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EXAMINING THE ROLE OF WEB-BASED DISCLOSURE IN MITIGATING DEFAULT RISK- EVIDENCE FROM JAPAN

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ABSTRACT

We examine whether web-based corporate disclosure reduces firms' default risk in the unique institutional and governance setting of Japan. Guided by agency and signaling theories, we hypothesize that enhanced online disclosure mitigates information asymmetry, strengthens market credibility, and lowers the likelihood of financial distress. Using 35,920 firm-year observations from 2007–2022, we employ Merton's distance-to-default as our primary measure of default risk and capture disclosure quality along four dimensions—massiveness, intelligibility, usability, and information amount—drawn from the NIKKEI Corporate Governance Evaluation System. Firm fixed-effects estimates indicate a robust positive association between disclosure quality and distance-to-default, consistent with lower default probability. The results are robust to alternative accounting- and market-based risk measures (Altman Z-score and CDS spreads) and to alternative estimation techniques. We further show that institutional ownership, analyst coverage, and board independence amplify the risk-reducing effect of web disclosure. Our findings contribute to the corporate disclosure and default risk literatures by isolating the role of dynamic, multidimensional web-based disclosure and by documenting its interaction with external governance mechanisms.

Keywords: Default Risk, Corporate Governance, Web-based Disclosure, Institutional Ownership.

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1. INTRODUCTION

In the digital age, effective and transparent disclosure plays a critical role in reducing information asymmetries (Wang et al., 2025; Romito & Vurro, 2021), facilitating efficient capital allocation (Zamir et al., 2022; Ellili, 2022), and bolstering investor confidence. While traditional disclosure mechanisms like annual reports have long served this purpose, web-based disclosure has recently emerged as a pivotal tool for firms to communicate with stakeholders in real time and at scale. This study is based on the Agency theory (Jensen & Meckling, 1976) which posits that conflicts of interest between managers and shareholders may lead to the withholding of relevant information. This in turn can increase risk premiums for debtholders (Abdi & Omri, 2020) and potentially elevate default risk. Hence, this paper investigates whether web-based disclosure can mitigate a firm's default risk—a key measure of financial distress—by enhancing transparency and reducing uncertainty among investors.

Web-based disclosure provides a more dynamic and receptive communication medium in contrast to traditional annual reports, which are static, backward-looking, and infrequently produced (Wang et al., 2025; Borrero-Domínguez et al., 2024). Unlike annual reports, digital platforms enable continuous and immediate updates, allow for the integration of multiple formats—such as visuals, videos, and interactive dashboards—and reach a broader, more diverse audience, including international stakeholders (Abdi & Omri, 2020). Additionally, the relatively low marginal cost of updating digital content enhances its efficiency as a disclosure mechanism. These characteristics position web-based disclosure as a more effective tool for curbing information asymmetry (Gajewski & Li, 2015) and promoting market efficiency than conventional reporting methods.

Empirical studies have documented various outcomes of disclosure practices (Romito &Vurro, 2021; Rossi &Harjoto, 2020; Ajina et al., 2015; Zamir et al., 2022; Ellili, 2022; Raimo et al., 2021; Michaels & Grüning, 2017). With regard to web-based disclosure specifically, studies have shown its influence on corporate performance (Cormier et al., 2009), market risk (Li, 2012), information asymmetry (Gajewski & Li, 2015), and financing costs (Orens et al., 2010; Wang, 2012; Abdi & Omri, 2020). However, to our knowledge, no study has directly examined the effect of web-based disclosure on corporate default risk.

This gap in the literature is significant because default risk is a critical signal of firm health, influencing everything from investor sentiment to capital access and policy response (Rego et al., 2009). This paper fills that gap by empirically testing the impact of web-based disclosure on firms' default risk using a unique dataset and focusing on Japan.

Japan offers a distinctive institutional and governance context that underscores the relevance of this study. Historically, Japanese firms operated within keiretsu networks, with main banks and affiliated firms as major shareholders (Cooke, 1996). This structure enabled private information exchange and reduced incentives for public disclosure (Aman et al., 2021). However, recent decades have seen a marked decline in stable shareholding (Yoshikawa & McGuire, 2008) and a significant rise in foreign institutional ownership—from 5% in 1990 to 30.4% in 2021. This shift has made external transparency through web-based disclosure increasingly vital. Despite Japan's high national ranking on corruption perception indices (Transparency International, 2022), firm-level transparency remains low, particularly in performance-related disclosure. Thus, Japan provides an ideal backdrop to study whether web-based disclosure can mitigate default risk under evolving corporate governance norms.

Using 35,920 firm-year observations from 2007 to 2022, we utilize the four dimensions of web-based disclosure—massiveness, intelligibility, usability, and information amount—as developed by the NIKKEI CGES database. We measure default risk using the market-based distance-to-default (DD) metric. Employing firm fixed effects as our baseline estimation method, we find that higher quality web-based disclosure is significantly associated with higher DD, implying reduced default risk. We find that the effect is amplified in firms with greater institutional ownership, higher analyst coverage, and more independent boards—supporting the monitoring role of external governance in enhancing the efficacy of disclosure. These results remain robust across alternative risk proxies and alternative estimation techniques.

This study contributes to the literature in several important ways. First, while most disclosure research centers on annual reports, we isolate web-based disclosure as an independent and dynamic communication tool. We focus on the unique attributes of web-based disclosure- such as interactivity, accessibility and real- time updates and try to understand how these might influence investor's risk perceptions. Second, we introduce a unique multidimensional dataset to quantify disclosure quality. Third, instead of exploring the determinants of web-based disclosure

(Prabowo & Angkoso, 2006; Xiao et al., 2004; Bollen et al., 2006; Ettredge et al., 2002; Marston & Polei, 2004; Debreceny et al., 2002), we focus on its impact on a largely unexplored outcome—default risk. Fourth, by examining Japanese firms, we extend the literature on both default risk determinants and corporate transparency in a non-Anglo-Saxon context. Finally, our findings have practical implications for policymakers and regulators aiming to enhance disclosure standards and financial market stability.

The remainder of the paper is organized as follows. Section 2 reviews the relevant literature. Section 3 outlines the research methodology. Section 4 presents the empirical analysis and results. Section 5 examines the mediating role of corporate governance mechanisms. Section 6 concludes with a summary of key findings, implications, and directions for future research.

2. LITERATURE REVIEW

2.1 Theoretical Framework

Economic theory suggests that creditors are more likely to offer debt at lower interest rates to firms that provide high-quality voluntary disclosure, as such disclosure mitigates the adverse effects of information asymmetry and reduces agency costs (Basuony & Mohamed, 2014). Web-based disclosure constitutes a critical form of voluntary corporate communication, enabling firms to disseminate timely, relevant financial and non-financial information to a broad audience. By providing real-time access to corporate data, web-based disclosure enhances reliability and transparency, and reduces conflicts of interest between managers and external stakeholders (Achoki et al., 2016).

The relationship between web-based disclosure and default risk can be understood through agency theory and signaling theory. According to agency theory (Jensen & Meckling, 1976), conflicts between managers (agents) and shareholders or debtholders (principals) arise when managers prioritize personal benefits over firm value maximization. Withholding material information exacerbates information asymmetry, prompting creditors to demand higher risk premiums to compensate for the increased uncertainty (Myers, 1977; Abdi & Omri, 2020). This increases the cost of debt and, ultimately, default risk. Voluntary disclosure reduces such asymmetries, enhancing investor confidence and lowering financing costs (Sengupta, 1998; Orens et al., 2010; Gajewski & Li, 2015). Web-based disclosure, in particular, offers universal,

low-cost access to information, making it an effective mechanism to address agency problems and reduce default risk. Interestingly, enhanced web-based disclosure may mitigate these agency problems by improving transparency and reducing bid-ask spreads (Leuz & Verrecchia, 2000; Yin et al., 2024).

Signaling theory (Akerlof, 1970; Healy & Palepu, 2001) complements this perspective by suggesting that high-performing firms disclose superior information to differentiate themselves from competitors, attract investors, and obtain external funds at lower cost (Marston & Polei, 2004; Ismail, 2002; Gallego Alvarez et al., 2008). In a globalized market, rapid, high-quality information dissemination signals operational strength and reliability, enhancing creditworthiness. Firms with strong performance have incentives to leverage web-based disclosure to assure creditors of their ability to service debt (Aly et al., 2010), strengthen managerial reputation, and reinforce perceptions of good governance. Complementarily, signaling theory (Akerlof, 1970; Healy & Palepu, 2001) suggests that firms use disclosure to differentiate themselves in capital markets by signaling financial soundness. Improved web-based disclosure may increase investor trust, lower cost of capital (Cheng et al., 2014), and thereby reduce the probability of default.

2.2 Empirical Framework

Extensive research has examined the association between voluntary disclosure and the cost of debt, with the consensus that higher disclosure quality facilitates access to finance at lower cost (Lundholm & Van Winkle, 2006). Boulland et al. (2025) introduce a novel measure of corporate disclosure derived from company websites, which are readily accessible and rich in information. Using historical data from U.S. public firms, they construct this measure, validate its accuracy by correlating it with existing disclosure and information asymmetry metrics, and investigate its determinants. They then apply this measure to examine disclosure practices in U.S. private firms and French firms' adherence to nonfinancial disclosure regulations. Their findings demonstrate that this website-based measure serves as a valuable addition to traditional disclosure metrics, which primarily focus on investor-related information in public capital markets. This makes this measure particularly relevant for research on private firms, non-investor audiences, and nonfinancial disclosures. Building on this, we posit that if web-based disclosure reduces the cost

of debt, it will also lower default risk, as reduced financing costs enhance a firm's ability to meet its obligations.

Prior studies have consistently reported a negative relationship between web-based disclosure and information asymmetry (Cormier et al., 2009; Yoon et al., 2011; Blankespoor et al., 2014; Gajewski & Li, 2015). These findings are attributed to the broad reach and immediacy of internet-based communication. However, some evidence suggests that this relationship may be insignificant if online disclosures lack credibility or fail to provide substantive insights (Chang et al., 2008; Nel & Baard, 2019). Consequently, Chen et al. (2025) explores the influence of digital transformation on corporate performance, concentrating on both information disclosure and investment. The study focuses on A-share listed companies from 2013 to 2020. Findings indicate an inverted U-shaped correlation between the level of information disclosure in digital transformation and corporate performance, highlighting the importance of balanced disclosure. Furthermore, investments in digital transformation show a positive relationship with corporate performance, suggesting that such investments contribute to improved outcomes. Interestingly, Salin et al. (2024) examines transparency in organizations through the lens of firm disclosure practices and the informativeness of their websites. It employs archival analysis of annual reports from the top 500 publicly listed companies in Malaysia, ranked by market capitalization. Nine independent variables were developed to assess various factors, while business performance, as measured by return on equity (ROE), return on assets (ROA), Tobin's Q, and the market-to-book ratio (MTB), served as the dependent variable. The results reveal no statistically significant relationship between a company's disclosure policy, website informativeness, and its financial performance, leading to the rejection of both hypotheses.

On the other hand, Abdi and Omri (2020), study a sample consisting of 237 non-financial companies listed in the MENA region for the year 2017. Multiple regression models were employed to analyze the effect of online disclosure on debt costs. The findings demonstrate a significant negative relationship between web-based disclosure and the company's cost of debt. These results confirm the hypothesis that the information disclosed on company websites holds economic value for creditors in this region. Specifically, web-based disclosure appears to reduce information asymmetry and creditor uncertainty, which in turn lowers the cost of debt.

Orens et al. (2010) conducted a study on a sample of 267 companies in four countries of continental Europe (Belgium, France, Germany and Netherland). The study shows that disclosing economically valuable intellectual capital information online reduces the cost of both debt and equity financing. By lowering information asymmetry, web-based disclosure reduces creditors' uncertainty regarding a firm's capacity to meet obligations, thereby lowering the cost of capital and, by extension, default risk. Drawing on the theoretical and empirical evidence above, we formally state our hypothesis as follows:

H1*: Higher levels of web-based disclosure are associated with lower default risk among firms.*

3. METHODOLOGY

3.1 Data and sample

We compile our dataset from three primary sources. First, the key variables measuring the quality of web-based disclosure are obtained from the NIKKEI Corporate Governance Evaluation System (CGES), a widely recognized and comprehensive source of standardized, annually updated indicators on Japanese corporate governance and disclosure practices. Second, firm-level default risk measures are sourced from the Credit Research Initiative (CRI) database. Third, control variables are drawn from LSEG Workspace (formerly EIKON), which provides consistent financial and market data. Datasets are merged using ticker codes to ensure accurate matching. Following prior literature on corporate disclosure and default risk, financial firms are excluded due to their distinct regulatory and capital structures. After removing observations with missing data, the final sample comprises 35,920 firm-year observations for the baseline regression over the period 2007–2022, with the number of observations varying across regression specifications.

3.2 Dependent Variable: Merton's Distance-to-Default (DD)

We use Merton's Distance-to-Default (DD) as our primary dependent variable and market-based measure of default risk. The DD framework, grounded in Merton's (1974) structural model and the Black–Scholes option-pricing theory, estimates how far a firm's asset value is from its default point, expressed in standard deviation units. Lower DD values indicate higher default risk.

While the conventional DD measure is widely applied (Chava & Purnanandam, 2010; Anginer et al., 2014), it faces practical challenges, including difficulties in estimating asset returns and market values, and the omission of certain liabilities. To address these issues, we use the enhanced specification developed by Duan and Wang (2012), which adjusts the definition of the default point to incorporate sector-specific calibrations for other liabilities.

Our DD data are obtained from the Credit Research Initiative (CRI) at the National University of Singapore, which applies this improved estimation method. The CRI dataset is widely used in the literature (Shin & Kim, 2015; Leroy & Lucotte, 2017; Ali et al., 2018; Nadarajah et al., 2021), ensuring methodological robustness and comparability with prior research.

3.3 Key Independent Variable: Web-based Disclosure

Our main independent variable is web-based disclosure quality, evaluated across four dimensions reported in the NIKKEI Corporate Governance Evaluation System (CGES) and calculated by Nikko Investor Relations. These standardized measures have an average value of 50 points and a standard deviation of 10 points, facilitating consistent comparison across firms and years.

- *Massiveness* – Assesses the comprehensiveness of the firm's website in covering a wide range of corporate activities, including operational, strategic, and governance-related information.
- *Intelligibility* – Measures the clarity and ease of understanding of the content, ensuring that it is accessible to a broad audience without requiring specialized knowledge.
- *Usability* – Evaluates the ease of navigation, organization, and interactivity of the website, enabling users to locate and utilize information efficiently.
- *Information Amount* – Captures the quantity and materiality of financial and non-financial data provided on the website.

Each score ranges from 0 to 100, with higher scores indicating stronger performance in the respective dimension. These metrics allow us to investigate both the aggregate and individual effects of different aspects of web-based disclosure quality on a firm's default risk.

3.4 Control variables

Following prior studies (Ali et al., 2018; Haque et al., 2024), we include several control variables. Firm size is measured as the logarithm of total sales (LNS), with larger firms expected to exhibit higher DD due to greater stability and resource access. Capital-sales ratio (K/S) captures tangible asset intensity, which is generally associated with lower bankruptcy risk. Market power/free cash flow is proxied by EBITDA-to-sales (Y/S), with higher values indicating stronger debt-servicing capacity. R&D intensity (R&D/K) is measured as R&D expenditure to property, plant, and equipment, with missing values set to zero, and an R&D dummy (RDUM) equals one if R&D data are reported. Growth opportunities are proxied by capital expenditure-to-PPENT (I/K), where higher values may increase default risk. Profitability is measured by return on assets (ROA), expected to have a positive effect on DD. Leverage is total debt-to-equity, where higher leverage increases default risk. Firm age is the log of years since incorporation, with older firms expected to be more stable. All control variables are winsorized at the 1% level in both tails to mitigate outlier effects.

3.5 Estimation model

To test our reported hypothesis (H1), we estimate the following fixed-effects model, which controls for firm-specific effects.

$$DD_{i,t} = \alpha_0 + \beta_1 WEBQUALITY_{i,t} + \beta_2 LNS_{i,t} + \beta_3 K/S_{i,t} + \beta_4 Y/S_{i,t} + \beta_5 R\&D/K_{i,t} + \beta_6 RDUM_{i,t} + \beta_7 I/K_{i,t} + \beta_8 ROA_{i,t} + \beta_9 LEVERAGE_{i,t} + \beta_{10} AGE_{i,t} i,t + Year_t + \varepsilon_{i,t} \quad (1)$$

Here, DD = is the measure of default risk calculated based on equation 3 (Merton's distance-to-default, DD); *WEBQUALITY* measures of web-based disclosure quality, represented by the four dimensions: *massiveness*, *intelligibility, usability, and information amount*; *LNS*= Firm Size is measured by the natural logarithm of total assets; *K/S*= capital to sales ratio; *Y/S*= EBITDA to sales ratio; *R&D/K*= ratio of research and development expenditures to property plant and equipment (*PPENT*) denoted by *K*; *RDUM*= Dummy Variable, takes 1 if R&D is available or 0 for missing data; *I/K*= ratio of firms' capital expenditure to property, plant, and equipment; *ROA*= return on assets; *LEVERAGE*= total debt to total assets; *Age* = Natural logarithm of a firm's AGE; *YEAR*= year dummies and ε_i = the error term.

4. EMPIRICAL ANALYSIS

4.1 Summary Statistics

Table 1 reports the descriptive statistics for all variables. The mean Distance-to-Default (DD) is 4.154 with a standard deviation of 2.426, indicating substantial variation in default risk across firms. The four web-based disclosure dimensions have mean (median) scores close to 49%, with modest dispersion: Massiveness (49.371%, 48.3%), Intelligibility (49.379%, 47.9%), Usability (49.382%, 48.1%), and Information Amount (49.354%, 47.9%). Ranges vary from 0% to approximately 96%–100%, with standard deviations of 8.6–9.5 percentage points, reflecting meaningful cross-firm differences in disclosure quality.

For the controls, firms have an average log sale (LNS) of 10.64, a mean capital-to-sales ratio (K/S) of 0.344, and an average EBITDA-to-sales ratio (Y/S) of 0.083. The mean capital expenditure-to-PPENT ratio (I/K) is 0.157, while ROA averages 5.57%. The average leverage ratio is 21.8%, and firms have an average age of 36.68 years. Overall, the data indicate considerable heterogeneity in both disclosure practices and firm characteristics, providing a rich setting to examine the link between web-based disclosure and default risk.

Table 1: Summary Statistics

	N	Mean	Std. Dev.	Median	Min	Max
Distance-to-Default (DD)	35920	4.154	2.426	3.671	0.185	12.690
Massiveness	35920	49.371	8.627	48.300	0.000	95.900
Intelligibility	35920	49.379	9.539	47.900	0.000	94.900
Usability	35920	49.382	9.380	48.100	0.000	100.000
Information amount	35920	49.354	9.525	47.900	0.000	96.600
LNS	35920	10.640	1.671	10.511	2.079	16.955
K/S	35920	0.344	0.367	0.260	0.004	2.290
Y/S	35920	0.083	0.081	0.074	-0.251	0.354
R&D/K	35920	0.157	2.114	0.008	-0.091	216.857

	N	Mean	Std. Dev.	Median	Min	Max
I/K	35920	0.157	0.369	0.105	-0.004	39.957
ROA	35920	5.570	7.546	4.540	-20.459	35.202
LEVERAGE	35920	0.218	0.204	0.178	0.000	8.813
Age	35920	36.683	20.261	29.000	2.000	70.000
INST	35920	12.716	14.427	7.430	0.000	85.600
Analyst	35920	5.225	5.102	3.000	1.000	30.000
IDIR	35920	0.086	1.202	0.000	0.000	69.990
Z-score	35920	3.426	2.773	2.700	0.200	19.200
CDS	35920	13.057	20.570	5.551	0.007	125.569

Note: This table presents summary statistics of Distnace-to-Default (DD), Web-disclosure characteristics and other control variables used in this study. All variables are winsorized at the 1–99% levels.

4.2 Correlation Analysis

Table 2 reports the Pearson correlation coefficients for all variables. DD is positively associated with all four web-based disclosure dimensions, with coefficients ranging from 0.107 to 0.148, indicating that higher disclosure quality is linked to lower default risk. The disclosure measures themselves are strongly correlated (0.710–0.920), reflecting their common derivation from the CGES framework.

For the control variables, DD shows positive correlations with firm size (LNS), profitability (ROA), and operating performance (Y/S), and a negative correlation with leverage, consistent with theoretical predictions such as Orens et al. (2010). Correlations among control variables are generally moderate, suggesting no multicollinearity concerns in the regression model.

Table 2: Correlation Matrix

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
(1) DD	1.000												
(2) Massiveness	0.137	1.000											
(3) Intelligibility	0.121	0.920	1.000										
(4) Usability	0.107	0.891	0.710	1.000									

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
(5) Information amount	0.148	0.929	0.811	0.735	1.000								
(6) LNS	0.130	0.468	0.377	0.394	0.513	1.000							
(7) K/S	0.049	-0.092	-0.096	-0.073	-0.083	-0.048	1.000						
(8) Y/S	0.353	0.167	0.142	0.138	0.177	0.139	0.287	1.000					
(9) R&D/K	0.004	0.020	0.017	0.024	0.016	-0.089	-0.044	-0.095	1.000				
(10) I/K	-0.008	0.056	0.051	0.050	0.053	-0.068	-0.107	-0.002	0.138	1.000			
(11) ROA	0.337	0.136	0.138	0.099	0.136	0.118	-0.142	0.562	-0.070	0.053	1.000		
(12) LEVERAGE	-0.426	-0.058	-0.051	-0.049	-0.060	0.036	0.276	-0.130	-0.035	-0.034	-0.290	1.000	
(13) Age	-0.044	0.043	-0.011	0.059	0.070	0.419	0.228	0.032	-0.049	-0.098	-0.155	0.112	1.000

Note: This table presents the correlation matrix.

4.3 Baseline Regression Results

Table 3 reports the baseline fixed-effects regression results examining the relationship between web-based disclosure quality and firms' Distance-to-Default (DD). In Columns (1)– (4), we assess each of the four disclosure dimensions—massiveness, intelligibility, usability, and information amount—without control variables. All four coefficients are positive and statistically significant at the 1% level, indicating that higher quality in each dimension is associated with greater DD, and therefore lower default probability. For example, *Massiveness* exhibits a coefficient of 0.034 ($p < 0.01$), consistent with the notion that broader, more comprehensive web content improves transparency and fosters investor confidence. This finding aligns with prior evidence from diverse contexts (Pour & Imanzadeh, 2017; DaSilva Rodrigues & Galdi, 2017; Nel et al., 2018) showing that voluntary online disclosure reduces information asymmetry and enhances market trust. Similarly, the positive effects of *intelligibility, usability, and information amount* echo Abdi and Omri, (2020), who documents a negative association between web-based disclosure and the cost of debt in MENA countries—implying reduced financing costs and, in turn, lower default risk.

Columns (5)– (8) incorporate the full set of control variables. The positive and highly significant coefficients for all four disclosure dimensions remain robust, underscoring the independent effect of web-based disclosure on default risk reduction. Among the controls, firm size (LNS) is positively associated with DD, consistent with the lower default probability of larger firms documented by Nguyen (2011) for Japan. The capital-sales ratio (K/S) also shows a positive relationship, suggesting that capital-intensive firms benefit from stable earnings generation through efficient utilization of tangible assets. Measures of operating performance (Y/S) and profitability (ROA) are likewise positively related to DD, while R&D intensity (R&D/K) contributes to lower default risk by enhancing firms' long-term competitive position and earnings potential. In contrast, capital expenditure intensity (I/K) and leverage are negatively associated with DD, in line with theoretical expectations that riskier investment strategies and higher debt burdens elevate default risk.

Overall, these findings provide strong empirical support for H1, demonstrating that higher quality across multiple dimensions of web-based disclosure is systematically linked to lower default probability, even after accounting for key firm characteristics.

Table 3: Baseline Regression Results

	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**
Dependent Variable DD								
Massiveness	0.034***				0.012***			
	(25.827)				(8.658)			
Intelligibility		0.024***				0.008***		
		(20.635)				(6.845)		
Usability			0.024***				0.006***	
			(20.173)				(5.501)	
Information amount				0.034***				0.014***
				(28.887)				(10.631)
LNS					0.122***	0.138***	0.142***	0.106***
					(14.114)	(17.039)	(17.620)	(11.913)
K/S					0.773***	0.777***	0.778***	0.768***

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Dependent Variable DD								
					(19.762)	(19.858)	(19.874)	(19.632)
Y/S					5.231***	5.243***	5.239***	5.229***
					(30.603)	(30.664)	(30.635)	(30.612)
R&D/K					0.010**	0.010***	0.010***	0.010**
					(2.538)	(2.655)	(2.651)	(2.505)
RDUM					0.545	0.484	0.506	0.528
					(0.912)	(0.810)	(0.846)	(0.883)
I/K					-0.102***	-0.099***	-0.099***	-0.105***
					(-4.022)	(-3.888)	(-3.902)	(-4.131)
ROA					0.030***	0.030***	0.030***	0.030***
					(15.884)	(15.672)	(15.783)	(16.029)
LEVERAGE					-5.861***	-5.866***	-5.864***	-5.855***
					(-96.817)	(-96.849)	(-96.797)	(-96.748)
Age					0.073***	0.069***	0.060***	0.081***
					(5.288)	(4.939)	(4.349)	(5.805)
Constant	2.830***	3.315***	3.332***	2.791***	2.085***	2.190***	2.214***	2.143***
	(43.184)	(56.713)	(56.607)	(46.432)	(3.436)	(3.610)	(3.647)	(3.538)
Observations	35920	35920	35920	35920	35920	35920	35920	35920
R-squared	0.321	0.317	0.317	0.324	0.542	0.542	0.542	0.543
Industry effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

*Note: This table presents the baseline regression results examining the relationship between Distance-to-default and Web-disclosure. Columns 1-4 reports the model without controls, while Column 5-8 includes firm-level control variables. The dependent variable in both models is Distance-to-Default, a proxy for DD. Control variables includes firm size (LNS), capital intensity (K/S), firm age, profitability (ROA), leverage, investment intensity (I/K), R&D intensity (R&D/K), and other firm characteristics that may influence default risk. All regressions control for industry and year fixed effects. Standard errors are clustered at the firm level, and t-statistics are reported in parentheses. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.*

4.4 Robustness Test:

To verify the stability of our baseline results, we conduct additional analyses using both alternative measures of default risk and alternative estimation techniques.

4.4.1 Alternative Proxies for Default Risk

We first re-estimate our models using two widely recognized proxies for default risk: the Altman Z-score, an accounting-based measure, and Credit Default Swap (CDS) spreads, a market-based measure.

The Altman Z-score integrates five weighted financial ratios—working capital to total assets, retained earnings to total assets, EBIT to total assets, market value of equity to total liabilities, and sales to total assets—into a composite solvency measure, where higher values indicate lower bankruptcy risk. Results in Columns (1)–(4) of Table 4 indicate that all four dimensions of web-based disclosure are positively related to the Z-score. Massiveness (0.006, $p < 0.01$) and information amount (0.010, $p < 0.01$) are significant at the 1% level, while intelligibility (0.002, $p < 0.10$) and usability (0.002, $p < 0.10$) are significant at the 10% level, suggesting that stronger web-based disclosure is associated with greater financial stability.

CDS spreads measure the cost of insuring against default, with higher spreads reflecting greater market-perceived credit risk. As reported in Columns (5)–(8) of Table 4, all four disclosure dimensions are negatively and significantly related to CDS spreads, with coefficients of –0.079 (massiveness), –0.062 (intelligibility), –0.045 (usability), and –0.073 (information amount), each significant at the 1% level. This pattern indicates that enhanced web-based disclosure reduces creditors' required risk premiums and lowers market-implied default probabilities.

These results, based on both accounting-based and market-based indicators, are consistent with our baseline findings and reinforce the conclusion that web-based disclosure mitigates default risk by reducing information asymmetry and enhancing investor and creditor confidence.

Table 4: Robustness test: Alternative measure of DD: Z score and CDS

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Altman Z score				**CDS Spread**			
Massiveness	0.006***				-0.079***			
	(3.754)				(-7.394)			
Intelligibility		0.002*				-0.062***		
		(1.645)				(-7.053)		

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Altman Z score				**CDS Spread**			
Usability			0.002*				-0.045***	
			(1.783)				(-5.068)	
Information amount				0.010***				-0.073***
				(6.799)				(-7.179)
LNS	-0.124***	-0.111***	-0.112***	-0.145***	0.386***	0.311***	0.256***	0.411***
	(-12.701)	(-12.112)	(-12.192)	(-14.278)	(5.661)	(4.871)	(4.010)	(5.809)
K/S	-0.579***	-0.576***	-0.576***	-0.584***	-2.885***	-2.906***	-2.915***	-2.868***
	(-12.834)	(-12.775)	(-12.775)	(-12.957)	(-9.319)	(-9.387)	(-9.414)	(-9.261)
Y/S	3.680***	3.690***	3.688***	3.669***	-12.234***	-12.295***	-12.284***	-12.263***
	(18.495)	(18.544)	(18.535)	(18.452)	(-9.050)	(-9.095)	(-9.083)	(-9.072)
R&D/K	0.103***	0.103***	0.103***	0.102***	-0.103***	-0.105***	-0.106***	-0.104***
	(21.590)	(21.698)	(21.685)	(21.501)	(-3.411)	(-3.482)	(-3.496)	(-3.439)
RDUM	-0.896	-0.942	-0.926	-0.877	0.334	0.629	0.543	0.633
	(-1.408)	(-1.480)	(-1.455)	(-1.380)	(0.071)	(0.133)	(0.115)	(0.134)
I/K	0.311***	0.314***	0.313***	0.308***	1.373***	1.355***	1.355***	1.378***
	(10.388)	(10.463)	(10.444)	(10.280)	(6.829)	(6.739)	(6.736)	(6.853)
ROA	0.114***	0.114***	0.114***	0.114***	-0.366***	-0.364***	-0.365***	-0.367***
	(51.749)	(51.654)	(51.663)	(51.921)	(-24.407)	(-24.250)	(-24.332)	(-24.441)
LEVERAGE	-4.880***	-4.882***	-4.882***	-4.874***	39.230***	39.258***	39.245***	39.200***
	(-68.752)	(-68.768)	(-68.760)	(-68.695)	(81.928)	(81.983)	(81.928)	(81.853)
Age	-0.283***	-0.289***	-0.291***	-0.273***	-1.117***	-1.107***	-1.029***	-1.127***
	(-17.884)	(-18.249)	(-18.538)	(-17.200)	(-10.166)	(-10.081)	(-9.461)	(-10.220)
Constant	6.207***	6.308***	6.293***	6.174***	10.052**	9.697**	9.300*	9.235*
	(9.596)	(9.753)	(9.726)	(9.562)	(2.095)	(2.022)	(1.937)	(1.927)
Observations	35920	35920	35920	35920	35920	35920	35920	35920
R-squared	0.524	0.524	0.524	0.525	0.450	0.449	0.449	0.450
Industry effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

*Note: This table presents robustness tests to address potential endogeneity concerns by employing alternative measures of default risk: Z-score and CDS spreads. Columns 1-4 use variations of the Z-score, while Columns 5-8 use CDS spreads as the dependent variable. The main independent variables of interest are the proxy for web-based disclosure levels. All models include industry and year fixed effects. Robust standard errors are reported in parentheses. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.*

4.4.2 Alternative Estimation Techniques

We further assess robustness by employing estimation methods designed to address potential cross-sectional dependence and outlier sensitivity. First, we apply the Fama–MacBeth (1973) two-step procedure, which estimates annual cross-sectional regressions and averages the coefficients over time, with standard errors adjusted for cross-sectional correlation. Columns (1)–(4) of Table 5 show that massiveness (0.009, $p < 0.05$), intelligibility (0.007, $p < 0.01$), and information amount (0.010, $p < 0.05$) remain positively and significantly related to distance-to-default, while usability (0.004) is positive but not statistically significant.

Second, following Fabisik et al. (2021), we estimate median regressions, which minimize absolute deviations and are less influenced by extreme observations. As shown in Columns (5)–(8) of Table 5, all disclosure dimensions exhibit positive and highly significant coefficients, ranging from 0.010 to 0.018 ($p < 0.01$). The consistency of results across both alternative risk measures and estimation methods provides strong and convergent evidence that greater web-based disclosure is robustly associated with lower default risk.

Table 5: Alternative Estimation technique: Fama Macbeth regression and Median Regression

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Fama Macbeth				**Median Regression**			
Dependent Variable	DD							
Massiveness	0.009**				0.016***			
	(2.383)				(12.524)			
Intelligibility		0.007***				0.011***		
		(3.175)				(9.588)		
Usability			0.004				0.010***	
			(1.468)				(9.188)	
Information amount				0.010**				0.018***
				(2.531)				(15.837)
LNS	0.180***	0.186***	0.195***	0.173***	0.116***	0.136***	0.139***	0.098***
	(6.750)	(6.955)	(7.177)	(6.497)	(16.284)	(19.023)	(21.020)	(13.678)
K/S	1.061***	1.059***	1.056***	1.061***	1.036***	1.045***	1.026***	1.034***

	(17.721)	(17.739)	(17.424)	(18.049)	(24.293)	(23.870)	(24.745)	(24.343)
Y/S	5.130***	5.179***	5.198***	5.103***	4.664***	4.764***	4.794***	4.560***
	(15.493)	(15.178)	(15.399)	(15.719)	(24.819)	(25.101)	(25.452)	(25.693)
R&D/K	0.077***	0.079***	0.080***	0.075***	0.029	0.035	0.030	0.027
	(3.321)	(3.239)	(3.258)	(3.384)	(0.905)	(1.126)	(0.984)	(0.813)
RDUM	1.100***	1.057***	0.977***	1.041***	0.520	0.419	0.425	0.482
	(3.685)	(3.437)	(3.329)	(3.469)	(0.571)	(0.793)	(0.603)	(0.564)
I/K	-0.405***	-0.388***	-0.380***	-0.414***	-0.093*	-0.090	-0.078***	-0.120**
	(-4.396)	(-4.397)	(-4.318)	(-4.389)	(-1.766)	(-1.468)	(-3.442)	(-2.197)
ROA	0.037***	0.036***	0.036***	0.037***	0.045***	0.045***	0.045***	0.045***
	(5.682)	(5.725)	(5.764)	(5.602)	(21.678)	(21.196)	(21.501)	(23.181)
LEVERAGE	-5.737***	-5.751***	-5.754***	-5.730***	-5.172***	-5.188***	-5.192***	-5.151***
	(-18.449)	(-18.497)	(-18.627)	(-18.346)	(-101.854)	(-92.866)	(-98.332)	(-104.287)
Age	-0.122***	-0.123***	-0.135***	-0.117***	0.016	0.013	0.006	0.020
	(-3.915)	(-4.060)	(-4.592)	(-3.610)	(1.191)	(0.959)	(0.443)	(1.598)
Constant	1.602***	1.669***	1.837***	1.695***	1.035	1.166**	1.197*	1.145
	(4.631)	(5.155)	(5.472)	(5.148)	(1.131)	(2.120)	(1.672)	(1.328)
Observations	35920	35920	35920	35920	35920	35920	35920	35920
Industry effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

*Note: This table presents results for analyzing the effect of web-disclosure on firm default risk using DD spread as a proxy of default risk. Columns 1-4 presents the results of regression using Fama and Macbeth (1973) and Columns 5-8 presents the results of Median regression as the alternative estimation technique. The dependent variable is DD. T-statistics are in parentheses. Superscripts ***, ** and * denote statistical significance at 1, 5 and 10% level, respectively.*

5. ROLE OF CORPORATE GOVERNANCE MECHANISMS

External governance mechanisms can play a pivotal role in shaping the relationship between web-based disclosure and default risk. Drawing on prior literature, we focus on three key mechanisms: institutional ownership, analyst coverage, and board independence.

5.1 Institutional Ownership

Institutional investors are central to external governance because their investment scale and monitoring capacity constrain managerial discretion (Lima & Hossain, 2018; Sakawa &

Watanabel, 2020). Concentrated institutional holdings create incentives to demand consistent disclosure practices that limit information asymmetry and enhance creditor assessments of firm risk. If institutional monitoring increases the credibility and completeness of web-based disclosure, its effect on reducing default risk should be amplified in firms with higher institutional ownership.

To examine this prediction, the sample is partitioned into high and low institutional ownership subsamples based on the median institutional shareholding. Institutional ownership data are obtained from the NIKKEI CGES database. The baseline specification is then re-estimated for each subsample.

The results, reported in Table 6, show that for firms with high institutional ownership, all four dimensions of web-based disclosure—massiveness, intelligibility, usability, and information amount—are positively and significantly related to Distance-to-Default (DD) at the 1% level. In contrast, for firms with low institutional ownership, the estimated coefficients are smaller in magnitude, statistically insignificant, or negative. These findings indicate that institutional monitoring strengthens the link between web-based disclosure and lower default risk, consistent with the view that external block holders enforce disclosure practices that enhance transparency and creditor confidence.

Table 6: Higher Institutional ownership vs Lower institutional ownership

	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**
	High Institutional Ownership				**Low Institutional Ownership**			
Dependent Variable	DD							
Massiveness	0.009***				0.007***			
	(4.795)				(3.615)			
Intelligibility		0.004***				-0.000		
		(2.794)				(-0.179)		
Usability			0.006***				0.002	
			(3.593)				(1.029)	
Information amount				0.011***				0.010***

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	High Institutional Ownership				**Low Institutional Ownership**			
				(6.325)				(5.104)
LNS	0.064***	0.081***	0.077***	0.049***	0.130***	-0.136***	0.145***	0.118***
	(4.809)	(6.529)	(6.102)	(3.563)	(9.777)	(-3.677)	(11.318)	(8.704)
K/S	0.720***	0.723***	0.721***	0.717***	0.749***	0.289***	0.752***	0.745***
	(11.466)	(11.501)	(11.476)	(11.418)	(14.656)	(3.439)	(14.712)	(14.586)
Y/S	6.601***	6.610***	6.598***	6.601***	3.272***	-0.318	3.284***	3.266***
	(25.776)	(25.800)	(25.753)	(25.792)	(14.246)	(-1.396)	(14.292)	(14.220)
R&D/K	0.020**	0.020***	0.020**	0.020**	0.004	-0.000	0.004	0.003
	(2.546)	(2.634)	(2.567)	(2.566)	(0.824)	(-0.034)	(0.882)	(0.789)
RDUM	0.470	0.428	0.456	0.447	1.765		1.634	1.813
	(0.644)	(0.586)	(0.624)	(0.613)	(1.038)		(0.960)	(1.066)
I/K	-0.377***	-0.367***	-0.369***	-0.385***	-0.084***	-0.014	-0.083***	-0.085***
	(-5.241)	(-5.108)	(-5.128)	(-5.353)	(-3.060)	(-0.686)	(-3.022)	(-3.096)
ROA	0.024***	0.024***	0.024***	0.024***	0.032***	0.018***	0.032***	0.033***
	(8.559)	(8.456)	(8.567)	(8.587)	(12.524)	(8.018)	(12.420)	(12.667)
LEVERAGE	-6.737***	-6.735***	-6.732***	-6.740***	-5.252***	-3.004***	-5.258***	-5.243***
	(-67.373)	(-67.320)	(-67.305)	(-67.435)	(-66.946)	(-25.712)	(-67.020)	(-66.816)
Age	0.165***	0.160***	0.158***	0.171***	-0.005	0.204***	-0.019	0.004
	(7.994)	(7.733)	(7.671)	(8.258)	(-0.272)	(5.039)	(-1.002)	(0.230)
Constant	2.910***	3.005***	2.971***	2.964***	1.147	5.319***	1.430	1.065
	(3.902)	(4.026)	(3.982)	(3.981)	(0.670)	(14.114)	(0.835)	(0.623)
Observations	15926	15926	15926	15926	19994	19994	19994	19994
R-squared	0.607	0.606	0.606	0.607	0.508	0.798	0.508	0.509
Industry effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

*Note: This table presents the moderating role of external governance—proxied by Institutional Ownership—on the relationship between Web disclosure and DD. Columns 1-4 show results for high Institutional Ownership, while Columns 5-8 show results for low Institutional Ownership. The dependent variable is DD, proxied by Distance-to-Default. The key independent variable is Web disclosure. All models control for firm-specific characteristics. Industry and year fixed effects are included in all regressions. Robust standard errors are clustered at the firm level. T-statistics are reported in parentheses. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.*

5.2 Analyst coverage

Analyst coverage serves as an important external governance mechanism capable of mitigating agency conflicts and information asymmetry. Prior research suggests that analysts rely on timely and comprehensive corporate disclosures, including information disseminated through firm websites, to refine forecasts and enhance market transparency (Watkins & Harris, 2002). Firms that maintain extensive online disclosure are perceived as less likely to withhold unfavorable information, thereby improving investor and creditor confidence (Healy & Palepu, 2001). Higher analyst coverage can therefore exert additional monitoring pressure on managers, discouraging excessive risk-taking and potentially reducing default risk (Mouselli et al., 2014).

We measure analyst coverage as the number of unique analysts issuing earnings forecasts for a firm over a 12-month period, sourced from the I/B/E/S database. Following convention, missing values are replaced with zero, and the coverage variable is defined as the natural logarithm of 1+ the number of analysts. Firms are classified as having *high* coverage if their analyst count is above the sample median, and *low* coverage otherwise.

Results in Table 7 show that for all four web-disclosure dimensions—massiveness, intelligibility, usability, and information amount—the coefficients are positive and statistically significant for both high and low coverage groups. However, the magnitude of the coefficients is consistently larger under high analyst coverage. For instance, in the high coverage group, the coefficient for massiveness is 0.012 (1% significance), compared to 0.008 (5% significance) for the low coverage group. Similarly, intelligibility records coefficients of 0.007 (1% significance) for high coverage and 0.005 (10% significance) for low coverage; usability shows 0.006 (1%) versus 0.005 (10%), and information amount 0.014 (1%) versus 0.008 (1%).

These results indicate that the positive relationship between web-based disclosure and distance-to-default is more pronounced when firms are subject to greater analyst scrutiny. In such settings, disclosure is more likely to be effectively processed, verified, and incorporated into market assessments, thereby strengthening its impact on reducing default risk.

Table 7: Firms have more than median analyst coverage vs less than median analyst coverage

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	High analyst coverage				**Low analyst coverage**			
Dependent Variable DD								
Massiveness	0.012***				0.008**			
	(7.956)				(2.467)			
Intelligibility		0.007***				0.005*		
		(6.116)				(1.924)		
Usability			0.006***				0.005*	
			(5.070)				(1.953)	
Information amount				0.014***				0.008***
				(9.960)				(2.589)
LNS	0.131***	0.148***	0.152***	0.115***	-0.052*	-0.044	-0.044	-0.056**
	(14.114)	(17.081)	(17.552)	(11.841)	(-1.885)	(-1.612)	(-1.619)	(-2.001)
K/S	0.728***	0.732***	0.734***	0.722***	0.930***	0.932***	0.930***	0.932***
	(17.347)	(17.435)	(17.465)	(17.201)	(8.105)	(8.119)	(8.099)	(8.116)
Y/S	4.999***	5.012***	5.009***	4.997***	5.012***	5.010***	5.008***	5.016***
	(26.829)	(26.889)	(26.869)	(26.839)	(11.470)	(11.464)	(11.458)	(11.480)
R&D/K	0.008**	0.009**	0.008**	0.008*	-0.009	-0.009	-0.009	-0.009
	(1.975)	(2.084)	(2.061)	(1.957)	(-0.824)	(-0.800)	(-0.798)	(-0.841)
RDUM	0.748	0.685	0.712	0.731				
	(1.216)	(1.114)	(1.158)	(1.190)				
I/K	-0.076***	-0.073***	-0.073***	-0.080***	-0.368***	-0.366***	-0.368***	-0.366***
	(-2.864)	(-2.733)	(-2.745)	(-2.990)	(-4.289)	(-4.263)	(-4.290)	(-4.272)
ROA	0.034***	0.034***	0.034***	0.034***	0.007	0.006	0.007	0.007
	(16.409)	(16.204)	(16.303)	(16.548)	(1.425)	(1.387)	(1.422)	(1.450)
LEVERAGE	-5.632***	-5.637***	-5.634***	-5.625***	-7.264***	-7.263***	-7.263***	-7.262***
	(-86.143)	(-86.183)	(-86.123)	(-86.078)	(-42.604)	(-42.585)	(-42.587)	(-42.595)
Age	0.059***	0.053***	0.045***	0.067***	0.191***	0.190***	0.184***	0.192***
	(3.877)	(3.493)	(2.977)	(4.428)	(5.277)	(5.241)	(5.119)	(5.309)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	High analyst coverage				Low analyst coverage			
Dependent Variable DD								
Constant	1.768***	1.877***	1.889***	1.824***	4.870***	4.935***	4.949***	4.903***
	(2.831)	(3.007)	(3.023)	(2.927)	(16.815)	(17.170)	(17.376)	(17.239)
Observations	30248	30248	30248	30248	5672	5672	5672	5672
R-squared	0.542	0.541	0.541	0.542	0.616	0.616	0.616	0.616
Industry effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

*Note: This table presents the moderating role of external governance—proxied by analyst coverage—on the relationship between Web disclosure and DD. Columns 1-4 show results for high analyst coverage, while Columns 5-8 show results for low analyst coverage. The dependent variable is DD, proxied by Distance-to-Default. The key independent variable is Web disclosure. All models control for firm-specific characteristics. Industry and year fixed effects are included in all regressions. Robust standard errors are clustered at the firm level. T-statistics are reported in parentheses. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.*

5.3 Independent Directors

The presence of independent directors on the board serves as a critical governance mechanism, given their ability to provide objective oversight and mitigate potential conflicts of interest (Fama and Jensen, 1983). Independent directors can strengthen the credibility of corporate disclosures by ensuring that the information disseminated—both financial and non-financial—is accurate, complete, and timely. Prior research (Cheng & Courtenay, 2006; Li & Wang, 2016) documents that firms with a greater proportion of independent directors tend to engage in higher levels of voluntary disclosure, thereby reducing information asymmetry and improving market perceptions of creditworthiness. In the Japanese context, where regulatory emphasis on board independence has been increasing, we expect the positive association between web disclosure and distance-to-default (DD) to be more pronounced among firms with higher levels of board independence. We classify firms into high and low independent director groups based on the median proportion of independent directors, using data obtained from the NIKKEI CGES database.

The results, presented in Table 8, are consistent with our expectations. Across all four dimensions of web disclosure—massiveness, intelligibility, usability, and information amount—the coefficients are larger for firms with higher independent director representation, with all

estimates statistically significant at the 1% level. For example, the coefficient on massiveness is 0.017 for the high group compared to 0.010 for the low group, intelligibility is 0.010 versus 0.006, usability is 0.010 versus 0.005, and information amount is 0.017 versus 0.005. These results indicate that the presence of independent directors amplifies the beneficial effect of web disclosure on DD, suggesting that rigorous board oversight enhances transparency, mitigates default risk, and improves creditor confidence.

Table 8: Have higher independent directors' vs. have lower independent director

	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**
	High Independent director				**Low Independent director**			
Dependent Variable DD								
Massiveness	0.017***				0.010***			
	(5.291)				(8.114)			
Intelligibility		0.010***				0.006***		
		(4.165)				(6.177)		
Usability			0.010***				0.005***	
			(3.143)				(5.679)	
Information amount				0.017***				0.005***
				(7.025)				(9.060)
LNS	0.111***	0.125***	0.131***	0.093***	0.144***	0.165***	0.165***	0.133***
	(9.372)	(11.252)	(11.869)	(7.494)	(11.086)	(13.341)	(13.284)	(10.011)
K/S	0.705***	0.709***	0.708***	0.700***	0.857***	0.858***	0.866***	0.853***
	(13.086)	(13.161)	(13.125)	(12.987)	(14.309)	(14.306)	(14.448)	(14.241)
Y/S	5.640***	5.650***	5.655***	5.632***	4.341***	4.357***	4.326***	4.350***
	(23.809)	(23.845)	(23.861)	(23.786)	(17.467)	(17.515)	(17.388)	(17.514)
R&D/K	0.011**	0.011**	0.011**	0.010**	0.009	0.009	0.009	0.008
	(2.424)	(2.510)	(2.537)	(2.365)	(1.031)	(1.075)	(1.034)	(1.001)
RDUM	1.146	1.094	1.111	1.147				
	(1.625)	(1.551)	(1.574)	(1.628)				
I/K	-0.087***	-0.084***	-0.084***	-0.089***	-0.223***	-0.213***	-0.214***	-0.224***
	(-3.035)	(-2.953)	(-2.955)	(-3.138)	(-3.509)	(-3.356)	(-3.362)	(-3.524)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	High Independent director				Low Independent director			
Dependent Variable DD								
ROA	0.022***	0.021***	0.022***	0.022***	0.040***	0.039***	0.040***	0.040***
	(8.433)	(8.300)	(8.334)	(8.579)	(14.190)	(14.019)	(14.192)	(14.237)
LEVERAGE	-6.059***	-6.062***	-6.061***	-6.051***	-5.615***	-5.621***	-5.618***	-5.610***
	(-70.896)	(-70.913)	(-70.891)	(-70.832)	(-64.335)	(-64.353)	(-64.304)	(-64.302)
Age	0.090***	0.087***	0.079***	0.097***	0.059***	0.050***	0.040**	0.066***
	(4.365)	(4.203)	(3.858)	(4.712)	(3.082)	(2.611)	(2.135)	(3.458)
Constant	1.885***	1.965***	1.990***	1.911***	1.947***	2.070***	2.113***	2.011***
	(2.626)	(2.738)	(2.770)	(2.668)	(15.214)	(16.353)	(16.853)	(16.274)
Observations	19839	19839	19839	19839	16081	16081	16081	16081
R-squared	0.541	0.540	0.540	0.541	0.558	0.557	0.557	0.558
Industry effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

6. CONCLUSION

The rapid advancement of digital technologies has transformed corporate communication channels, with web-based disclosure emerging as a critical medium through which firms voluntarily disseminate timely, comprehensive, and high-quality financial and non-financial information. In Japan, this shift holds particular relevance given its distinctive ownership and corporate governance structure—characterized by stable shareholding arrangements and cross-shareholdings—that diverges markedly from the Anglo-American model. At the same time, Japanese firms face evolving risk profiles, with macroeconomic vulnerabilities amplified by the country's exceptionally high level of government debt. Despite the growing literature on web-based disclosure and its implications for corporate outcomes, evidence on its relationship with default risk—particularly in the Japanese context—remains limited.

This study addresses this gap by examining the effect of web-based disclosure on the default risk of Japanese listed firms. Using a comprehensive dataset of 35,920 firm-year observations spanning 2007–2022, and employing Merton's distance-to-default (DD) as our primary risk

metric, we find robust evidence that greater web-based disclosure is associated with a higher DD, indicating a lower probability of default. This finding is consistent with the predictions of both agency theory and signaling theory, suggesting that enhanced disclosure reduces information asymmetry, strengthens market confidence, and acts as a credible signal of firm quality.

We further investigate whether external corporate governance mechanisms—specifically institutional ownership, analyst coverage, and board independence—moderate this relationship. Across all specifications, our results indicate that the positive effect of web-based disclosure on DD is significantly stronger in the presence of higher institutional ownership, greater analyst following, and a larger proportion of independent directors. These mechanisms appear to reinforce the monitoring of managerial actions and enhance the credibility of disclosed information, thereby amplifying the risk-mitigating benefits of disclosure. Our findings remain robust to alternative default risk measures, including the Altman Z-score and CDS spreads.

The implications of our results are threefold. First, for corporate managers, the evidence underscores the strategic value of web-based disclosure as a tool for lowering default risk. Beyond its compliance and reputational benefits, an expanded and transparent disclosure policy can enhance creditor and investor confidence, limit financing costs, and reduce the likelihood of financial distress. Second, for investors, web-based disclosure provides timely and comprehensive information that reduces decision-making under uncertainty and facilitates early identification of emerging risks. Third, for policymakers, our findings highlight the importance of integrating disclosure quality into corporate governance reforms. Encouraging firms to adopt more comprehensive and accessible web-based disclosures—complemented by robust governance mechanisms—can contribute to a more resilient corporate sector and a more stable financial system.

This study has several limitations, including the exclusion of qualitative web content, which may provide additional insights into the tone and depth of corporate disclosures. Additionally, the measurement of disclosure scores may be subject to bias, as the criteria used might not fully capture the complexities of corporate disclosure practices. Furthermore, the Japan-specific institutional context restricts the generalizability of the findings, as the observed relationship between disclosure and default risk may differ in countries with varying regulatory environments and corporate governance structures. Future research could address these limitations by

conducting cross-country comparative studies to assess the broader applicability of the findings. Lastly, exploring the integration of artificial intelligence in online disclosure practices may present a promising avenue for future research.

Overall, this study provides novel empirical evidence that web-based disclosure plays a meaningful role in mitigating default risk in Japan, particularly when supported by strong external governance. These insights not only contribute to the disclosure–risk literature but also offer actionable guidance for enhancing corporate transparency and stability in an evolving global capital market environment.

REFERENCES

Abdi, H. & Omri, M.A.B., 2020. Web-based disclosure and the cost of debt: MENA countries evidence. *Journal of Financial Reporting and Accounting*, 18(3), pp.533–561.

Achoki, G., Rotich, G. & Okibo, B., 2016. Effect of web-based financial reporting on financial performance of companies listed at Nairobi Securities Exchange. *Journal of Finance and Accounting*, 4(6), pp.336–344.

Aguilera, R.V., Desender, K.A., Lamy, M.L.P. & Lee, J.H., 2017. The governance impact of a changing investor landscape. *Journal of International Business Studies*, 48(2), pp.195–221.

Ajina, A., Sougne, D. & Lakhal, F., 2015. Corporate disclosures, information asymmetry and stock-market liquidity in France. *Journal of Applied Business Research*, 31(4), p.1223.

Akerlof, G.A., 1970. The market for "lemons": Quality uncertainty and the market mechanism. *The Quarterly Journal of Economics*, 84(3), pp.488–500.

Ali, W., Liu, B. & Su, J.J., 2018. Corporate governance and default risk of Chinese firms. *China Journal of Accounting Research*, 11(1), pp.41–62.

Aly, D., Simon, J. & Hussainey, K., 2010. Determinants of CIR: evidence from Egypt. *Managerial Auditing Journal*, 25(2), pp.182–202.

Álvarez, I.G., Sánchez, I.M.G. & Domínguez, L.R., 2008. Voluntary and compulsory information disclosed online: The effect of industry concentration and other explanatory factors. *Online Information Review*, 32(5), pp.596–622.

Aman, H., Beekes, W. & Brown, P., 2021. Corporate governance and transparency in Japan. *The International Journal of Accounting*, 56(01), p.2150003.

Anginer, D., A. Demirguc-Kunt, and M. Zhu. 2014. How does competition affect bank systemic risk? *Journal of Financial Intermediation* 23 (1):1-26.

Basuony, M.A.K. & Mohamed, E.K.A., 2014. Determinants of internet financial reporting in emerging markets: Evidence from Egypt. *Accounting and Management Information Systems*, 13(2), pp.134–161.

Blankespoor, E., Miller, G.S. & White, H.D., 2014. The role of dissemination in market liquidity: Evidence from firms' use of Twitter. *The Accounting Review*, 89(1), pp.79–112.

BOULLAND, R., BOURVEAU, T. and BREUER, M., 2025. Company Websites: A New Measure of Disclosure. *Journal of Accounting Research*.

Bollen, L., Hassink, H. & Bozic, G., 2006. Measuring and explaining the quality of internet investor relations activities: a multinational empirical analysis. *International Journal of Accounting Information Systems*, 7(4), pp.273–298.

Borrero-Domínguez, C., Cortijo-Gallego, V. and Escobar-Rodríguez, T., 2024. Digital transformation voluntary disclosure: Insights from leading European companies. *International journal of accounting information systems*, *55*, p.100711.

Black, F. & Scholes, M., 1973. The pricing of options and corporate liabilities. *The Journal of Political Economy*, 81(3), pp.637–654.

Cormier, D., Ledoux, M.J. & Magnan, M., 2009. The use of Web sites as a disclosure platform for corporate performance. *International Journal of Accounting Information Systems*, 10(1), pp.1–24.

Chang, M., Khanna, T. & Palepu, K., 2008. Analyst activity around the world. *Harvard Business School Working Paper Series*.

Chava, S., and A. Purnanandam. 2010. Is Default Risk Negatively Related to Stock Returns? *Review of Financial Studies* 23 (6):2523-2559.

Chen, Z. and Cai, S., 2025, April. Exploring the Influence of Digital Transformation on Corporate Performance: A Study from the Perspectives of Information Disclosure and Investment. In *International Conference on Computational Finance and Business Analytics* (pp. 654-671). Cham: Springer Nature Switzerland.

Cheng, E.C. & Courtenay, S.M., 2006. Board composition, regulatory regime and voluntary disclosure. *The International Journal of Accounting*, 41(3), pp.262–289.

Cheng, B., Ioannou, I. & Serafeim, G., 2014. Corporate social responsibility and access to finance. *Strategic Management Journal*, 35(1), pp.1–23.

Cooke, T.E., 1996. The influence of the keiretsu on Japanese corporate disclosure. *Journal of International Financial Management & Accounting*, 7(Autumn), pp.191–216.

DaSilva Rodrigues, A. & Galdi, F.C., 2017. Voluntary disclosure and stock liquidity: Evidence from Brazil. *Revista Contabilidade & Finanças*, 28(74), pp.11–26.

Debreceny, R., Gray, G.L. & Rahman, A., 2002. The determinants of internet financial reporting. *Journal of Accounting and Public Policy*, 21, pp.371–394.

Duan, J.-C., and T. Wang. 2012. Measuring Distance-to-Default for Financial and Non-Financial Firms. In *Global Credit Review*: Co-published with Risk Management Institute, Singapore, 95-108.

Ellili, N.O.D., 2022. Impact of ESG disclosure and financial reporting quality on investment efficiency. *Corporate Governance: The International Journal of Business in Society*, 22(5), pp.1094–1111.

Eppler, M.J. & Mengis, J., 2004. The concept of information overload: A review of literature from organization science, accounting, marketing, MIS, and related disciplines. *The Information Society*, 20(5), pp.325–344.

Ettredge, M., Richardson, V.J. & Scholz, S., 2002. Dissemination of information for investors at corporate websites. *Journal of Accounting and Public Policy*, 21, pp.357–369.

Fabisik, K., Fahlenbrach, R., Stulz, R.M. & Taillard, J.P., 2021. Why are firms with more managerial ownership worth less? *Journal of Financial Economics*, 140(3), pp.699–725.

Fama, E.F. & Jensen, M.C., 1983. Separation of ownership and control. *Journal of Law and Economics*, 26(2), pp.301–325.

Fama, E. F., and J. D. MacBeth. 1973. Risk, Return, and Equilibrium: Empirical Tests. *Journal of Political Economy* 81 (3):607-636.

Gallego Alvarez, I., I. María García Sánchez and L. Rodriguez Dominguez (2008). 'Voluntary and compulsory information disclosed online: The effect of industry concentration and other explanatory factors', Online Information Review, 32, pp. 596-622.

Gajewski, J.F. & Li, L., 2015. Can internet-based disclosure reduce information asymmetry? *Advances in Accounting*, 31(1), pp.115–124.

Graf, B. & Antoni, C.H., 2020. The relationship between information characteristics and information overload at the workplace – a meta-analysis. *European Journal of Work and Organizational Psychology*, 30(1), pp.143–158.

Haque, H., Kabir, M.N., Abedin, S.H., Miah, M.D. & Sharma, P., 2024. Insider ownership and default risk: What does the data reveal about Japanese firms? *China Accounting and Finance Review*, 26(3), pp.354–384.

Healy, P.M. & Palepu, K.G., 2001. Information asymmetry, corporate disclosure, and the capital markets: A review of the empirical disclosure literature. *Journal of Accounting and Economics*, 31(1–3), pp.405–440.

Index, C.P., 2022. Transparency international, corruption perceptions index. Available at: https://www.transparency.org/cpi2021.

Ismail, T.H., 2002. An empirical investigation of factors influencing voluntary disclosure of financial information on the internet in the GCC countries. Available at: https://ssrn.com/abstract=420700.

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

Klausegger, C. & Sinkovics, R.R., 2007. Information overload: A cross- national investigation of influence factors and effects. *Marketing Intelligence & Planning*, 25(7), pp.691–718.

Klapp, O.E., 1986. *Overload and boredom: Essays on the quality of life in the information society*. Westport, CT: Greenwood Press, pp.98–99.

Leuz, C. & Verrecchia, R., 2000. The economic consequences of increased disclosure. *Journal of Accounting Research*, 38, pp.91–124.

Leroy, A., and Y. Lucotte. 2017. Is there a competition-stability trade-off in European banking? *Journal of International Financial Markets, Institutions and Money* 46:199-215.

Li, L., 2012. The impact of internet-based disclosure on capital market risk. In *29th International Conference of the French Finance Association (AFFI)*, June.

Lima, F.G. & Hossain, M., 2018. The role of institutional investors in corporate governance: Evidence from Brazil. *Corporate Governance*, 18(4), pp.715–732.

Li, W. & Wang, Y., 2016. The impact of independent directors on the quality of information disclosure. *China Journal of Accounting Studies*, 4(2), pp.156–169.

Lundholm, R. & Van Winkle, M., 2006. Motives for disclosure and non-disclosure: A framework and review of the evidence. *Accounting and Business Research*, 36(sup1), pp.43–48.

Marston, C. & Polei, A., 2004. Corporate reporting on the Internet by German companies. *International Journal of Accounting Information Systems*, 5(3), pp.285–311.

Merton, R., 1974. On the pricing of corporate debt: The risk structure of interest rates. *The Journal of Finance*, 29(2), pp.449–470.

Michaels, A. & Grüning, M., 2017. Relationship of corporate social responsibility disclosure on information asymmetry and the cost of capital. *Journal of Management Control*, 28(3), pp.251–274.

Mouselli, S., Jaafar, A. & Hussainey, K., 2014. The role of analyst coverage in improving firm transparency. *Journal of Applied Accounting Research*, 15(3), pp.323–340.

Myers, S.C., 1977. Determinants of corporate borrowing. *Journal of Financial Economics*, 5(2), pp.147–175.

Nadarajah, S., H. N. Duong, S. Ali, B. Liu, and A. Huang. 2021. Stock liquidity and default risk around the world. *Journal of Financial Markets* 55:100597.

Nel, C., Smith, J. & Reddy, P., 2018. Internet investor relations and information asymmetry: The role of analyst coverage. *South African Journal of Economic and Management Sciences*, 21(1).

Nel, G. & Baard, R., 2019. Minimum corporate website disclosure levels and information asymmetry: Evidence from Johannesburg Stock Exchange small-cap companies. *South African Journal of Accounting Research*, 33(3).

Nguyen, P., 2011. Corporate governance and risk-taking: Evidence from Japanese firms. *Pacific-Basin Finance Journal*, 19(3), pp.278–297.

Orens, R., Aerts, W. & Cormier, D., 2010. Web- based non- financial disclosure and cost of finance. *Journal of Business Finance & Accounting*, 37(9- 10), pp.1057–1093.

Pernagallo, G. & Torrisi, B., 2022. A theory of information overload applied to perfectly efficient financial markets. *Review of Behavioral Finance*, 14(2), pp.223–236.

Phillips-Wren, G. & Adya, M., 2020. Decision making under stress: The role of information overload, time pressure, complexity, and uncertainty. *Journal of Decision Systems*, 29(sup1), pp.213–225.

Pour, F.H. & Imanzadeh, Z., 2017. Impact of internet financial reporting on transparency. *Iranian Journal of Accounting Research*, 5(2), pp.41–60.

Prabowo, R. & Angkoso, K.S., 2006. Factors influencing the extent of web-based disclosure: An empirical analysis of Indonesian manufacturing firms. *Jurnal Akuntansi Dan Keuangan*, 8(2), pp.92–98.

Raimo, N., Caragnano, A., Zito, M., Vitolla, F. & Mariani, M., 2021. Extending the benefits of ESG disclosure: The effect on the cost of debt financing. *Corporate Social Responsibility and Environmental Management*, 28(4), pp.1412–1421.

Rego, L.L., Billett, M.T. & Morgan, N.A., 2009. Consumer-based brand equity and firm risk. *Journal of Marketing*, 73(6), pp.47–60.

Romito, S. & Vurro, C., 2021. Non- financial disclosure and information asymmetry: A stakeholder view on US listed firms. *Corporate Social Responsibility and Environmental Management*, 28(2), pp.595–605.

Rossi, F. & Harjoto, M.A., 2020. Corporate non-financial disclosure, firm value, risk, and agency costs: Evidence from Italian listed companies. *Review of Managerial Science*, 14(5), pp.1149–1181.

Sakawa, H. & Watanabel, N., 2020. Institutional ownership and firm performance under stakeholder-oriented corporate governance. *Sustainability*, 12(3), p.1021.

Saxena, D. & Lamest, M., 2018. Information overload and coping strategies in the big data context: Evidence from the hospitality sector. *Journal of Information Science*, 44(3), pp.287–297.

Salin, A.S.A.P., Ismail, Z. and Smith, M., 2024. The impact of corporate disclosure and website informativeness on enhancing corporate governance and performance.

Sengupta, P., 1998. Corporate disclosure quality and the cost of debt. *The Accounting Review*, 73(3), pp.459–474.

Shin, D., and B. Kim. 2015. Liquidity and credit risk before and after the global financial crisis: Evidence from the Korean corporate bond market. *Pacific-Basin Finance Journal* 33:38-61.

Transparency International, 2022. *Corruption Perceptions Index 2022*. [online] Available at: https://www.transparency.org/en/cpi/2022/index/nzl [Accessed 30 September 2025].

Toffler, A., 1970. *Future shock*. Sydney: Pan.

Wang, Y., Wang, T., Li, Y. and Li, J., 2025. Website disclosure and financial performance: Evidence from US hospitals using a textual analysis approach. *International Journal of Accounting Information Systems*, *56*, p.100741.

Wang, T., 2012. An analysis of the effects of online fiscal disclosure on municipal bond issuances. *International Review of Public Administration*, 17(2), pp.1–18.

Watkins, A.L. & Harris, M.S., 2002. The association between web disclosures and firm reputation. *Corporate Reputation Review*, 5(3), pp.241–254.

Xiao, Z., Yang, H. & Chow, C., 2004. Patterns and determinants of internet-based corporate disclosure in China. *Journal of Accounting and Public Policy*, 23(3), pp.91–225.

Yin, S., Yao, K., Chevapatrakul, T. & Huang, R., 2024. Reduced disclosure and default risk: Analysis of smaller reporting companies. *Review of Quantitative Finance and Accounting*, 63(1), pp.355–395.

Yoon, H.H., Zo, H. & Ciganek, A.P., 2011. Does XBRL adoption reduce information asymmetry? *Journal of Business Research*, 64(2), pp.157–163.

Yoshikawa, T. & McGuire, J., 2008. Change and continuity in Japanese corporate governance. *Asia Pacific Journal of Management*, 25(1), pp.5–24.

Zamir, F., Shailer, G. & Saeed, A., 2022. Do corporate social responsibility disclosures influence investment efficiency in the emerging markets of Asia? *International Journal of Managerial Finance*, 18(1), pp.28–48.

APPENDIX A1: VARIABLE DEFINITION

Variable	Definition	Source
Dependent Variable		
Distance to Default	Risk neutral distance-to-default measured by Merton (1974)	CRI
Independent Variable		
Massiveness	comprehensiveness of the website in covering various aspects of the firm's activities	NIKKEI CGES
Intelligibility	how understandable and clear the information on the website is for a member of the general public	Same as above
Usability	the ease of navigation and interaction with the website	Same as above
Information amount	the quantity and materiality of the details of the financial and non-financial information provided on the website.	Same as above
Control Variable		

APPENDIX A1: VARIABLE DEFINITION

Variable	Definition	Source
Dependent Variable		
LNS	The natural log of sales, used to measure firm size	DataStream
K/S	The ratio of tangible, long-term assets (property, plant, and equipment) to sales, used to measure the mitigation of agency problems as it can be stated that these assets can be monitored easily and provide proper collateral	DataStream
Y/S	The ratio of EBITDA (earnings before interest, tax, depreciation, and amortization) to sales	DataStream
R&D/K	The ratio of research and development expenditures to property, plant, and equipment. We set missing observations of R&D/K equal to zero to maintain sample size	DataStream
RDUM	A dummy variable equal to one if R&D data are available, and zero otherwise. This variable allows the intercept term to capture the mean of R&D/K for missing values	DataStream
I/K	The ratio of capital expenditures to property, plant, and equipment	DataStream
ROA	Net income before extraordinary items and discontinued operations divided by total assets multiplied by 100	DataStream
Leverage	Long-term debt divided by the book value of total assets	DataStream
Age	One plus the listing age of a firm as measured by the number of years from its IPO as reported in CRSP	DataStream

AUTHOR'S BIOGRAPHY

Taskin Shakib is an academic, entrepreneur, and finance professional with over a decade of national and international experience in consulting, research, corporate finance, and startups. He has taught courses in Financial Management, Investment Analysis, and Strategic Finance, integrating his practical experience with academic rigor. As an Investment Analyst in the Sustainable Investment Cell of the Central Bank of Bangladesh, he managed PPP-based infrastructure projects worth $600 million, primarily funded by the World Bank, and led $6 million in sustainable investment projects in agriculture. His research roles with USAID and the World Bank focused on diaspora investment and trade competitiveness. Taskin is also the co-founder of Sentinel Technologies, Bangladesh's most innovative tech company of 2023, which is building the country's EV charging infrastructure through its brand, Ekhon Charge. His

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IMPACT OF DIVERSITY AND INCLUSION ON CARBON EMISSION: EVIDENCE FROM A GLOBAL SAMPLE

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ABSTRACT

We investigate whether, how, and under what conditions workforce diversity and inclusion (D&I) improve corporate carbon emission by modeling environmental innovation (EI) as a mediating mechanism and institutional ownership as a moderating force over the period from 2015 to 2023. Using data from the Global Diversity Index and Inclusion Index provided by LSEG and a sample of 21,226 firm-year observations from globally listed firms, we find that both Diversity and Inclusion are positively associated with emission-reduction performance. Mediation tests indicate that EI is strongly related to lower emissions. Moderation analyses reveal stronger D&I effects among firms with higher institutional ownership, consistent with an engaged-ownership mechanism that converts inclusive human capital into credible decarbonization initiatives. Overall, the evidence supports an integrated capabilities-and-governance account in which inclusion expands the firm's problem-solving frontier and innovation capacity, while institutional investors reinforce incentives and monitoring. The findings carry actionable implications for boards, asset owners, and regulators seeking to align D&I strategy with real-economy emission reductions.

Keywords: Diversity, Inclusion, Environmental Innovation, Carbon Emissions, Institutional Ownership, ESG, Sustainable Finance.

1. INTRODUCTION

Climate change represents one of the most acute and complex challenges facing the global community, with carbon emissions constituting the principal contributor to rising global temperatures and ecological deterioration. Within the corporate context, carbon management transcends environmental stewardship, embodying significant financial and governance concerns that directly influence firm valuation, risk exposure, and investor sentiment (Clark, 2019). In this discourse, the influence of corporate diversity and

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inclusion (D&I) has emerged as a comparatively underexamined yet potentially transformative determinant of environmental performance, particularly in relation to carbon emissions. While early literature emphasized regulatory interventions and improvements in energy efficiency (Song, Yoon, & Kang, 2020), recent scholarship increasingly highlights the strategic role of organizational governance structures and workforce heterogeneity in advancing effective environmental practices (Nuber & Velte 2021; Kyaw, Treepongkaruna, & Jiraporn, 2022).

D&I encompasses the demographic composition of the organization—across dimensions such as gender, ethnicity, and culture—and the extent to which such diversity is acknowledged, integrated, and operationalized in organizational decision-making. Diversity introduces a multiplicity of perspectives, while inclusion ensures that these varied viewpoints contribute substantively to strategic objectives. Drawing upon the resource-based view (RBV), firms possessing rare and inimitable human capital—characterized by diverse and inclusive practices—are posited to achieve sustained competitive advantage (Barney, 1991). From this theoretical perspective, D&I functions as a strategic asset that augments problem-solving capabilities, fosters innovation, and enhances organizational resilience (Richard, 2000). In the realm of environmental governance, a diverse and inclusive workforce may thus catalyze the development of robust carbon mitigation strategies, strengthen transparency in carbon disclosures, and facilitate more ambitious decarbonization initiatives.

However, empirical findings remain inconclusive. Some studies provide evidence that gender-diverse boards are associated with enhanced environmental disclosure and lower emissions intensity (Ben-Amar, Chang, & McIlkenny, 2017; García Martín and Herrero 2020, Kyaw, Treepongkaruna et al. 2022). Proponents argue that female and minority directors demonstrate heightened awareness of environmental and social risks, thereby broadening the firm's governance priorities beyond financial outcomes (Liu 2018, Haque and Jones 2020). Conversely, other scholars caution against potential drawbacks associated with diversity, including intra-group conflict, inefficiencies in decision-making, and tokenistic representation, particularly in the absence of strong inclusivity mechanisms (Talavera, Yin et al. 2018). These divergent perspectives underscore the necessity of identifying mediating and moderating pathways that elucidate the conditions under which D&I influences carbon-related outcomes.

A critical factor is institutional ownership. Institutional investors, by virtue of their financial clout and long-term investment horizon, are increasingly recognized as pivotal actors in shaping corporate sustainability agendas (Shleifer and Vishny 1986, Park, Song et al. 2019). Firms with substantial institutional ownership have been observed to exhibit stronger commitments to corporate social responsibility (CSR) and governance reform (Aggarwal, Jindal et al. 2019, Saha, Kabir et al. 2024).

Within the D&I context, institutional investors may act as catalysts, not only advocating for inclusive practices but also ensuring that such initiatives yield substantive, rather than symbolic, environmental outcomes. Hence, institutional ownership may serve as a moderating variable that intensifies the positive impact of D&I on carbon reduction.

To empirically assess these relationships, we leverage the Global Diversity Index and Inclusion Index from LSEG Workspace, which quantifies organizational diversity (e.g., board-level gender and cultural representation, women in the workforce, diversity policies) and inclusion (e.g., flexible work arrangements, accessibility services, equality metrics). Utilizing firm-level data from globally listed firms spanning 2015–2023, our analyses reveal a statistically significant positive relationship between D&I and carbon emissions reduction. Mediation analyses further confirm that environmental innovation is significantly associated with reduced emissions. Additionally, the moderating role of institutional ownership is substantiated, with D&I exhibiting stronger effects in firms with higher levels of institutional equity, consistent with a governance model characterized by active stewardship and enhanced accountability. These findings support a composite theoretical framework that combines capabilities-based and governance-based perspectives, suggesting that D&I enhances the firm's problem-solving and innovation potential, while institutional investors act as accountability mechanisms that align inclusive practices with environmental performance objectives. The study yields practical insights for corporate boards, institutional investors, and policy regulators aiming to integrate D&I into the broader architecture of sustainability strategy.

This study advances the extant literature in several dimensions. First, it represents one of the few global investigations into the intersection of D&I and carbon emissions, addressing the limitations of prior research that predominantly emphasized diversity in isolation (Gorain, Dutta, et al., 2025), neglecting the impact of Inclusion. Second, most existing studies are confined to single-country or single-industry contexts (Nuber & Velte 2021, Saadah, Setiawan, et al., 2024), thereby neglecting a holistic, cross-national perspective that incorporates the full spectrum of workforce diversity. This study by analyzing a global dataset, takes a more holistic approach towards understanding the impact of D&I on carbon emission. Third, previous research has typically focused on narrow dimensions of diversity, such as gender representation racial and cultural diversity without examining the broader implications of diverse workforce attributes (Koseoglu, Arici, Altin, & Okumus, 2024; Mehedi, Akhtaruzzaman, Boubaker, & Jasimuddin, 2024). Our study addresses this gap by analyzing the composite effects of multiple diversity dimensions on carbon emission outcomes through a global lens. Finally, we address the contextual contingencies that may condition the efficacy of D&I initiatives by examining institutional ownership as a

moderating variable. In doing so, we contribute to a more nuanced understanding of how corporate governance dynamics mediate the relationship between inclusive practices and environmental outcomes.

The remainder of this paper is structured as follows: Section 2 reviews the literature and develops hypotheses; Section 3 describes the sample, variables, and empirical model; Section 4 presents empirical results; and Section 5 concludes with key findings and policy implications.

2. LITERATURE REVIEW AND HYPOTHESIS DEVELOPMENT

2.1 Diversity and Inclusion (D&I)

Within the domains of corporate governance and sustainable finance, diversity and inclusion (D&I) are increasingly conceptualized as strategic, intangible assets that enhance organizational capacities for information processing, oversight, and complex problem-solving—ultimately influencing firm-level outcomes (Barney, 1991; Richard, 2000). The heterogeneity of boards and workforces—encompassing dimensions such as gender, cultural and ethnic background, age, tenure, and human capital—serves to strengthen both advisory and monitoring functions, mitigate groupthink, and expand the cognitive bandwidth for addressing complex issues such as climate change (Johnson, Daily, & Ellstrand, 1996).

Empirical literature consistently affirms the relevance of D&I in shaping sustainability-oriented decisions. However, studies relying on unidimensional proxies (e.g., gender representation alone) frequently yield inconsistent findings, particularly when they fail to consider inclusion practices or the contextual variables such as industry, regulation, or market dynamics. Contemporary scholarship thus advocates for a multidimensional conceptualization of D&I and a theoretical framing that elucidates the mechanisms, such as innovation through which diversity translates into organizational outcomes (Mehedi, Akhtaruzzaman, et al., 2024, Saha, Kabir, et al., 2024).

2.2 The Influence of D&I on Carbon Emissions

An expanding body of research explores the nexus between D&I, particularly gender diversity on corporate boards and environmental performance, including carbon emissions. European studies demonstrate that board gender diversity is positively associated with enhanced carbon disclosure

practices, with a more limited, though notable, connection to improved emissions performance. This line of inquiry extends beyond linear associations to explore thresholds such as critical mass and curvilinear effects, revealing that tokenistic representation may be insufficient to generate meaningful environmental impact (Nuber & Velte, 2021).

In the U.S. context, (Kyaw, Treepongkaruna, et al., 2022) finds that firms with boards achieving a critical mass of at least three female directors show statistically significant improvements in emissions reduction. Methodological rigor—through techniques such as propensity score matching, entropy balancing, and instrumental variables—bolsters the credibility of these causal claims. Evidence from the U.K., particularly in response to the 2013 regulatory mandate for carbon reporting, indicates that board diversity gains salience under tighter regulatory regimes, acting through mechanisms such as environmental innovation and capital investment (Muktadir-Al-Mukit & Bhaiyat, 2024). Cross-country analyses further support the D&I–carbon nexus, though findings often vary by firm size or sector, suggesting potential nonlinearities and contextual dependencies (Bouaddi, Basuony, et al., 2023). Therefore, we anticipate that workforce diversity and inclusion will have a positive impact on a firm's carbon emission reduction.

H1: *Diversity and Inclusion is positively associated with Carbon Emission reduction.*

2.3 The Mediating Role of Environmental Innovation

Environmental innovation (EI) which encompasses green technologies, eco-efficient products, and carbon-reducing process redesign emerges as a theoretically grounded mediator linking D&I to emissions outcomes. From the perspective of the resource-based view, cognitively diverse teams are more likely to generate diverse solution sets. Inclusive organizational climates enhance the surfacing, resourcing, and scaling of innovative ideas, enabling firms to build rare and inimitable capabilities essential for decarbonization (Barney, 1991). Empirical studies consistently highlight the role of board and workforce heterogeneity in promoting environmental innovation and resource sustainability, which in turn yields improved carbon performance (Mehedi, Akhtaruzzaman, et al., 2024). Hence, environmental innovation emerges as a promising mediating construct. Innovation is central to the corporate pursuit of decoupling economic growth from environmental degradation, achieved through the deployment of cleaner technologies, sustainable product designs, and operational reforms. The cognitive variety inherent in

diverse teams enhances the firm's capacity for creative problem-solving, thereby increasing the likelihood of novel, high-impact environmental innovations (Albitar, Borgi et al., 2023).Consequently, environmental innovation is a plausible conduit through which D&I translates into improved carbon performance.

The impact of environmental policy such as emissions trading systems and carbon taxation—further enhances the salience of EI as a transmission mechanism between D&I and environmental outcomes (Nuber & Velte, 2021). Certain studies explicitly delineate the pathways such as regulatory stringency, green investments, and innovation capacity through which D&I influences emissions, with post-regulation periods often exhibiting stronger effects (Muktadir-Al-Mukit & Bhaiyat, 2024). For example, (Demiralay, Kilincarslan, et al., 2025) investigates LGBTQ+ inclusion across 898 U.S. firms and demonstrates that stronger inclusion practices correlate with higher environmental performance and increased renewable energy adoption. The study identifies EI as a partial mediator, suggesting that inclusivity in the workplace cultivates a fertile ground for innovation-driven environmental outcomes. Accordingly, we propose the following hypothesis:

H2: *Environmental Innovation is strongly related to lower Carbon Emissions.*

2.4 The Moderating Role of Institutional Ownership

Institutional investors, given their substantial ownership stakes, long-term investment horizons, and superior monitoring capacities, play a pivotal role in shaping corporate governance and sustainability strategy. The literature frequently reports a positive association between institutional ownership and enhanced commitments to corporate social responsibility and governance reforms (Saha, Kabir, et al., 2024). In high-emission industries, institutional actors can catalyze the transformation of D&I policies from symbolic statements into concrete initiatives such as environmental innovation, internal carbon pricing, and emissions reduction targets. Thus, institutional ownership is theorized to amplify the link between D&I and carbon performance.

Studies in related governance domains suggest that gender and diversity effects are more pronounced in regulatory contexts with strong external pressures, where institutional investors

act as enforcers of stakeholder expectations (Nuber & Velte 2021, Muktadir-Al-Mukit & Bhaiyat, 2024). Despite its relevance, the moderating role of institutional ownership in the D&I–carbon emissions relationship has rarely been empirically tested, particularly in conjunction with environmental innovation as a mediator. Adjacent research examining firm performance indicates that D&I effects are indeed contingent on ownership structure, with differing impacts observed between domestic and foreign institutions (Saha, Kabir, et al., 2024). Analyzing this dynamic within an emissions context necessitates moderated mediation models that address endogeneity concerns (e.g., through instrumental variable approaches) and account for variation in stewardship types (active vs. passive, domestic vs. foreign). Accordingly, we propose the following hypothesis:

H3: *The impact of diversity and inclusion on Carbon Emission reduction becomes more pronounced as the level of institutional ownership increases in firm's ownership structure.*

3. METHODOLOGY

3.1 Data and Sample

We construct our empirical sample utilizing data from LSEG Workspace (formerly Refinitiv Eikon), a globally recognized financial and ESG database extensively employed in academic research. Our initial dataset comprises 28744 firm-year observations across 49 countries, each reporting values for the Diversity Index score and Inclusion Index score. To enhance data reliability and ensure cross-country comparability, we exclude countries with fewer than 50 firm-year observations over the sample period. Subsequently, we merge this dataset with firm-level carbon emission reduction scores, financial indicators, and additional ESG control variables. After removing firm-year observations with missing data, the final sample for the composite D&I Index analysis consists of 21,226 firm-year observations spanning 48 countries. Consistent with standard practices in the finance literature, all continuous variables are winsorized at the 1st and 99th percentiles to mitigate the influence of extreme outliers.

3.2 Dependent Variable: Emission Reduction score

The emission reduction score, obtained from Refinitiv/LSEG Workspace, captures the percentile rank of a firm's commitment and effectiveness in reducing environmental emissions across its production and operational processes. The score is benchmarked relative to the firm's industry

peers and is scaled from 0 to 100, with higher values indicating stronger performance in managing and mitigating emissions.

3.3 Independent Variables

This study uses firm-level scores from LSEG Workspace's Global Diversity Index and Inclusion Index as key independent variables. The diversity component includes indicators like gender and cultural diversity at the board level, female representation across roles, and diversity-related policies. The inclusion component covers factors such as flexible work arrangements, support for disabilities, and equality indices. All scores are based on publicly disclosed data, normalized by industry, and range from 0 to 100, with higher values indicating stronger Diversity & Inclusion performance.

3.4 Control Variables

Consistent with prior literature, we use several control variables to investigate the impact of diversity and inclusion on carbon emission reduction. These variables capture key firm characteristics that may influence carbon emission reduction outcomes, including size, financial structure, growth prospects, and risk exposure. Firm size (Size) is measured as the natural logarithm of total assets, while leverage (Lev) is defined as the ratio of total debt to total assets. Firm age (Age) is calculated as the number of years since incorporation. Cash holdings (Cash) are measured as cash and cash equivalents scaled by total assets, and property, plant, and equipment (PPENT) is expressed as a proportion of total assets. The market-based risk is captured by price volatility (Price Volatility), calculated as the standard deviation of daily stock returns over the previous year. We also use return on assets, board size and board independence among the control variables.

3.5 Mediator Variable

This study considers environmental innovation as a mediating variable in the relationship between diversity and inclusion and carbon emission reduction performance. Environmental Innovation which encompasses green technologies, eco-efficient products, and carbon-reducing process redesign emerges as a theoretically grounded mediator linking D&I to emissions outcomes. By including this variable, the analysis assesses whether the impact of D&I on carbon emission reduction performance differs depending on the extent of environmental innovation.

3.6 Moderator variable

This study considers institutional ownership as a moderating variable in the relationship between diversity and inclusion and carbon emission reduction performance. Institutional ownership is measured as the percentage of a firm's outstanding shares held by institutional investors, following prior research that links higher institutional ownership to improved corporate governance, enhanced monitoring, and stronger engagement in sustainability practices environmental innovation (García-Sánchez & García-Sánchez, 2020). Data on institutional ownership are sourced from the FactSet database. By including this variable, the analysis assesses whether the impact of D&I on carbon emission reduction performance differs depending on the extent of institutional investor involvement.

3.5 Empirical Model

To examine the influence of diversity and inclusion on carbon emission reduction, following empirical model is developed:

$$\begin{aligned} Emission\ Reduction_{,\,t+1} = {} & \alpha_0 + \beta_1 Diversity_{i,\,t} + \beta_2 Inclusion_{i,\,t} + \beta_3 Size_{i,\,t} + \beta_4 Lev_{i,\,t} + \\ & \beta_5 ROA_{i,\,t} + \beta_6 Age_{i,\,t} + \beta_7 Cash_{i,\,t} + \beta_8 PPENT_{i,\,t} + \beta_9 Price\ Volatility + \beta_{10} Board\ Size + \\ & \beta_{11} Board\ Independence + Industry + Year + Country + \boldsymbol{\varepsilon_{i,\,t}} \end{aligned}$$

where *i* and *t* denote industry and year, accordingly. The dependent variable *emission reduction* indicates the carbon emission reduction score of firm *i* at year *t+1*, as measured by LSEG workspace. The independent variables are *Diversity* score & *Inclusion* score. Control variables include the total assets (*Size*), leverage (*Lev*), Return on Assets (ROA), firm age (*Age*), cashflow (*Cash*), property, plant, and equipment net (*PPENT*), price volatility (*Price Volatility*), board size (*Board Size*) and board independence (*Board Independence*). The detailed descriptions of all variables have been provided in the Appendix. We incorporate all the control variables in all regression analyses, while also controlling for the year, industry, and country fixed effects

4. EMPIRICAL ANALYSIS

4.1 Descriptive statistics

Table 1 summarises the variables used in the empirical analyses. The dependent variable, Emission Reduction score, has 21,226 firm-year observations with a mean of 38.37 (SD = 33.36; range 0–99.85), indicating substantial cross-sectional variation in decarbonisation outcomes across the sample. The key explanatory variables also exhibit wide dispersion: Diversity score averages 23.18 (SD = 14.37; range 0–84) and Inclusion score averages 14.95 (SD = 20.85; range 0–100). Environmental Innovation—our proposed mediator—averages 23.08 (SD = 30.23; range 0–99.85). Among controls, firms are sizeable (Size mean = 16.19, SD = 2.85), moderately leveraged (mean = 0.21), and display considerable performance variability (ROA mean = 3.83, SD = 13.27). Board independence averages 60.14% and board size (logged) averages 2.19. These characteristics suggest adequate dispersion to identify relationships of interest.

Table 1: Descriptive statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
Emission Reduction score	21226	38.37	33.36	0.00	99.85
Diversity score	21226	23.18	14.37	0.00	84.00
Inclusion score	21226	14.95	20.85	0.00	100.00
Size	21226	16.19	2.85	7.11	26.72
Leverage	21226	0.21	0.18	0.00	0.80
PPENT	21226	0.32	0.27	0.00	0.96
Age	21226	3.26	0.79	0.00	5.32
ROA	21226	3.83	13.27	-83.02	35.35
Price Volatility	21226	27.97	10.32	11.55	63.05
Cash	21226	0.17	0.18	0.00	0.94
Board Size	21226	2.19	0.32	0.00	3.40
Board Independence	21226	60.14	24.87	0.00	100.00
Environmental Innovation	21195	23.08	30.23	0.00	99.85

Note: This table presents the summary statistics of Emission Reduction, Diversity score, Inclusion score and other control variables used in this study. All variables are defined in Appendix A1 and winsorized at the 1% and 99% levels.

4.2 Correlation Analysis

Table 2 reports Pearson correlations. Emission Reduction is positively associated with both Diversity (r = 0.51) and Inclusion (r = 0.48), suggesting a prima facie link between D&I and carbon outcomes. Emission Reduction also correlates positively with firm Size (r = 0.44), and negatively with Price Volatility (r = −0.32), a proxy for risk/uncertainty. Diversity and Inclusion are themselves moderately correlated (r = 0.43), indicating related but non-redundant constructs. Importantly, the majority of correlations are well below conventional multicollinearity thresholds, alleviating immediate concerns about unstable coefficient estimates in multivariate models.

Table 2: Correlation Matrix

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
(1) Emission Reduction score	1.00												
(2) Diversity score	0.51*	1.00											
(3) Inclusion score	0.48*	0.43*	1.00										
(4) Size	0.44*	0.08*	0.33*	1.00									
(5) Leverage	0.05*	0.06*	0.00	0.02*	1.00								
(6) PPENT	0.13*	0.01	-0.02*	0.08*	0.26*	1.00							
(7) Age	0.24*	0.14*	0.21*	0.25*	-0.10*	-0.04*	1.00						
(8) ROA	0.16*	0.10*	0.10*	0.22*	-0.04*	0.03*	0.11*	1.00					
(9) Price Volatility	-0.32*	-0.24*	-0.24*	-0.31*	-0.10*	-0.10*	-0.23*	-0.41*	1.00				

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
(10) Cash	-0.21*	-0.15*	-0.10*	-0.20*	-0.31*	-0.40*	-0.11*	-0.29*	0.37*	1.00			
(11) Board Size	0.36*	0.16*	0.26*	0.39*	0.09*	0.00	0.22*	0.11*	-0.28*	-0.14*	1.00		
(12) Board Independence	0.11*	0.10*	-0.03*	-0.41*	0.19*	-0.01	-0.13*	-0.08*	0.00	-0.01	-0.14*	1.00	
(13) Environmental Innovation	0.48*	0.28*	0.31*	0.32*	0.03*	0.01	0.24*	0.10*	-0.25*	-0.15*	0.25*	-0.07*	1.00

*Notes: This table reports the pairwise correlation matrix for carbon emission reduction, Diversity score, Inclusion score and other control variables used in this study. All variables are defined in Appendix A. * Indicates statistical significance of coefficient. *** p<0.01, ** p<0.05, * p<0.1*

4.3 Baseline regression results

Table 3 presents fixed-effects regressions (firm, year, and country effects included), with t-statistics in parentheses. Diversity score is positively associated with Emission Reduction (β = 0.271, t = 22.505) and remains robust with an extended control set (β = 0.256, t = 18.286). Inclusion score shows a similar pattern (β = 0.191, t = 23.159; with controls β = 0.174, t = 18.612). These estimates indicate that a one-unit increase in Diversity (Inclusion) is linked to an increase of roughly 0.27 (0.19) points in the Emission Reduction score. Control variables behave largely as expected: Size is positively related to Emission Reduction ($\beta \approx 4.0$), while Price Volatility is negatively related ($\beta \approx -0.18$). Leverage and capital intensity (PPENT) are small and statistically insignificant. Model fit is high ($R^2 \approx 0.93$), consistent with saturated fixed effects capturing persistent heterogeneity. The baseline results provide strong evidence that more diverse and inclusive firms achieve better carbon-reduction outcomes, even after controlling for fundamentals and unobserved firm, time and country effects. Our results are consistent with (Demiralay, Kilincarslan, et al., 2025) whose findings show that LGBTQ+-inclusive workplace practices enhance environmental outcomes by fostering innovation. Consistent with our results, (Gorain, Dutta, et al., 2025) show that financial inclusion promotes carbon mitigation by facilitating investments in circular economy initiatives, supporting climate risk insurance

schemes, fostering behavioral shifts through financial literacy programs, and enabling the growth of green innovations.

Table 3: Baseline Regression results

	(1)	(2)	(3)	(4)
			Emission Reduction score	
Diversity score	0.271***	0.256***		
	(22.505)	(18.286)		
Inclusion score			0.191***	0.174***
			(23.159)	(18.612)
Size		4.045***		3.965***
		(10.556)		(10.348)
Leverage		-1.278		-1.581
		(-0.996)		(-1.234)
PPENT		-0.422		-0.813
		(-0.232)		(-0.448)
Age		9.221***		9.548***
		(6.520)		(6.753)
ROA		-0.028**		-0.026**
		(-2.280)		(-2.108)
Price Volatility		-0.190***		-0.176***
		(-4.811)		(-4.454)
Cash		3.426**		3.395**
		(2.257)		(2.237)
Board Size		0.452		0.788
		(0.611)		(1.066)
Board Independence		-0.007		-0.005
		(-0.487)		(-0.335)
Constant	29.797***	-58.272***	33.253***	-55.780***
	(105.565)	(-7.579)	(248.802)	(-7.259)

	(1)	(2)	(3)	(4)
			Emission Reduction score	
Observations	28065	20585	28065	20585
R-squared	0.930	0.930	0.930	0.930
Firm effects	Yes	Yes	Yes	Yes
Year effects	Yes	Yes	Yes	Yes
Country effects	Yes	Yes	Yes	Yes

*Note: This table provides our main OLS regression result as to the impact of the diversity & inclusion on carbon emission reduction. The dependent variable is emission reduction score. Superscripts ***, **, * denote statistical significance at 1%, 5%, and 10% level respectively. T-values are in parentheses *** p<.01, ** p<.05, * p<.1*

4.4 Mediation analysis: Environmental innovation as mechanism

Table 4 evaluates Environmental Innovation (Envino) as a mediator. First, Diversity predicts Envino ($\beta = 0.114$, $t = 8.233$), and Envino itself is strongly associated with Emission Reduction ($\beta = 0.181$, $t = 22.168$). When Envino enters the Emission model, the coefficient on Diversity falls from 0.271 (Table 3) to 0.236 ($t = 17.038$), indicating partial mediation. An analogous pattern holds for Inclusion: Inclusion predicts Envino ($\beta = 0.088$, $t = 9.527$), Envino predicts Emission Reduction ($\beta = 0.179$, $t = 21.964$), and the Inclusion coefficient declines from 0.191 to 0.159 ($t = 17.174$) once Envino is included—again consistent with partial mediation. The evidence supports the contention that D&I facilitate environmental innovation—via broader idea generation and inclusive resource allocation—and that these innovations translate into superior decarbonisation performance. The persistence of statistically significant direct effects suggests that additional, non-innovation channels (e.g., risk governance, stakeholder engagement) may also link D&I to carbon outcomes.

Table 4: Mediating effect: Environmental Innovation

	(1)	(2)	(3)	(4)
	Environmental Innovation	Emission Reduction score	Environmental Innovation	Emission Reduction score
Diversity score	0.114***	0.236***		
	(8.233)	(17.038)		
Environmental Innovation		0.181***		0.179***
		(22.168)		(21.964)
Inclusion score			0.088***	0.159***
			(9.527)	(17.174)
Size	2.018***	3.702***	1.971***	3.640***
	(5.318)	(9.802)	(5.199)	(9.636)
Leverage	-1.247	-1.069	-1.370	-1.331
	(-0.983)	(-0.847)	(-1.080)	(-1.055)
PPENT	-2.868	0.273	-3.078*	-0.115
	(-1.596)	(0.153)	(-1.715)	(-0.064)
Age	3.291**	8.648***	3.450**	8.929***
	(2.351)	(6.212)	(2.467)	(6.414)
ROA	-0.028**	-0.024**	-0.027**	-0.022*
	(-2.270)	(-1.978)	(-2.178)	(-1.833)
Price Volatility	-0.087**	-0.178***	-0.080**	-0.165***
	(-2.238)	(-4.589)	(-2.045)	(-4.244)
Cash	0.119	3.458**	0.093	3.466**
	(0.079)	(2.313)	(0.062)	(2.319)
Board Size	0.227	0.487	0.385	0.791
	(0.310)	(0.669)	(0.527)	(1.088)
Independent Board Members	-0.002	-0.007	-0.001	-0.005
	(-0.131)	(-0.510)	(-0.108)	(-0.388)
Constant	-19.506**	-55.274***	-18.436**	-53.022***
	(-2.562)	(-7.299)	(-2.424)	(-7.005)

	(1)	(2)	(3)	(4)
	Environmental Innovation	Emission Reduction score	Environmental Innovation	Emission Reduction score
Observations	20553	20553	20553	20553
R-squared	0.916	0.932	0.917	0.932
Firm effects	Yes	Yes	Yes	Yes
Year effects	Yes	Yes	Yes	Yes
Country effects	Yes	Yes	Yes	Yes

*Notes: This table reports estimates from regression results for analyzing the mediating impact of environmental innovation on the relationship between Diversity & Inclusion and carbon emission reduction. Definitions of all variables are provided in Appendix. Superscripts ***, **, and * denote statistical significance at the 1%, 5%, and 10% level, respectively.*

4.5 Moderation analysis: Institutional ownership as amplifier on the relationship between D&I and Carbon Emission

Table 5 splits the sample into low- versus high-institutional-ownership groups. The D&I effects are markedly stronger in the high-institutional-ownership subsample: the Diversity coefficient increases from 0.201 (t = 11.116) to 0.384 (t = 14.953), while the Inclusion coefficient rises from 0.153 (t = 12.360) to 0.212 (t = 12.732). Size remains positively associated with Emission Reduction in both groups; Price Volatility remains negative. These results align with a monitoring/engagement view in which institutional investors press management to convert inclusive human-capital practices into credible, measurable environmental performance.

Table 5: Moderating effect: Institutional ownership

	(1)	(2)	(3)	(4)
	Low Inst	High Inst	Low Inst	High Inst
			Emission Reduction Score	
Diversity score	0.201***	0.384***		
	(11.116)	(14.953)		
Inclusion score			0.153***	0.212***
			(12.360)	(12.732)
Size	3.983***	4.163***	3.783***	4.071***

	(1)	(2)	(3)	(4)
	Low Inst	High Inst	Low Inst	High Inst
	Emission Reduction Score			
	(7.473)	(5.946)	(7.105)	(5.779)
Leverage	-1.765	-1.031	-1.829	-1.247
	(-1.010)	(-0.458)	(-1.048)	(-0.551)
PPENT	-1.150	-0.112	-1.637	-1.149
	(-0.464)	(-0.035)	(-0.661)	(-0.357)
Age	8.905***	6.927**	9.318***	7.123***
	(4.903)	(2.565)	(5.138)	(2.622)
ROA	-0.028	-0.033	-0.026	-0.031
	(-1.643)	(-1.529)	(-1.572)	(-1.419)
Price Volatility	-0.166***	-0.248***	-0.156***	-0.244***
	(-3.061)	(-3.428)	(-2.881)	(-3.356)
Cash	3.801*	5.310**	3.853*	4.987*
	(1.841)	(1.964)	(1.869)	(1.833)
Board Size	0.896	0.880	1.437	0.690
	(0.886)	(0.700)	(1.423)	(0.545)
Board Independence	0.019	-0.022	0.020	-0.029
	(1.053)	(-0.915)	(1.161)	(-1.195)
Constant	-54.314***	-59.144***	-51.233***	-52.228***
	(-5.238)	(-4.085)	(-4.952)	(-3.589)
Observations	11958	7141	11958	7141
R-squared	0.935	0.935	0.935	0.934
Firm effects	Yes	Yes	Yes	Yes
Year effects	Yes	Yes	Yes	Yes
Country effects	Yes	Yes	Yes	Yes

Notes: This table reports estimates from regression results for analyzing the moderating impact of institutional ownership on the relationship between Diversity & Inclusion and carbon emission reduction. High institutional ownership and low institutional ownership indicate the above- and below-median value of institutional ownership level. Columns 2, 4 and 6 show results for firms with high institutional ownership and columns 1, 3 and 5 show results for firms with less- than-median levels of institutional ownership. The dependent variable is carbon emission

*reduction. T-statistics are in parentheses. Definitions of all variables are provided in Appendix. Superscripts ***, **, and * denote statistical significance at the 1%, 5%, and 10% level, respectively.*

5. CONCLUSION

This study rigorously investigated the extent, mechanisms, and contextual conditions under which diversity and inclusion (D&I) influence corporate carbon performance. Employing a comprehensive multi-country panel dataset enriched with saturated fixed effects, the analysis yields three key empirical insights. First, both diversity and inclusion exhibit robust and economically significant associations with enhanced carbon emission reduction. Second, environmental innovation (EI) emerges as a mediating mechanism: D&I positively influences EI, which in turn correlates with improved emissions outcomes. Third, the positive effect of D&I on carbon performance is markedly amplified in firms characterized by higher institutional ownership, suggesting that active institutional investors play a pivotal role in transforming inclusive human capital into verifiable decarbonization initiatives.

These findings substantiate an integrated capabilities-and-governance paradigm. Under this framework, D&I is conceptualized as a strategic enabler that expands a firm's cognitive capacity for problem-solving and innovation, while institutional investors function as governance agents who incentivize and monitor environmental performance. From a practical standpoint, corporate managers should regard D&I as a critical component of climate strategy; investors are encouraged to embed D&I-driven innovation within stewardship practices; and regulatory bodies should advance transparency frameworks that distinguish between diversity and inclusion metrics and connect environmental innovation to emissions disclosures.

APPENDIX

Variable	Definition	Author's Calculation
Dependent Variable		
Emission Reduction score	Emission Reduction score captures the percentile rank of a firm's commitment and effectiveness in reducing environmental emissions across its production and operational processes	LSEG Workspace
Independent Variable		
Diversity score	The Diversity Score is a metric that evaluates a company's performance in promoting cultural, gender, and policy-based diversity within its board, management, and overall workforce.	LSEG Workspace
Inclusion score	The Inclusion Score evaluates a company's commitment to workplace equality, flexibility, support services, and programs for employees with disabilities or special needs.	LSEG Workspace
Control Variable		
Size	The natural logarithm of the book value of a firm's asset	LSEG Workspace
PPENT	The ratio of firm's property, plant, and equipment to the book value of asset	LSEG Workspace
Price Volatility	The rolling standard deviation of stock return for the year *t* plus the previous two years	LSEG Workspace
Institutional Ownership	% of shares held by institutions	Fact set
Board Size	Number of Board members	LSEG Workspace
Board Independence	Number of independent directors/ Number of board members	LSEG Workspace

Variable	Definition	Author's Calculation
ROA	The ratio of a firm's net profit to total assets	LSEG Workspace
Cash	The ratio of a firm's cashflow to operations to the book value of its assets	LSEG Workspace
Leverage	The ratio of a firm's total debt to the book value of its assets	LSEG Workspace
Age	One plus the listing age of a firm as measured by the number of years from its IPO as reported in CRSP	LSEG Workspace

REFERENCES

Aggarwal, R., Jindal, V., & Seth, R. (2019). Board diversity and firm performance: The role of business group affiliation. *International Business Review, 28*(6), Article 101600. https://doi.org/10.1016/j.ibusrev.2019.101600

Albitar, K., Borgi, H., Khan, M., & Zahra, A. (2023). Business environmental innovation and CO2 emissions: The moderating role of environmental governance. *Business Strategy and the Environment, 32*(4), 1996–2007. https://doi.org/10.1002/bse.3232

Barney, J. (1991). Firm resources and sustained competitive advantage. *Journal of Management, 17*(1), 99–120. https://doi.org/10.1177/014920639101700108

Ben-Amar, W., Chang, M., & McIlkenny, P. (2017). Board gender diversity and corporate response to sustainability initiatives: Evidence from the carbon disclosure project. *Journal of Business Ethics, 142*(2), 369–383. https://doi.org/10.1007/s10551-015-2759-1

Bouaddi, M., Basuony, M. A. K., & Ali, H. F. (2023). The heterogenous effects of carbon emissions and board gender diversity on a firm's performance. *Sustainability, 15*(19), Article 14642. https://doi.org/10.3390/su151914642

Clark, C. (2019). Climate change scenario analysis for public market investors. *Journal of Applied Corporate Finance, 31*(2), 118–123. https://doi.org/10.1111/jacf.12339

Demiralay, S., Kilincarslan, E., & Gencer, H. G. (2025). LGBTQ+ workplace inclusion and corporate environmental performance. *Business Strategy and the Environment*. Advance online publication. https://doi.org/10.1002/bse.3XXX

García Martín, C. J., & Herrero, B. (2020). Do board characteristics affect environmental performance? A study of EU firms. *Corporate Social Responsibility and Environmental Management, 27*(1), 74–94. https://doi.org/10.1002/csr.1775

García-Sánchez, I.-M., & García-Sánchez, A. (2020). Corporate social responsibility during COVID-19 pandemic. *Journal of Open Innovation: Technology, Market, and Complexity, 6*(4), Article 126. https://doi.org/10.3390/joitmc6040126

Gorain, S., Dutta, S., & Neog, Y. (2025). Multifaceted effect of financial inclusion on carbon emissions: A review. *Discover Cities, 2*(1), Article 75. https://doi.org/10.1007/s44327-025-00075-x

Haque, F., & Jones, M. J. (2020). European firms' corporate biodiversity disclosures and board gender diversity from 2002 to 2016. *The British Accounting Review, 52*(2), Article 100893. https://doi.org/10.1016/j.bar.2019.100893

Johnson, J. L., Daily, C. M., & Ellstrand, A. E. (1996). Boards of directors: A review and research agenda. *Journal of Management, 22*(3), 409–438. https://doi.org/10.1177/014920639602200303

Koseoglu, M. A., Arici, H. E., Altin, M., & Okumus, F. (2024). Environmental, social and governance assets and diversity scores: Exploring their relationship to carbon emissions in global companies. *Management Decision, 62*(10), 3181–3207. https://doi.org/10.1108/MD-12-2023-2345

Kyaw, K., Treepongkaruna, S., & Jiraporn, P. (2022). Board gender diversity and environmental emissions. *Business Strategy and the Environment, 31*(7), 2871–2881. https://doi.org/10.1002/bse.3055

Liu, C. (2018). Are women greener? Corporate gender diversity and environmental violations. *Journal of Corporate Finance, 52*, 118–142. https://doi.org/10.1016/j.jcorpfin.2018.08.004

Mehedi, S., Akhtaruzzaman, M., Boubaker, S., & Jasimuddin, S. M. (2024). Board demographic, structural, and capital diversity, and corporate carbon performance: International evidence. *Journal of Accounting Literature*. Advance online publication. https://doi.org/10.1108/JAL-XX-XXXX-XXXX

Muktadir-Al-Mukit, D., & Bhaiyat, F. H. (2024). Impact of corporate governance diversity on carbon emission under environmental policy via the mandatory nonfinancial reporting regulation. *Business Strategy and the Environment, 33*(2), 1397–1417. https://doi.org/10.1002/bse.3543

Nuber, C., & Velte, P. (2021). Board gender diversity and carbon emissions: European evidence on curvilinear relationships and critical mass. *Business Strategy and the Environment, 30*(4), 1958–1992. https://doi.org/10.1002/bse.2727

Park, S., Song, S., & Lee, S. (2019). The influence of CEOs' equity-based compensation on restaurant firms' CSR initiatives: The moderating role of institutional ownership. *International Journal of Contemporary Hospitality Management, 31*(9), 3664–3682. https://doi.org/10.1108/IJCHM-08-2018-0671

Richard, O. C. (2000). Racial diversity, business strategy, and firm performance: A resource-based view. *Academy of Management Journal*, *43*(2), 164–177. https://doi.org/10.2307/1556374

Saadah, K., Setiawan, D., Yuskar, Y., & Wulandari, T. R. (2024). The role of women in top management in carbon emission disclosure–Evidence from banking entities in ASEAN. *Journal of Open Innovation: Technology, Market, and Complexity, 10*(3), Article 100330. https://doi.org/10.1016/j.joitmc.2024.100330

Saha, R., Kabir, M. N., & Bose, S. (2024). Impact of diversity and inclusion on firm performance: Moderating role of institutional ownership. *Journal of Risk and Financial Management, 17*(8), Article 344. https://doi.org/10.3390/jrfm17080344

Shleifer, A., & Vishny, R. W. (1986). Large shareholders and corporate control. *Journal of Political Economy, 94*(3, Part 1), 461–488. https://doi.org/10.1086/261385

Song, H. J., Yoon, Y. N., & Kang, K. H. (2020). The relationship between board diversity and firm performance in the lodging industry: The moderating role of internationalization. *International Journal of Hospitality Management*, 86, 102461.

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UNLOCKING THE MILLENNIAL MINDSET: ORGANIZATIONAL JUSTICE AND TURNOVER INTENTIONS IN EMERGING MARKETS

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ABSTRACT

This paper examines organizational justice's impact on turnover intentions among millennial employees in emerging markets, focusing on Bangladesh. By exploring the distributive, procedural, and interactional components of organizational justice, our study aimed to identify the factors that most significantly influence millennials' decisions to keep or leave their jobs. By applying Partial Least Squares Structural Equation Modelling (PLS-SEM) on data drawn from a sample of 608 millennial employees, we found distributive and interactional justice to be negatively correlated with turnover intentions. In contrast, we found procedural justice did not exhibit any significant effect. This research fills a critical gap in the literature by focusing on millennials in emerging markets and offering new insights into how justice perceptions affect their workplace behavior. Our study's findings have practical implications for employers aiming to retain millennial talent by improving resource distribution and interpersonal relationships fairness. Furthermore, it contributes to organizational justice theory by highlighting the unique justice-related expectations of millennials in emerging economies.

Keywords: Millennial, Organizational Justice, Turnover, Psychological Contract, Human resource practices.

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1. INTRODUCTION

Millennials make up about 34.8% of Bangladesh's total population (LightCastle Partners, 2016). Their rising participation in the workforce makes it imperative to study and analyze their workplace behavior. Millennials, who graduated and started joining the workforce from 2004 onwards (Hershatter & Epstein, 2010), stand out from other generations in relation to their mindset, along with some other noteworthy traits and workplace behaviors. The use of technology for accumulating and compiling data is one of the distinguishable traits of millennials, and it is considered an invaluable skill in today's workplace (Hershetter & Epstein, 2010). Besides their unique skills, they also have distinctive preferences in terms of employment. A learning environment that ensures work safety, job security, and flexible job hours are some of the preferences that drive millennials' workplace motivation (Hershatter, 2007). Also, according to Murray (2009), they aspire to a strong correlation between performance and reward, which ultimately drives their desire to be part of organizations that provide them with adequate opportunities for career progression and recognition for any exceptional performance. Conversely, some studies have found that organizational justice plays a crucial role in these individuals' intentions to quit their jobs (Parker, Nouri, & Hayes, 2011; Ali & Jan, 2012).

Organizational justice has been the subject of frequent research, particularly in the field of organizational behavior, industrial psychology, and HRM (Cropanzano & Greenberg, 1997). Organizational justice reflects employee perceptions of fairness in the workplace (Greenberg, 1987; Nadiri & Tanova, 2010). It comprises of three components: distributive, procedural, and interactional justice. Distributive justice focuses on the fairness of outcomes like salary, promotions, and recognition (Adams, 1965). Procedural justice, on the other hand, refers to the fairness of the processes used to make decisions (Thibaut & Walker, 1975; Parker & Kohlmeyer, 2005), emphasizing unbiased procedures (Crenshaw et al., 2013). This fairness ensures employees feel valued (Lind & Tyler, 1988). Interactional justice involves how employees are treated, including respectful communication and explanations (Bies & Moag, 1986; Wang et al., 2010). Colquitt (2001) highlights two aspects of interactional justice: informational justice, which involves adequate explanations, and interpersonal justice, which is about treating employees with respect (Cropanzano et al., 2007).

Turnover intentions refer to conscious employee decisions to leave their jobs. They are a crucial indicator of potential turnover behaviors and are influenced by various factors, including organizational justice (Tett & Meyer, 1993). Millennials, who are well-known for their high job mobility, often express turnover intentions when they perceive to be subjected to unfair treatment in regard to any of the three forms of organizational justice (Twenge, 2010). Studies indicate that the turnover intentions of millennials decrease significantly when they experience fairness in rewards, decision-making processes, and interpersonal treatment (Ali & Jan, 2012; George & Wallio, 2017). As the current workforce in Bangladesh mainly consists of millennials, it is essential to study and analyze their behaviors. Huda, Iqbal, and Islam (2020) examined the relationship between HR spending and firm performance, which makes it imperative to look into the effect of organizational justice on employee morale—and, thus, turnover intentions (Huda et al., 2024; Huda et al., 2019).

Our study addresses a critical gap in the literature by examining how organizational justice influences turnover intentions among millennials in emerging markets, specifically focusing on Bangladesh. While organizational justice has been extensively explored in developed economies, emerging markets have distinct economic and cultural dynamics that remain underexplored, particularly for millennial employees (Al-Zoubi et al., 2022). By studying Bangladesh's workforce, which differs significantly from that of developed countries, we aim to extend organizational justice theory and provide actionable insights that help businesses formulate fairer workplace policies. Understanding how distributive, procedural, and interactional justice affect millennial turnover intentions is crucial for enhancing employee retention and organizational performance (Mokhber et al., 2020). Given the high turnover rates among millennials globally, our findings offer valuable contributions to both academic research and practical HR strategies. Using Colquitt's (2001) measures, we analyzed survey data from millennial employees across different industries in Bangladesh to determine how fairness perceptions impact their decisions to stay or leave. These insights can guide HR managers, policymakers, and organizational leaders in creating fairer policies that improve job satisfaction and retention. The following sections include a literature review, methodology, results, and practical recommendations.

2. RESEARCH QUESTIONS

Through our study, we sought to answer the question: *How does current organizational justice affect employees' intentions to leave an organization?*

3. LITERATURE REVIEW

3.1 Organizational justice

Organizational Justice Theory emerged as a way to explain how employees perceive fairness in the workplace and how their perceptions influence their attitudes and behaviors. The concept was first formally introduced in John Stacey Adams' Equity Theory (1965), which focused on distributive justice, or the fairness of outcome distributions such as salaries and promotions. As research on fairness expanded, scholars like Thibaut and Walker (1975) introduced procedural justice, emphasizing the fairness of the processes underpinning related decisions. In the late 1980s, Bies and Moag (1986) advanced the concept of interactional justice, which focuses on the quality of interpersonal treatment regarding organizational processes. A significant milestone in organizational justice research was provided by Jerald Greenberg (1987), who offered a comprehensive taxonomy that categorized organizational justice into its distinct but interrelated distributive, procedural, and interactional components. This framework has since been used extensively to understand the role played by fairness in relation to employee satisfaction, commitment, and turnover. Over time, the theory has been expanded to include subcategories like interpersonal (treatment with respect) and informational (adequacy of explanations) justice, further refining how fairness is perceived in various organizational contexts (Colquitt et al., 2001). Today, Organizational Justice Theory remains a critical framework for understanding workplace dynamics and influencing policies on equity, fairness, and employee retention.

Distributive justice refers to the perceived fairness of organizational outcomes—such as pay, promotions, and rewards. Employees evaluate the fairness of these outcomes based on comparisons with their colleagues. This concept stems from Adams' Equity Theory (1965), which emphasizes how individuals perceive justice in relation to the degree to which their input-to-outcome ratio is comparable to others. Any dissatisfaction felt by employees when their

efforts are not equitably rewarded can increase their turnover intentions. Distributive justice significantly influences employee perceptions of how fairly rewards and resources are allocated (Adams, 1965). In the context of millennials, reward distribution fairness is crucial because they value career growth, recognition, and equitable compensation (George & Wallio, 2017).

Procedural justice is concerned with perceptions of fairness regarding the processes by which outcome decisions are made. Greenberg (1987) highlighted how, unlike its distributive counterpart, procedural justice focuses not on the outcomes themselves but on the fairness of the procedures that lead to those outcomes. Fair processes include transparency, consistency, and impartiality. According to Thibaut and Walker (1975), procedural justice impacts employee perceptions of fairness beyond the immediate results. Millennials, who prioritize transparency and participation in decision-making, may perceive a lack of procedural fairness if they feel excluded from important organizational decisions, contributing to higher turnover intentions (Colquitt et al., 2001).

As Bies and Moag (1986) outlined, interactional justice focuses on the quality of the interpersonal treatment of employees during the implementation of decisions. Interactional justice has two components: (i) interpersonal justice, which reflects the degree to which individuals are treated with respect, dignity, and courtesy by those in authority; and (ii) informational justice, which measures the perceived adequacy of the explanations and justifications underpinning any decisions that affect employees. Greenberg (1987) recognized interactional justice as an essential complement to distributive and procedural justice, emphasizing the importance of respectful and honest communication in maintaining perceptions of fairness. Interactional justice, which plays a crucial role in shaping the overall sense of workplace fairness among millennials—who value meaningful interactions and the respect of their supervisors—has been shown to reduce turnover intentions when effectively practiced (Bies & Moag, 1986; Colquitt et al., 2001).

All three components of organizational justice tend to be correlated (Cropanzano et al., 2007). These can be treated as three elements that work together to create overall fairness in the

organization (Ambrose & Arnaud, 2005; Ambrose & Schminke, 2007). Even so, if the goal is to foster organizational justice, it is imperative to examine them separately to understand their impacts clearly on managerial actions.

3.2 Employee Turnover Intentions

Employee retention is one of the major HR challenges faced by today's organizations because high employee turnover is often very costly, involving the loss of critical skills, knowledge, and experience, coupled with an adverse impact on overall workforce morale (Hom & Griffeth, 1995; Ponnu & Chuah, 2010; Kwon & Rupp, 2013). Turnover intentions refer to employees considering leaving their current jobs for other, potentially more satisfying ones (Carmeli & Weisberg, 2006), which can then lead to actual turnover. Numerous studies have identified factors that affect turnover intentions (Avcı & Küçükusta, 2009), such as company support (Hui, Wong, & Tjosvold, 2007), citizenship behavior (Bellou, 2008), organizational justice or fairness (Choi, 2011), and organizational commitment (Boyas, Wind, & Kang, 2012). Previous studies have also indicated that employee perceptions of organizational fairness—which are significantly related to their commitment to their respective organizations—affect their intentions to quit their jobs (Ponnu & Chuah, 2010).

Turnover intentions—as conscious decisions to leave an organization (Emeji, 2018; Tett & Meyer, 1993; Issa, Ahmed, & Gelaidan, 2013)—do not necessarily lead to actual turnover, but they do represent a significant outcome variable (Ciftcioglu, 2011; Chang, Wang, & Huang, 2013). Furthermore, turnover intentions have consistently been proven to predict employee turnover behaviors (Griffeth, Hom, & Gaertner, 2000; Firth, Mellor, Moore, & Loquet, 2004). Dalton, Daily, Johnson, and Ellstrand (1999) found that around 25% of all employee turnover intentions translate into actual resignation decisions.

3.3 Understanding Millennials and their Generational Characteristics

A generation can be defined as a group of individuals who were born within a certain date range and share life experiences mostly influenced by the same historical and socio-cultural context,

resulting in similar ways of thinking and acting (Smith & Clurman, 1997; Beldona, Nusair, & Demicco, 2009; Lyons & Kuron, 2014). The modern workplace includes several generational cohorts, each with distinct traits (Gursoy, Maier, & Chi, 2008; Gursoy, Chi, & Karadag, 2013; Salahuddin, 2010). To retain, manage, and nurture the talents of a multigenerational workforce, organizations are required to effectively understand varying sets of beliefs, lifestyles, attitudes, work ethics, preferences, and expectations (Calk & Patrick, 2017). The literature suggests that differences among generations exist—for example, Twenge, Campbell, and Freeman (2012) indicate that millennials assign great significance to extrinsic values like money and fame. Accordingly, our study aimed to understand generational workplace differences and how they affect organizations, with a special focus on millennials, and to identify the correlation between organizational justice levels and millennial turnover intentions.

As previous generations approach retirement, organizations are increasingly dependent on their millennial employees (Ertas, 2015; Lewis & Wescott, 2017). The first millennials entered the workforce in 2004 (Hershatter & Epstein, 2010), and this is the youngest and fastest-growing generation in today's workforce. Often known as digital natives (Ivanović & Ivančević, 2019), millennials differ from previous generations in many ways as they grew up in a technology-dominated world (Manaf, Mohd, & Abdullah, 2010). Organizations face significant challenges in retaining them (Deal, Altman, & Rogelberg, 2010; Ng & Schweitzer, 2010) because of their tendency to frequently switch jobs (Meier & Crocker, 2010; Twenge, 2010) and their general lack of loyalty toward employers (Calk & Patrick, 2017). As a result of their distinctive work ethics and preferences (Naim & Lenka, 2017), millennials demonstrate high levels of optimism, confidence, and self-esteem (Martin, 2005; Twenge, 2010), exhibiting average turnover rates that are higher than those of previous generations (Adkins, 2016; Campione, 2015; Frian & Mulyani, 2018). The literature has considered many factors suitable for formulating strategies aimed at millennial retention, which is one of the most significant challenges faced by organizations, suggesting that gaining a better understanding of such factors can enable a substantial competitive edge in managing turnover (Tallman & Mason, 2012; Lancaster & Stillman, 2002).

3.4 Organizational Justice and its Relation to Employee Turnover Intentions

Colquitt et al. (2001) found that perceived organizational justice significantly influences employee attitudes and behaviors, such as job satisfaction and turnover intentions. Their findings were supported by those of Herda (2012), Herda and Lavelle (2012), and Parker, Nouri, and Hayes (2011). Cropanzano, Bowen, and Gilliland (2007) added that organizational justice perceptions are shaped by supervisors' ethical and moral standards, highlighting the importance of supervisor awareness of these perceptions. Wallace and Gaylor (2012) noted that employee turnover can damage an organization's reputation and efficiency. Dalton et al. (1999) and others identified some of the key variables influencing turnover intentions, including job dissatisfaction and perceived workplace unfairness (Herda & Lavelle, 2012; DeTienne et al., 2012; Yücel, 2012; Parker et al., 2011). Our study considers perceived organizational justice a critical factor influencing turnover intentions among millennials (George & Wallio, 2016).

Recent studies have emphasized the significant role played by organizational justice in reducing turnover intentions across various industries. Distributive justice, which pertains to the fairness of outcome distributions such as pay and rewards, has been shown to strongly reduce turnover intentions, as employees who perceive fairness in rewards are less likely to leave their organization (Özkan, 2022). Similarly, procedural justice, which involves the fairness of decision-making processes, has been identified as a key factor in lowering turnover intentions, with studies highlighting its more significant influence compared to distributive justice in specific sectors, such as pharmaceuticals (Younas et al., 2021). Interactional justice, which focuses on fairness in interpersonal relationships, also plays a crucial role, particularly in mitigating the adverse effects of job stress on turnover. Employees who are treated respectfully and in a dignified manner by their supervisors are more likely to stay in their jobs, even in highly stressful environments (Cho et al., 2019). Finally, organizational justice fosters trust, which mediates the relationship between justice and turnover intentions. Employees who trust their organizations because they are treated fairly are significantly less likely to consider leaving (Farooq & Farooq, 2020). Together, these findings highlight the importance of fostering fairness

across the distributive, procedural, and interactional dimensions of organizational justice in reducing employee turnover intentions and improving retention.

Few studies have examined the relationship between employee perceptions of organizational justice and turnover intentions. Employees quit their jobs if they perceive low levels of distributive justice (Hendrix, Robbins, Miller, & Summers, 1999). Dailey and Kirk (1992) found that the distributive and procedural dimensions of organizational justice act as predictors of job satisfaction and turnover intentions. The scarcity of studies on millennial employee perceptions of organizational justice and turnover intentions calls for further investigation (George & Wallio, 2017). Millennials' turnover intentions and behaviors have been the focus of research (George & Wallio, 2017). Millennial turnover intention rates have been found to be higher than those exhibited by previous generations (Kowske, Rasch, & Wiley, 2013; Ertas, 2015). Specifically, Deloitte's (2011) Talent Edge 2020 survey found that around 26% of millennials plan to leave their jobs within their first 12 months of employment, with other studies also indicating that millennial employees are less likely than previous generations to stay in their current employment (Twenge, 2010; Sujansky & Ferri-Reed, 2009). Parker et al. (2011)—who focused on the pharmaceutical industry—and Ali and Jan (2012) found a negative relationship between distributive justice and employee turnover intentions.

Based on the literature review, we formulated the following hypotheses:

H1*: There is a negative relationship between distributive justice and turnover intentions.*

H2*: There is a negative relationship between procedural justice and turnover intentions.*

H3*: There is a negative relationship between interactional justice and turnover intentions.*

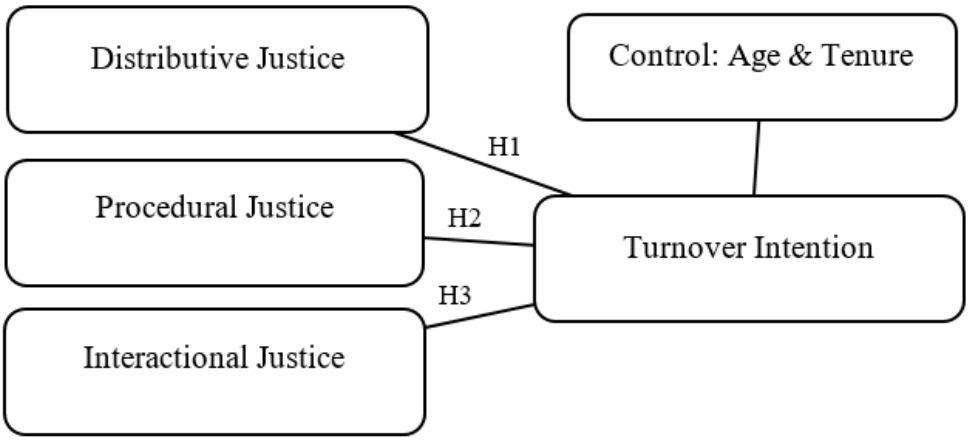

Figure 1: Proposed Model

Our study focuses on finding the influence of perceived organizational justice on millennial employees' turnover intention. This calls for further study due to the absence of relevant literature. Therefore, we intend to close the gap by exploring the stated relationships between millennial employees' perceived organizational justice and their intention to leave the organization.

4. DATA AND METHODOLOGY

4.1 Sampling

To identify the participants from whom to collect survey data for our study, we employed a non-probability convenience sampling method, which is commonly used in exploratory research when the goal is to gather initial insights or when random sampling is impractical (Etikan, Musa, & Alkassim, 2016). We selected this method due to its practicality in efficiently reaching members of our target demographic.

4.2 Method

In our study, we used Partial Least Squares Structural Equation Modeling (PLS-SEM) to analyze the relationship between perceptions of organizational justice and millennial turnover intentions across various industry sectors in Bangladesh. We chose PLS-SEM due to its effectiveness in exploring complex models with multiple constructs and its suitability for yielding robust results

from smaller sample sizes in social science research (Hair et al., 2017). We administered a survey to 608 millennial employees and used SEM to assess the impact of their perceptions of distributive, procedural, and interactional justice on their turnover intentions.

4.3 Measures

As the constructs for our study, we considered the three dimensions of organizational justice proposed by Colquitt (2001)—namely, distributive, procedural, and interactional justice—which we measured using that author's validated scale. We assessed procedural justice through seven items—for example, "Were you able to express your views and feelings during those procedures?" We measured distributive justice with four items, such as: "Do the outcomes you receive from your job (e.g., pay, promotions, etc.) reflect the effort you have put into your work?" Given the independent effects of the internal components of interactional justice, we measured it using four items for interpersonal and five items for informational justice, with questions such as "Does your supervisor treat you in a polite manner?" and "Does your supervisor communicate details in a timely manner?"

We measured all the items on a five-point Likert scale ranging from 1 ("to a small extent") to 5 ("to a large extent"). To assess turnover intentions, we used a six-item scale developed by Bothma and Roodt (2013), with questions such as "How often do you dream about getting another job that will better suit your personal needs?" We incorporated control variables into our analysis, including gender and job tenure, because previous research by Herda and Lavelle (2012) and Reed, Kratchman, and Strawser (1994) found established relationships between these factors and turnover intentions. Before the data collection process, we obtained permission from the respective authors to use the questionnaires. This approach ensured the reliability and validity of our constructs and controls, allowing for a comprehensive assessment of the relationships under investigation.

5. ANALYSIS OF FINDINGS

We assessed the structural model and hypotheses, verified item reliability and validity, and evaluated the model's predictive relevance through the PLS-SEM approach and SmartPLS (v.3.3.3) software (Ringle, Wende, and Becker, 2015). The following table (Table 1) summarizes the descriptive statistics of our 608 respondents.

Birth Year	**n**	**%**
1982	17	2.80
1983	34	5.59
1984	23	3.78
1985	30	4.93
1986	56	9.21
1987	75	12.34
1988	77	12.66
1989	81	13.32
1990	70	11.51
1991	37	6.09
1992	55	9.05
1993	24	3.95
1994	18	2.96
1995	11	1.81
Gender		
Male	523	86.02
Female	85	13.98
Tenure		
0-2	282	46.38
3-4	79	12.99
5-6	104	17.11
7-8	88	14.47
9 and above	55	9.05

Table 1: Descriptive Statistics

5.1 Measurement Model

We assessed the internal reliability of our constructs using composite reliability and Cronbach's alpha (Hair et al., 2017). As shown in Table 2, the composite reliability and Cronbach's alpha of most constructs exceeded the recommended threshold of 0.7, confirming internal reliability (Henseler, Ringle, & Sinkovics, 2009; Hair et al., 2017). For some items, factor loadings fell to 0.5, which is still considered acceptable in exploratory models, as noted in recent publications (Hayes & Coutts, 2020; Shevlin et al., 2000; Taber, 2018). We checked for convergent validity using the item loading criteria and average variance extracted (AVE), and measured discriminant validity using the heterotrait-monotrait (HTMT) ratio of correlation (Hair et al., 2017). As Table 2 shows, all constructs were found to have item loadings and AVE above the threshold value of 0.5, thus confirming convergent validity (Fornell & Larcker, 1981). Table 3 shows that the HTMT ratio of each pair fell below 0.85, confirming the discriminant validity of all constructs.

To measure the level of multicollinearity, we used the collinearity coefficients and variance inflation factors (VIFs). Table 4 shows that the VIF values of the constructs fell below the threshold of 10 (O'Brien, 2007). Furthermore, all the correlation coefficients were also found to be lower than the threshold value of 0.9 (Hair et al., 2006). This suggests that the model was unaffected by any multicollinearity issues.

Constructs	Item Loadings	Cronbach's Alpha	Composite Reliability	Average Variance Extracted (AVE)
DJ (Distributive Justice)	DJ1: 0.849, DJ2: 0.870, DJ3: 0.890, DJ4: 0.905	0.898	0.929	0.766
IJ (Interactional Justice)	IJ1: 0.689, IJ2: 0.687, IJ3: 0.690, IJ4: 0.729, IJ5: 0.829	0.904	0.922	0.57
PJ (Procedural Justice)	PJ1: 0.567, PJ2: 0.590, PJ3: 0.675, PJ4: 0.650, PJ5: 0.712, PJ6: 0.710, PJ7: 0.799	0.848	0.884	0.524
Turnover	TO1: 0.579, TO2: 0.685, TO3: 0.687, TO4: 0.675, TO5: 0.700, TO6: 0.791	0.803	0.859	0.507

Table 2: Internal reliability and convergent validity

Constructs	DJ	IJ	PJ	Turnover_
DJ				
IJ	0.758			
PJ	0.781	0.746		
Turnover_	0.561	0.497	0.43	

Table 3: Discriminant Validity (heterotrait-monotrait (HTMT) ratio)

	The correlation matrix and the square root of the AVE				VIF
	DJ	IJ	PJ	Turnover_	Turnover
DJ	0.875				2.297
IJ	0.684	0.755			2.176
PJ	0.687	0.665	0.724		2.19
Turnover_	-0.484	-0.437	-0.373	0.712	

Table 4: Fornell-Larcker criterion and variance inflation factors (VIF)

Hypothesis	Path	β	t-statistics	p-value	Result
H1	DJ -> Turnover	-0.311**	4.899	0	Supported
H2	IJ -> Turnover	-0.2**	3.479	0.001	Supported
H3	PJ -> Turnover	-0.015	0.279	0.78	Not Supported
Control Variables	Gender	0.027	0.693	0.488	Not Significant
	Tenure	-0.182	5.223	0	Significant

***Significant at p < 0.01*

Table 5: Structural Model

Our results indicate a negative relationship between distributive and interactional justice with millennial employee turnover intentions. However, we did not find a statistically significant relationship between procedural justice and turnover intention.

	Adjusted R^2	Q^2
Endogenous Construct		
Turnover	0.28	0.139

Table 6: Coefficient of Determination (Adjusted R^2), Predictive Relevance (Q^2), and Effect Size (f^2)

We examined the structural model to test the hypotheses using a bootstrapping process with 5,000 bootstrap sub-samples. As shown in Table 6, the adjusted R^2 of the model was 0.28, meaning that 28% of the variance in turnover can be explained by organizational justice. Table 5 shows the statistical significance of the relationships we had posited in hypotheses H1 (DJ → Turnover, $\beta = -0.311$, $t = 4.899$) and H2 (IJ → Turnover, $\beta = -0.2$, $t = 3.479$). This indicates that both distributive and interactional justice negatively affect turnover. However, the relationship posited in hypothesis H3 (PJ → Turnover, $\beta = -0.015$, $t = 0.279$) was found to have a p-value greater than 0.05 ($p > 0.05$), indicating its statistical non-significance. Therefore, according to the model, procedural justice does not appear to significantly influence job satisfaction.

Table 5 also shows that the control variable tenure has a p-value less than 0.05 ($p < 0.05$), indicating that its effect is statistically significant in explaining the variance in turnover. Tenure is observed to influence turnover negatively. However, the control variable gender does not appear statistically significant, as its p-value is greater than 0.05 ($p > 0.05$).

The predictive relevance of the endogenous construct, Stone–Geisser's Q^2, was measured using the blindfolding procedure in SmartPLS (v.3.3.3) software (Ringle et al., 2015). As Table 6 shows, the Q^2 for turnover is well above zero, suggesting a high predictive relevance for the model.

6. DISCUSSION

Our study aimed to identify millennial employees' perceptions of organizational justice and how these affect their turnover intentions in the emerging market of Bangladesh. Our findings support the reactive theory of justice (Özkan, 2022), as they show that both the distributive and interactional justice dimensions have negative effects on turnover intentions—i.e., the higher the degree of perceived injustice in these two components, the stronger the employee turnover intentions. Our results are consistent with those of Özkan (2022), Nurhayti, Haningsih, and Awaliyah (2020), and with the meta-analyses of Sahin (2021) and Park and Min (2020). On the

other hand, we did not find any significant relationship between perceptions of procedural justice and turnover intentions, despite the negative relationship reported in previous studies (e.g., Cohen-Charash & Spector, 2001). Given the significant relationship between procedural justice perceptions and turnover intentions identified by many studies, our results may have been affected by the specificity of millennial employees' perceptions of justice or by the uncertainty caused by the COVID-19 pandemic (Parker & Kohlmeyer, 2005; Meisler, 2013).

Millennial staff turnover is a major cause for concern both globally and specifically in Bangladesh, where the incidence of millennial staff turnover presents a significant challenge for organizations. Our study thus provides key insights into the mindset of millennial employees and possible solutions (George & Wallio, 2017). We found that the distributive and interactional dimensions of perceived organizational justice negatively affect employee turnover, whereas the procedural dimension does not appear to have any effect. Our model was found to explain 28% of the variance in turnover. This indicates that employee perceptions of fairness in decision outcomes and interpersonal treatment influence their turnover decisions. Thus, increased fairness in these two aspects may reduce organizational turnover, whereas process fairness does not seem to have a substantial influence on individual intentions to leave the job.

7. LIMITATIONS OF THE STUDY AND FUTURE SCOPE

Our study had a broader scope, covering a wide range of industries. Future studies could verify the generalizability of our findings by drawing upon larger samples and focusing on specific industries. Additionally, our descriptive data show the limited presence of female staff in our sample and that most respondents had recently graduated and joined the workforce. Another limitation of our study is that we collected data during the COVID-19 pandemic, with the resulting uncertainty and volatility in most job sectors possibly causing respondent bias due to heightened positive perceptions of having a stable job. Future studies could further explore these dynamics across different industries and with larger, more diverse samples (Rusbadrol et al., 2021).

8. IMPLICATIONS

The findings of this study have significant policy and managerial implications for organizations aiming to retain millennial employees, especially since employers are already struggling (Montag et al., 2012). Enhancing both distributive and interactional justice should be a top priority, as these dimensions of organizational justice were found to have the most impact on reducing turnover intentions among millennials. Organizations should focus on transparent and consistent reward systems, ensuring that promotions, resources, and benefits are allocated fairly. Equally important is maintaining respectful communication and treatment, as millennials are particularly responsive to positive interpersonal interactions. Implementing such measures can foster higher employee commitment and lower turnover rates (George & Wallio, 2017; Anggiani & Wiyana, 2021). The research established that, to retain employees, employers must understand millennial preferences, such as providing structure in their work (Epstein & Howes, 2008), a flatter hierarchy (Hewlett et al., 2009), opportunities for career development (De Hauw & De Vos, 2010), and, most importantly, a suitable work-life balance (Smola & Sutton, 2002).

Although procedural justice had a less significant impact on millennial turnover intentions in Bangladesh, it is still beneficial to enhance transparency in decision-making processes. Improving procedural justice can support overall job satisfaction and retention, which may benefit other employee demographics or different contexts (Saraswati & Lie, 2021). Managers should receive training focused on fair communication, decision-making, and resource distribution to promote perceptions of fairness. This approach not only creates a positive organizational culture but also aids in retaining millennial talent (Vaamonde et al., 2018; Epstein & Howes, 2008).

Additionally, organizations should regularly monitor and evaluate employee perceptions of fairness. Conducting employee surveys can help identify gaps in distributive, procedural, and interactional justice, allowing for timely interventions. Addressing these gaps can further reduce turnover intentions by enhancing employee satisfaction and loyalty (Younas et al., 2021). These strategies provide a comprehensive framework for creating a fair and just work environment that

aligns with the preferences and expectations of millennial employees, thereby improving retention.

9. CONCLUSION

This study investigated the influence of organizational justice on turnover intentions among millennials in Bangladesh. The results revealed that distributive and interactional justice negatively impact turnover intentions, aligning with previous findings that higher perceptions of these two justice types can reduce turnover intentions among millennial employees (George & Wallio, 2017). Procedural justice, however, did not show a significant relationship with turnover intentions, suggesting that millennials prioritize outcome fairness and interpersonal treatment over decision-making processes (Anggiani & Wiyana, 2021). Our study highlights that, while distributive justice is a known predictor of turnover intentions in the general population, millennials in emerging markets like Bangladesh may perceive aspects of justice differently, affecting their behavior uniquely (Muzumdar, 2012; Khalid et al., 2018).

REFERENCES

Abd Manaf, N. H., Mohd, D., & Abdullah, K. (2010). Satisfaction among Gen Y patients. *International Journal of Islamic and Middle Eastern Finance and Management*.

Adams, J. S. (1965). Inequity in social exchange. In L. Berkowitz (Ed.), Advances in experimental social psychology (Vol. 2, pp. 267-299). Academic Press.

Adkins, A. (2016). Millennials: the job-hopping generation. *Gallup Business Journal*, *1*, 26-35. available at: www.nacada.ksu.edu/Resources/Journal.aspx

Ali, N. and Jan, S. (2012), Relationship between organizational justice and organizational commitment and turnover intentions amongst medical representatives of pharmaceuticals companies of Pakistan. *Journal of Managerial Sciences, 6*(2), 201-212.

Ambrose, M. L., & Arnaud, A. (2005). Are procedural justice and distributive justice conceptually distinct? InJ. A. Colquitt & J. Greenberg (Eds.), *Handbook of organizational justice,* 85–112, Mahwah, NJ: Lawrence Erlbaum Associates

Ambrose, M. L., & Schminke, M. (2007). Examining justice climate: Issues of fit, simplicity, and content. In F. Dansereau & F. J. Yammarino (Eds.), *Research in multi level issues*, 6, 397–413. Oxford, England: Elsevier

Anggiani, S., & Wiyana, T. (2021). Linking Organizational Justice to Turnover Intention: Organization-Employee Relationship Quality Mediator. *Proceedings of the 2nd Southeast Asian Academic Forum on Sustainable Development (SEA-AFSID 2018)*.

Avcı, N., & Küçükusta, D. (2009). The analysis of the relationship among organizational learning, organizational commitment and tends to leave in hotels. *Anatolia: J. Tourism Res*, *20*(1), 33-44.

Bangladesh Banking Sector: Number of Employee, (n.d.). Retrieved from https://www.ceicdata.com/en/bangladesh/banking-sector-number-of-employee

Beldona, S., Nusair, K., & Demicco, F. (2009). Online travel purchase behavior of generational cohorts: a longitudinal study. *Journal of Hospitality Marketing & Management*, *18*(4), 406-420.

Bellou, V. (2008). Exploring civic virtue and turnover intention during organizational changes. *Journal of Business Research*, *61*(7), 778-789.

Bies, R. J., & Moag, J. F. (1986). Interactional justice: communication fairness of communication. *Research in negotiations in organizations*, 43-55.

Bothma, C.F. and Roodt, G. (2013), The validation of the turnover intention scale. *SA Journal of Human Resource Management*, *11*(1), 1-12.

Boyas, J., Wind, L. H., & Kang, S. Y. (2012). Exploring the relationship between employment-based social capital, job stress, burnout, and intent to leave among child protection workers: An age-based path analysis model. *Children and Youth Services Review*, *34*(1), 50-62.

Calk, R., & Patrick, A. (2017). Millennials through the looking glass: Workplace motivating factors. *The Journal of Business Inquiry*, *16*(2), 131-139.

Campione, W. A. (2014). The Influence of Supervisor Race, Gender, Age, and Cohort on Millennials' Job Satisfaction. *Journal of Business Diversity*, *14*(1).

Campione, W. A. (2015). Corporate Offerings: Why Aren't Millennials Staying?. *Journal of Applied Business & Economics*, *17*(4).

Carmeli, A., & Weisberg, J. (2006). Exploring turnover intentions among three professional groups of employees. *Human Resource Development International*, *9*(2), 191-206.

Chang, W. J. A., Wang, Y. S., & Huang, T. C. (2013). Work-design related antecedents of turnover intention: A multilevel approach. *Human Resource Management*, 52(1), 1-26.

Cho, J., Yoo, J., & Lim, J. (2019). An Impact Analysis of Information Security Professional's Job Stress and Job Satisfaction to Turnover Intention: Moderation of Organizational Justice. The e-Business Studies.

Choi, S. (2011). Organizational justice and employee work attitudes: The federal case. *The American Review of Public Administration*, *41*(2), 185-204.

Ciftcioglu, A. (2011), Investigating occupational commitment and turnover intention relationship with burnout syndrome, *Business and Economics Research Journal*, 2 (3), 109-119.

Cohen-Charash, Yochi, and Paul E. Spector. 2001. The role of justice in organizations: A meta-analysis. Organizational Behavior and Human Decision Processes, 86, 278–324

Colquitt, J. A., Conlon, D. E., Wesson, M. J., Porter, C. O., & Ng, K. Y. (2001). Justice at the millennium: A meta-analytic review of 25 years of organizational justice research. Journal of Applied Psychology, 86(3), 425-445.

Crenshaw, J.R., Cropanzano, R., Bell, C.M. and Nadisic, T. (2013), Organizational justice: new insights from behavioural ethics, *Human Relations*, 66 (7), 885-904.

Cropanzano, R., & Greenberg, J. (1997). Progress in organizational justice: Tunneling through the maze. In C. Cooper & I. Robertson (Eds.), *International review of industrial and organizational psychology* (pp. 317-372). New York:Wiley.

Cropanzano, R., Bowen, D. E., & Gilliland, S. W. (2007). The management of organizational justice. *Academy of management perspectives*, 21(4), 34-48.

Daileyl, R. C., & Kirk, D. J. (1992). Distributive and procedural justice as antecedents of job dissatisfaction and intent to turnover. *Human relations*, *45*(3), 305-317.

Dalton, D. R., Daily, C. M., Johnson, J. L., & Ellstrand, A. E. (1999). Number of directors and financial performance: A meta-analysis. *Academy of Management Journal*, 42(6), 674-686.

De Hauw, S., & De Vos, A. (2010). Millennials' Career Perspective and Psychological Contract Expectations: Does the Recession Lead to Lowered Expectations?. *Journal Of Business And Psychology*, *25*(2), 293-302.

Deal, J. J., Altman, D. G., & Rogelberg, S. G. (2010). Millennials at work: What we know and what we need to do (if anything). *Journal of Business and Psychology*, *25*(2), 191-199.

DeConinck, J.B. and Johnson, J.T. (2009), The effects of perceived supervisor support, perceived organizational support, and organizational justice on turnover among salespeople, *Journal of Personal Selling and Sales Management*, 29 (4), 333-351.

Deloitte (2011). Talent Edge 2020: Building the recovery together - What talent expects and homanagers are responding. Retrieved from http://www.deloitte.com/assets/Dcom-UnitedStates/Local%20Assets/Documents/IMOs/Talent/us_talent_talentedge2020employee_042811.pdf

DeTienne, K.B., Agle, B.R., Phillips, J.C. and Ingerson, M.C. (2012), The impact of moral stress compared to other stressors on employee fatigue, job satisfaction, and turnover: an empirical investigation, J*ournal of Business Ethics*, 110 (3), 377-391.

DeVaney, S. A. (2015). Understanding the millennial generation. *Journal of Financial Service Professionals*, *69*(6).

Emeji, I. H. (2018). Organizational Justice and Turnover Intention, *Noble International Journal of Social Sciences Research*, 3(12), 97-104.

Epstein, M., & Howes, P. (2008). Recruiting, retaining and managing the millennial generation. Selected readings 2008—Management of a practice [CD ROM]. New York: American Institute of Certified Public Accountants.

Ertas, N. (2015). Turnover intentions and work motivations of millennial employees in federal service. *Public Personnel Management*, *44*(3), 401-423.

Etikan, I., Musa, S. A., & Alkassim, R. S. (2016). *Comparison of convenience sampling and purposive sampling*. American Journal of Theoretical and Applied Statistics, 5(1), 1-4

Farooq, M., & Farooq, O. (2020). Organizational Justice, Employee Turnover, and Trust in the Workplace: A Study in South Asian Telecommunication Companies. Global Business and Organizational Excellence.

Firth, L., Mellor, D., Moore, K. A.,& Loquet, C. (2004). How can managers reduce employee turnover intention?. *Journal of Managerial Psychology*, 19(2), 170–187.

Folger, R., & Cropanzano, R. (1998). *Organizational Justice and Human Resources Management*. Thousand Oaks London: Sage Publications.

Fornell, C., & Larcker, D. F. (1981). Evaluating structural equation models with unobservable variables and measurement error. Journal of marketing research, 18(1), 39-50.

Frian, A., & Mulyani, F. (2018). Millennials employee turnover intention in Indonesia. *Innovative Issues and Approaches in Social Sciences*, *11*(3), 1855-0541.

George, J., & Wallio, S. (2017). Organizational justice and millennial turnover in public accounting. *Employee Relations*, 39(1), 112-126.

George, J., & Wallio, S. (2017). Organizational justice and millennial turnover in public accounting. Employee Relations, 39(1), 112-126.

Greenberg, J. (1987). A taxonomy of organizational justice theories. Academy of Management Review, 12(1), 9-22.

Griffeth, R. W., Hom, P. W.,& Gaertner, S. (2000). A meta-analysis of antecedents and correlates of employee turnover: Update, moderator tests, and research implications for the next millennium. *Journal of Management*, 26(3), 463-488.

Gursoy, D., Chi, C. G. Q., & Karadag, E. (2013). Generational differences in work values and attitudes among frontline and service contact employees. *International Journal of Hospitality Management*, *32*, 40-48.

Gursoy, D., Maier, T. A., & Chi, C. G. (2008). Generational differences: An examination of work values and generational gaps in the hospitality workforce. *International Journal of Hospitality Management*, *27*(3), 448-458.

Hair, J. J. F., Hult, G. T. M., Ringle, C., & Sarstedt, M. (2017). A primer on partial least squares structural equation modeling (PLS-SEM). Sage Publications

Hair, J., Anderson, R., Tatham, R., & Black, W. (2006). Multivariate data analysis 6th edition prentice hall. New Jersey.

Hayes, A., & Coutts, J. J. (2020). *Use Omega Rather than Cronbach's Alpha for Estimating Reliability. But…. Communication Methods and Measures*, 14, 1-24.

Hendrix, W. H., Robbins, T., Miller, J., & Summers, T. P. (1999). Effects of Procedural and Distributive Justice on Factors Predictive of Turnover.

Henseler, J., Ringle, C.M. and Sinkovics, R.R. (2009), "The use of partial least squares path modeling in international marketing", Advances in International Marketing, Vol. 20 No. 1, pp. 277-319

Herda, D.N. (2012), Auditors' relationship with their accounting firm and its effect on burnout,turnover intention, and post-employment citizenship, *Current Issues in Auditing*, 6(2), 13-17.

Herda, D.N. and Lavelle, J.J. (2012), The auditor-audit firm relationship and its effect on burnout and turnover intention, *Accounting Horizons*, 26 (4), 707-723.

Hershatter, A. (2007). Millennials on Millennials (video produced at Emory University).

Hershatter, A., & Epstein, M. (2010). Millennials and the world of work: An organization and management perspective. *Journal of business and psychology*, *25*(2), 211-223.

Hewlett, S. A., Sherbin, L., & Sumberg, K. (2009). How gen Y and boomers will reshape your agenda. Harvard Business Review, *87*(7/8), 71–76.

Hom, P. W., & Griffeth, R. W. (1995). Employee Turnover (South-Western, Cincinnati, OH). *Hulland,.(1999)," use of partial least squares*.

Huda, R. N., Iqbal, R., & Islam, Q. T. (2019). Spending on human resource: Cost or investment?-a developing country perspective. The Business & Management Review, 10(5), 115-115.

Huda, R. N., Iqbal, R., & Islam, Q. T. (2020). Effect of human resource investment on the financial performance of publicly listed banks in bangladesh. *North South Business Review*, 40. doi: 10.47126/J.NSBR.1991-4938

Huda, R. N., Islam, Q. T., & Iqbal, R. (2024). The effect of organisational justice across firm HR practices on employee job satisfaction and firm performance. International Journal of Work Organisation and Emotion, 15(1), 23-43.

Hui, C., Wong, A., & Tjosvold, D. (2007). Turnover intention and performance in China: The role of positive affectivity, Chinese values, perceived organizational support and constructive controversy. *Journal of Occupational and Organizational Psychology*, *80*(4), 735-751.

Issa, A. M. F., Ahmad & Gelaidan, H. M. (2013). Job Satisfaction and Turnover Intention based on salesperson standpoint.

Ivanović, T., & Ivančević, S. (2019). Turnover Intentions and Job Hopping among Millennials in Serbia. *Management: Journal of Sustainable Business & Management Solutions in Emerging Economies*, *24*(1).

Johnson, J. A., & Lopes, J. (2008). The intergenerational workforce, revisited. *Organization Development Journal*, *26*(1), 30.

Khalid, S., Rehman, C. A., & Muqadas, F. (2018). Exploring the mediating role of affective commitment on organizational justice and turnover intention. *Pakistan Business Review*, 19, 1012-1028.

Kowske, B., Rasch, R.,&Wiley, J. (2013). Millennials' lack of attitude problem: An empirical examination of generational effects on work attitudes. *Journal of Business Psychology*, 25(2), 265-279.

Kwon, K., & Rupp, D. E. (2013). High-performer turnover and firm performance: The moderating role of human capital investment and firm reputation. *Journal of Organizational Behavior, 34*(1), 129-150.

Lancaster, L., & Stillman, D. (2002). *When Generations Collide at Work: Managing Traditionalists, Baby Boomers, Generation Xers, and Millennials*. HarperCollins.

Lewis, L. F., & Wescott, H. D. (2017). Multigenerational workforce: Four generations united in lean. *Journal of Business Studies Quarterly*, *8*(3), 1.

LightCastle Partners. (2016, March 6). *Millennials: The group market leaders need to focus on*. https://lightcastlepartners.com/insights/2016/03/millennials-the-group-market-leaders-need-to-focus-on/

Lind, E.A., & Tyler, T.R. (1988). *The social psychology of procedural justice*. New York: Plenum.

Lyons, S., & Kuron, L. (2014). Generational differences in the workplace: A review of the evidence and directions for future research. *Journal of Organizational Behavior*, *35*(S1), S139-S157.

Martin, C. A. (2005). From high maintenance to high productivity. *Industrial and commercial training*.

McCrae, R. R., Costa, P. T., de Lima, M. P., Simões, A., Ostendorf, F., Angleitner, A., ... & Chae, J. H. (1999). Age differences in personality across the adult life span: parallels in five cultures. *Developmental psychology*, *35*(2), 466.

Meier, J., & Crocker, M. (2010). Generation Y in the workforce: Managerial challenges. The Journal of Human Resource and Adult Learning, 6(1), 68.

Meisler, G. (2013). Empirical exploration of the relationship between emotional intelligence, perceived organizational justice and turnover intentions. *Employee relations*.

Montag, T., Campo, J., Weissman, J., Walmsley, A. and Snell, A. (2012), In their own words: Best practices for advising Millennial students about majors, *NACADA Journal*, *32*(2).

Murray, S. (2009). The curse and class of 2009. The Wall Street Journal.

Muzumdar, P. (2012), "Influence of interactional justice on the turnover behavioral decision in an organization", *Journal of Behavioral Studies in Busines*s, Vol. 5, pp. 31-41, available at: http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2180697 (accessed August 6, 2014).

Nadiri, H., & Tanova, C. (2010). An investigation of the role of justice in turnover intentions, job satisfaction, and organizational citizenship behavior in hospitality industry. *International journal of hospitality management*, *29*(1), 33-41.

Naim, M. F., & Lenka, U. (2017). Linking knowledge sharing, competency development, and affective commitment: Evidence from Indian Gen Y employees. *Journal of Knowledge Management*.

Ng, E. S., Schweitzer, L., & Lyons, S. T. (2010). New generation, great expectations: A field study of the millennial generation. *Journal of business and psychology*, *25*(2), 281-292.

Nurhayati, M., Haningsih, L. & Awaliyah, S. (2020). Job Satisfaction and Turnover Intention: Moderation of Organizational Trust and Organizational Justice. KINERJA, 24(2), 126-139.

O'brien, R.M. (2007), "A caution regarding rules of thumb for variance inflation factors", Quality and Quantity, Vol. 41 No. 5, pp. 673-690.

Özkan, A. (2022). Organizational justice perceptions and turnover intention: A meta-analytic review. *Kybernetes*, 52 (8), 2886-2899.

Park, J. and Min, H. (2020), "Turnover intention in the hospitality industry: a meta-analysis", International Journal of Hospitality Management, 90, 102599.

Parker, R. J., & Kohlmeyer III, J. M. (2005). Organizational justice and turnover in public accounting firms: A research note. *Accounting, Organizations and Society*, *30*(4), 357-369.

Parker, R.J., Nouri, H. and Hayes, A.F. (2011), "Distributive justice, promotion instrumentality, and turnover intentions in public accounting firms", Behavioral Research in Accounting, *23*(2), 169-186.

Ponnu, C. H., & Chuah, C. C. (2010). Organizational commitment, organizational justice and employee turnover in Malaysia. *African Journal of Business Management*, *4*(13), 2676-2692.

Reed, S.A., Kratchman, S.H. and Strawser, R.H. (1994), Job satisfaction, organizational commitment, and turnover intentions of United States accountants: the impact of locus of control and gender, *Accounting, Auditing and Accountability Journal*, *7*(1), pp. 31-58.

Ringle, C. M., Wende, S., & Becker, J. M. (2015). SmartPLS 3. Boenningstedt. SmartPLS GmbH.

Rusbadrol, N., Panatik, S. A., Sarip, A., & Fakhruddin, F. M. (2021). Effects of Organizational Justice and Organizational Citizenship Behavior on Employee Turnover Intention. *International Journal of Academic Research in Business and Social Sciences*.

Sahin, M. (2021), "A meta-analysis of the relationship between perceived organizational justice and turnover intetnion", Journal of Social and Humanities Sciences Research, 8 (74), 2386-2395.

Salahuddin, M. M. (2010). Generational differences impact on leadership style and organizational success. *Journal of Diversity Management (JDM), 5*(2).

Saraswati, K. D., & Lie, D. (2021). Work Engagement and Turnover Intention: The Moderating Effect of Organizational Justice. *Proceedings of the International Conference on Economics, Business, Social, and Humanities (ICEBSH 2021).*

Shevlin, M., Miles, J., Davies, M., & Walker, S. (2000). *Coefficient alpha: A valuable indicator of reliability? Personality and Individual Differences*, 28, 229-237.

Smith, J. W., & Clurman, A. (1997). *Rocking the ages: The Yankelovich report on generational marketing*. HarperBusiness.

Smola, K. W., & Sutton, C. D. (2002). Generational differences: Revisiting generational work values for the new millennium. *Journal of Organizational Behavior*, 23, 363–382.

Sujansky, J., & Ferri-Reed, J. (2009). *Keeping the Millennials*. Hoboken, NJ: Wiley and Sons.

Taber, K. (2018). *The Use of Cronbach's Alpha When Developing and Reporting Research Instruments in Science Education*. *Research in Science Education*, 48, 1273-1296.

Tallman, R., & Mason, J. (2012). Generation X and Y work values in public accounting. *International Journal of Strategic Management*, *12*(1), 134-139.

Tett, R. P. & Meyer, J. P., (1993). Job Satisfaction, Organisational Commitment, turnover intention and turnover: Path analyses based on meta-analytical findings. *Personnel Psychology,* 46(2), 259-293.

Thibaut, J. W., & Walker, L. (1975). Procedural justice: A psychological analysis. Erlbaum.

Twenge, J. M. (2010). A review of the empirical evidence on generational differences in work attitudes. *Journal of Business Psychology*, 25(2),201-210.

Twenge, J. M., & Campbell, W. K. (2010). Birth cohort differences in the monitoring the future dataset and elsewhere: Further evidence for Generation Me—Commentary on Trzesniewski & Donnellan (2010). *Perspectives on Psychological Science, 5*(1), 81-88.

Twenge, J. M., Campbell, W. K., & Freeman, E. C. (2012). Generational differences in young adults' life goals, concern for others, and civic orientation, 1966–2009. *Journal of personality and social psychology*, *102*(5), 1045.

Vaamonde, J., Omar, A., & Salessi, S. (2018). From Organizational Justice Perceptions to Turnover Intentions: The Mediating Effects of Burnout and Job Satisfaction. *Europe's Journal of Psychology*, 14(3), 554-570.

Wang, X., Liao, J., Xia, D., & Chang, T. (2010). The impact of organizational justice on work performance. *International Journal of manpower*.

Younas, M., Saeed, I., Qadir, G., & Khan, S. U. (2021). Effect of Organizational Justice on Turnover Intention: Mediating Role of Employee Motivation. Journal of Business & Tourism.

Yücel, İ. (2012), Examining the relationships among job satisfaction, organizational commitment, and turnover intention: an empirical study, *International Journal of Business and Management*,Vol. 7 (20), 44-58.

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