.675, 6.712, 3.980, and 4.167, respectively. Table 2 provides additional details about the descriptive statistics for all variables included in Model 1.

Table 2. Descriptive statistics

Variables	Observations	Mean	SD	Minimum	Maximum
DAI	114	0.589	0.169	0.224	0.870
DAIB	114	0.627	0.181	0.194	0.973
DAIP	114	0.522	0.219	0.068	0.897
DAIG	114	0.617	0.166	0.195	0.980
CORR	114	9.335	6.208	0	23.600
EBOF	114	4.081	0.934	2.500	6.300
INVPRO	114	5.675	1.188	2.800	8.300
PI	114	6.712	4.815	0	24.600
MS	114	3.980	1.193	1.300	7.000
JUDI	114	4.167	1.245	1.100	6.700

Note: DAI: digital adoption index; DAIB: digitalization adoption by business; DAIP: digitalization adoption by people; DAIG: digitalization adoption by government; CORR: the level of corruption in one country; EBOF: the ethical behavior of firms; INVPRO: the level of investor protection in one country; PI: the degree of policy instability in one country; MS: market size; JUDI: judicial independence.

4.2. Univariate analysis

Table 3 displays the results of the univariate analysis. The findings indicate that the overall digitalization index and the sub-indices related to business, individuals, and government are negatively correlated with corruption, with Pearson correlation coefficients of -0.648, -0.717, -0.570, and -0.614,

respectively. These results may provide preliminary support for *H1*. Additionally, the ethical behavior of firms, the strength of investor protection, policy instability, market size, and judicial independence also show negative correlations with corruption, with Pearson correlation coefficients of -0.348, -0.450, -0.367, -0.246, and -0.556, respectively.

Table 3. Correlation matrix

Variables	CORR	DAI	DAIB	DAIP	DAIG	CORR	EBOF	INVPRO	PI	MS	JUDI
CORR	1.000										
DAI	-0.648***	1.000									
DAIB	-0.717***	0.936***	1.000								
DAIP	-0.570***	0.944***	0.897***	1.000							
DAIG	-0.614***	0.790***	0.587***	0.589***	1.000						
EBOF	-0.348**	0.494***	0.476**	0.556***	0.257**	-0.695***	1.000				
INVPRO	-0.450***	0.517***	0.502***	0.435***	0.461***	-0.158*	0.021	1.000			
PI	-0.367***	0.048	0.070	0.033	0.025	-0.260**	0.172*	0.079	1.000		
MS	-0.246**	0.479***	0.361**	0.378**	0.559***	-0.070	0.144*	0.040	0.192*	1.000	
JUDI	-0.556***	0.496***	0.465***	0.555***	0.265*	-0.316**	0.068	0.039	0.190*	0.516***	1.000

Note: DAI: digital adoption index; DAIB: digitalization adoption by business; DAIP: digitalization adoption by people; DAIG: digitalization adoption by government; CORR: the level of corruption in one country; EBOF: the Ethical behavior of firms; INVPRO: the level of investor protection in one country; PI: the degree of policy instability in one country; MS: market size; JUDI: judicial independence. * significant at 10%; ** significant at 5%; *** significant at 1%.

4.3. Multivariate analyses

Table 4 displays the empirical findings of our study. In Model 1, the results indicate a negative association between the overall digitalization index and corruption, with a coefficient of -4.445 and a t-value of -6.321. Consequently, *H1* is validated, suggesting that digitalization efforts in a country contribute to a reduction in corruption levels. These results support the notion that digitalization enables countries to access improved macro-environmental resources, such as robust technological

infrastructure and the automation of administrative processes, which enhance accountability and control, thereby facilitating the identification, management, and mitigation of corruption and illicit activities in the black economy.

Similarly, the ethical behavior of firms is found to be negatively and significantly associated with corruption. Among the control variables, the strength of investor protection, policy instability, and judicial independence also show negative and significant associations with corruption.

Model 1 does not exhibit multicollinearity issues, as indicated by the reported variance inflation factors, with the maximum variance inflation factor (VIF) being 4.256. The adjusted R² is 52.47%, demonstrating a significantly high overall explanatory power for the model ($F = 17.970$; $p < 0.000$).

Similar findings are observed for the sub-indices related to digitalization adoption by

businesses (*DAIB*), individuals (*DAIP*), and the government (*DAIG*). Specifically, the coefficients and t-statistics are (Coeff = -3.920; $t = -6.423$) for *DAIB*, (Coeff = -3.987; $t = -5.745$) for *DAIP*, and (Coeff = -2.460; $t = -2.813$) for *DAIG*. These results further support *H1*, indicating that digitalization efforts in a country contribute to a reduction in corruption.

Table 4. Multivariate regression analyses

Variables	Model 1			
	Coefficient (t-statistic)	Coefficient (t-statistic)	Coefficient (t-statistic)	Coefficient (t-statistic)
Intercept	9.235*** (12.136)	9.164*** (12.345)	8.502*** (11.023)	9.460*** (12.001)
<i>DAI</i>	-4.445*** (-6.321)	-	-	-
<i>DAIB</i>	-	-3.920*** (-6.423)	-	-
<i>DAIP</i>	-	-	-3.987*** (-5.745)	-
<i>DAIG</i>	-	-	-	-2.460*** (-2.813)
<i>EBOF</i>	-5.439*** (-2.341)	-1.350* (-4.002)	-2.428** (-1.162)	1.790* (-2.543)
<i>INVPRO</i>	-0.218*** (-1.650)	-0.108* (-1.680)	-0.247** (-2.700)	-0.150*** (-2.530)
<i>PI</i>	-0.140 (-1.340)	-2.010** (-0.910)	-0.100 (-1.040)	-0.950 (-1.700)
<i>MS</i>	-0.171 (-3.170)	-2.360** (-2.060)	-0.093 (-2.230)	-0.830 (-2.270)
<i>JUDI</i>	-2.288*** (-2.874)	-1.560*** (-2.986)	-1.123** (-0.972)	-1.004** (-1.756)
Size (N)	114	114	114	114
F (p-value)	17.970*** (0.000)	16.270*** (0.000)	15.130*** (0.000)	9.780*** (0.000)
Adj. R ²	52.470	53.270	49.570	38.390
Max VIF	4.256	4.867	4.645	4.345

Note: *DAI*: digital adoption index; *DAIB*: digitalization adoption by business; *DAIP*: digitalization adoption by people; *DAIG*: digitalization adoption by government; *CORR*: the level of corruption in one country; *EBOF*: the Ethical behavior of firms; *INVPRO*: the level of investor protection in one country; *PI*: the degree of policy instability in one country; *MS*: market size; *JUDI*: judicial independence. * significant at 10%; ** significant at 5%; *** significant at 1%.

To assess the moderating effect of firms' ethical behavior on the relationship between digitalization and corruption, the overall sample is divided into low and high-ethical behavior sub-groups based on the median value of this variable (Model 2).

The association between digitalization and corruption remains negative and significant for the high ethical behavior group across the overall digitalization index and its sub-indices related to businesses, individuals, and government. For instance, the coefficients and t-statistics for the overall digitalization index are (Coeff = -4.655; $t = -5.570$).

In contrast, this association becomes insignificant in settings characterized by low ethical behavior among firms (Coeff = -0.065; $t = -1.321$).

These findings confirm *H2*, indicating that business ethics serve to constrain corruption and enhance digitalization efforts. As a result, these mechanisms contribute to a more effective role for digitalization in reducing corruption in countries with high levels of ethical behavior among firms.

Moreover, from our perspective, these results underscore that digitalization alone is insufficient to curb corruption. The presence of strong ethical standards within firms amplifies the impact of technological adoption, suggesting that anti-corruption policies should combine digital initiatives with ethical governance frameworks. This insight emphasizes the need for policymakers to focus not only on technology deployment but also on promoting ethical corporate culture.

Comparatively, while previous studies (Uyar et al., 2021; Khelil et al., 2023) established a general negative link between digitalization and corruption, our findings advance this literature by demonstrating that this relationship is conditional on firms' ethical behavior. Unlike prior research that examined digitalization effects in isolation, our study highlights the interactive effect of ethical business practices, revealing that digitalization's effectiveness varies significantly depending on the ethical environment. This provides a more nuanced understanding of the digitalization-corruption nexus than previously reported.

Table 5. The moderating effect of the ethical behavior of firms

Variables	Model 2							
	High EBOF				Low EBOF			
	Coefficient (t-statistic)	Coefficient (t-statistic)	Coefficient (t-statistic)	Coefficient (t-statistic)	Coefficient (t-statistic)	Coefficient (t-statistic)	Coefficient (t-statistic)	Coefficient (t-statistic)
Intercept	9.345*** (9.986)	9.456*** (10.444)	8.889*** (9.564)	9.254*** (7.123)	8.934*** (7.660)	9.405*** (7.590)	8.119*** (7.046)	9.462*** (7.213)
DAI	-4.655*** (-5.570)	-	-	-	-0.065 (-1.321)	-	-	-
DAIB	-	-4.327*** (-6.440)	-	-	-	-0.023 (-3.643)	-	-
DAIP	-	-	-3.520*** (-5.600)	-	-	-	-0.087 (-1.620)	-
DAIG	-	-	-	-1.700*** (-2.201)	-	-	-	-0.043 (-2.245)
INVPRO	-0.328*** (-1.850)	-0.123* (-1.710)	-0.344** (-2.841)	-0.255*** (-2.730)	-0.178 (-1.670)	-0.113 (-1.710)	-0.156 (-1.540)	-0.178 (-1.940)
PI	-0.178 (-1.388)	-2.456** (-1.210)	-0.189 (-1.245)	-0.998 (-1.811)	-0.129 (-1.220)	-1.985 (-1.120)	-0.112 (-1.190)	-0.760 (-1.456)
MS	-0.221 (-3.479)	-2.360** (-2.560)	-0.093 (-2.230)	-0.830 (-2.270)	-0.121 (-2.978)	-2.189 (-2.189)	-0.021 (-2.154)	-0.756 (-2.007)
JUDI	-2.288*** (-2.874)	-1.966*** (-3.100)	-1.333** (-0.993)	-1.895** (-1.865)	-1.287 (-2.874)	-1.005 (-3.187)	-1.065 (-0.213)	-1.456 (-1.234)
Size (N)	57	57	57	57	57	57	57	57
F (p-value)	11.230*** (0.000)	12.460*** (0.000)	10.720*** (0.000)	4.450*** (0.000)	5.670*** (0.000)	6.340*** (0.000)	4.270*** (0.000)	3.550*** (0.000)
Adj. R ²	55.220	58.640	53.480	32.080	36.250	38.730	31.220	24.510
Max VIF	3.960	3.670	3.750	4.115	2.140	1.750	1.480	3.112

Note: DAI: digital adoption index; DAIB: digitalization adoption by business; DAIP: digitalization adoption by people; DAIG: digitalization adoption by government; CORR: the level of corruption in one country; EBOF: the Ethical behavior of firms; INVPRO: the level of investor protection in one country; PI: the degree of policy instability in one country; MS: market size; JUDI: judicial independence. * significant at 10%; ** significant at 5%; *** significant at 1%.

5. CONCLUSION

This study explores the relationship between digitalization and corruption using a cross-country dataset, while also investigating the moderating effect of firms' ethical behavior on this relationship. Analyzing a sample of 114 countries from 2016, the study provides evidence that various proxies for digitalization (including the overall index and sub-indices related to business, individuals, and government) are negatively associated with corruption.

The association between digitalization and corruption remains negative and significant for the high ethical behavior group across the overall digitalization index and its sub-indices. In contrast, this association becomes insignificant in contexts characterized by low ethical behavior among firms.

The empirical findings of this study highlight the importance of digital transformation for regulators and governments in emerging and developing economies as a means to combat illicit transactions. Digitalization enhances the ability to identify these transactions due to their traceability. More importantly, government efforts to implement digital transformation can only effectively combat corruption if the country in question has standards and legislation that enforce business ethics.

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